

## Assessment of Community Resilience and Environmental Casualties in a Flood Prone Terrain of Uyo Urban, Akwa Ibom State, Nigeria.

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### **Abstract**

*Flood remains a very serious environmental problem in Uyo Urban, Akwa Ibom State. Recurrent flood events in the city of Uyo the State Capital of Akwa Ibom State have been traced to inadequate drainage channels. Many properties have been destroyed, lives lost and thus subjecting the people to unquantifiable trauma. More so, the menace of flood has been on the increase as a result of incipient and prolonged weather conditions. The study assessed community resilience on matters of recurrent flood disaster in Uyo Urban, Akwa Ibom State, Nigeria. This study aims at assessing community adaptation and coping strategies to this salient environmental monster. Reconnaissance survey on four demarcated zones enables identification of active flood sites for effective data collection in the study area. 97 copies of structured questionnaires were administered to each of the four zones making a total of 388 in order to assess community resilience and adaptation strategies. The study revealed that flood occurs every year and the people have adapted through various strategies ranging from scooping, channelization of drains, clearing of gutters, water retention pit, raising of household materials, relocation to safer zones, timely evacuation of drains and fencing. In most parts of the season, the flood intensity fluctuates from a very high to fairly high intensity. Chi-square manipulation revealed that there is significant community resilience on matters of recurrent flood disaster in Uyo Urban, Akwa Ibom State as accentuated by adaptation and coping strategies identified. The study recommended among others that the government should promote community awareness and participation in flood prone area and also put in place a people-driven community flood management initiatives in Uyo Urban to mitigate to the barest minimum environmental casualties.*

**Keyword: Community Resilience, Environmental Casualties, Flood-Prone Terrain**

### **Introduction**

Urban flooding is a recurrent environmental scenario in both developed and developing countries. Environmental stress emanating from urban flooding is a manifestation of annual flood scenario globally. Excessive overflow of water in a place that is normally dry is an urgent environmental issue with dire consequences. In Nigeria as a whole, there is no state that is exempted from urban flooding (Efobi and Anierobi, 2013; Ugonna, 2016). The intensity of this scenario differs based on extreme weather event, anthropogenic structures and geomorphic parameters (Abraham, Wilcox and Ebong 2018). Community over the years have made concerted effort to adapt to this scenario but they are limited in terms of awareness and resources at their disposal. Building in a flood prone area where land is cheap is accentuated by poverty and residents in such flood prone environment find it difficult to relocate to safer environment due to limited financial resources and the fear of losing their ancestral heritage.

Building community resilience against disaster occurrences is one of the most difficult undertakings among policy makers and institutions in developing countries most especially Sub-Saharan Africa of which Nigeria is inclusive (Clark, 2007., Clark and Dickson, 2003). Community adaptation to flood menace varies over time and space and the degree of adaptation correspondingly influences community perception of flood outbreak (Carl, 2006, 2012). Some vulnerable groups in local community are sometime reluctant to vacate the flooded areas even where there is support on resettlement. This is primarily traceable to the fear of losing their loved ones, the long-established relationship at community level, ancestral homes and their most cherished home

gardens. Flood occurrence poses a great risk to not only the physical structure but the valuable social assets, and emotional scar left behind threatens community development and harmonious co-existence. Flood prone areas in the Niger Delta such as Bayelsa State, Rivers State, Delta State, Akwa Ibom State and Ondo State are facing severe issues of community disassociation which result to a recurrent increase in the number of flood refugees (Odubo and Raimi, 2019). People with quality houses are now left stranded in the Niger Delta whenever flood begins. It is pathetic since there is no strong institutional intervention on resettlement plan for flood casualties apart from relief materials which act as a "first aid treatment". The Niger Delta Region needs more than "first aid and palliatives treatment" on flood matters since the region is surrounded by water and the level of flood risk is so severe (Audu, 2017). The region has experienced heavy flood menace all year round because of her topography and as a result, policy makers ought to redefine workable resettlement plan for flood-prone terrain and casualties vis-a-vis victims.

In Uyo Urban, Akwa Ibom State, communities have re-designed varying adaptation options so as to survive in an environment where resettlement plan is not recognised or forth coming. Some have chosen to raise their household items above the floor, use special shoes that could not be damaged by flood, raise their bed above the floor, drink hot tea and alcoholic substance, flood-supported farming, water retention pit to reduce the volume of the water and many others (Idongesit, 2018; Idorenyin, 2019). All these have been an attempt to derive some level of comfort from adverse situations and survive until the flood ends. The casualties have not forgotten their sad experiences as well as their losses since it is more tragic. As a result this study seek to challenge the conventional ideology as to how many people must die and the worth of assets before interventions are made to re-integrate the casualties to the society that they dream to belong.

### **The Problem**

Urban flooding has been a serious issue globally and has influenced ecosystem stability, destroyed properties, increased mortality of man and animal, and has a high magnitude of economic loss. Flood has also caused land degradation, landslide and declining food production. Uyo, the capital city of Akwa Ibom State has overtime been faced with the problem of flooding whenever it rains. This problem has remained throughout the regime of successive governments, who in their efforts had tried to find lasting solution to the menace.

Nevertheless, the effects of incessant flooding in Uyo urban during the rainy season remain devastating, and many residents who have fallen victim of this natural disaster are still counting their losses. Lives have been lost, houses swept away by the flood, while others have had their important documents submerged in water among others. Previous administrations had attempted to tackle flood in the state through building of underground drainages and pipe jacking drainage system in a bid to curtail flood erosion menace. In spite of this, the success of such intervention programmes is questionable compared to the huge capital investment in flood control (Green, Parker and Tunstall, 2000). Many roads and streets built in Uyo such as Udo Udoma, IBB, Nkemba, Faith Tabernacle, Urua Ekpa and others were constructed with either poor drainages or none at all and through this water collection and channelization became impossible and thereafter water discharge drifts into a low point and settles, build up flood and disseminate to everywhere else. Over 20 buildings have been abandoned along Urua Ekpa road, 15 buildings in Nkemba Street, 12 buildings in Tabernacle Road and many other places in the adjoining areas and even at that, flood victims have been resettled. All these are scenarios that attest to the fact that intervention on settlement does not exist even when flood casualties are steadily increasing and residential buildings are being flooded year-in year-out in the study area identified. Therefore, the study aims at examining the various community resilience strategies and adaptation options in identified flood sites, vulnerable flood casualties in Uyo Urban, assess the consequences of flooding and existing institutional interventions in flood control in the study area

### **Literature Review**

Community resilience research is very paramount in the management of environmental hazard like urban

flood. The central theme that unites the various perspectives on resilience is that of response and recovery from shocks (Barrett and Conostas, 2014). Currently, there is vast literature on urban flood in developing countries including Nigeria. This literature is mostly on the negative effect of flood, spatial distribution of flood, flood mapping, livelihood effect of flood and many others. However, the issue of urban flood control in the aspect of community resilience and coping strategies has not received adequate attention. Community resilience entails the ability of a community preferably a flood prone environment to bounce back, recover from the negative circumstance and return to its original condition. In other words, it is the capacity of flood casualties and the entire flood devastated environment to spring up from shock and buffer the disturbance during and after flood incidence (Asian Development Bank, 2013). It is a common scenario in Uyo Urban and Niger Delta Region for individuals and community to be ravaged without any hope of recovery after a flood occurrence. Similarly, people living in vulnerable areas over a period of time consciously or unconsciously develop adaptation strategies so as to survive in such unpleasant situation until resources are available for resettlement (Adams, 2006., David, 2008).

Individuals are vulnerable to flood at various scales and seasons in such a way that places with no indication of flood can become flooded in the future as a result of natural or anthropogenic disturbance. People who spent good sums of money to secure a comfortable location can wake up and see their properties washed away by flood. Farmers who had good yield can lose their farmland, and business places can shut down following flood occurrence. As noted earlier, flood does not respect social class, it affects the rich and the poor, although the poor seem to be more vulnerable (Asadzadeh, Kotter, Salehi and Birkmann, 2017). Braun, Boris and Tibor (2011) observed that some groups are more vulnerable to floods than others. In most cases, women and children are more vulnerable to urban flood than men (owing to conventional gender responsibilities and relations). Flood victims have valuable knowledge and experience in coping with such disasters. Yet their strengths and capabilities are often ignored in policy making.

World Bank (2015) argues that due to high poverty levels, people have become more vulnerable because they live in hazardous areas including flood plains and steep hills. They have fewer resources which make them more susceptible to disasters and their ability to take urgent decisions is too minimal. A study conducted by Bruan, Boris and Tibor (2011) portrays how vulnerable communities in Dhaka/Bangladesh develop workable coping strategies to manage flood disaster.

A recent study conducted by Odubo and Raimi (2019) on Settlement and Readjustment Patterns of Rural Dwellers during and after flood disasters in Bayelsa State, Nigeria indicates that flood victims are more in shock and confusion during and immediately after flood disasters as well as worsened situation in terms of resettlement and re-adjustment patterns. Out of the eight (8) local government areas in Bayelsa state, seven (7) were adversely affected. Public and private properties worth billions of naira were submerged and destroyed and thus the living conditions of some of the victims remain deplorable. Another study conducted by Olanrewaju (2016) on flood and flood management in Uyo Urban, Akwa Ibom State revealed that a larger part of Uyo Urban has been ravaged by incidence of flood. In his study, he noted that urban flood is mostly caused by anthropogenic activities in addition to climate variability which is more alarming over the years. Systematic random sampling was used for the study of which four (4) flood zones were used. His findings revealed that flood exists every year and causes untold destruction, but the challenges involved in restoring the emotional, social, economic status of the victim in the study area are clearly identified.

### **Consequences of Flooding**

Flood is considered as overflow of water into an environment that is normally dry, causing inundation and harm to plants and animals, including man (Efe, 2011). Its harm can be extended to residential buildings and other infrastructures (Udosen, 2011). Globally, flood is known to cause great damage to people's lives, belongings and properties. Flood causes one third of deaths, one third of all damage from natural disasters

(Abraham, 2018). This damage is normally felt by various individuals, buildings, infrastructure, agriculture and open recreational spaces. There are social, economic and emotional costs of flooding (Odubo and Raimi, 2019). The consequences of flooding are but not limited to resettlement, loss of personal valuables, fear and insecurity caused by such experience. According to Idorenyin (2018), urban economy can be ruined by flooding as businesses lose patronage, productivity dwindles and can lead to workers' retrenchment. Moreover, utilities and transport infrastructure can be rendered inefficient by flood. Portable water supplies may be contaminated in a flood which can pose serious health challenge on human beings and animals.

Ibrahim (2019) put up a comprehensive timeline of flooding in Nigeria in his studies on "Evaluation of Urban Flood Scenario in Uyo Urban, Nigeria: Management Perspective" He noted that flood hit many communities in Ibadan in 1980 and rendered over 50,000 people homeless together with properties worth millions of Naira. Between 1988-1997 over 40,000 people were rendered homeless in Kano and another 2,000 people in Dekina, Kogi State were also affected. In Lafia, one thousand (1000) persons lost their ancestral homes, while over 10,000 people were rendered homeless in the flood that ravaged Pategi, Kpada and Gbogdondogi region, Kwara State. The coastal cities of Lagos, Port Harcourt, Calabar, Uyo, Warri, Yenagoa and Asaba are major hot spot for recurrent flood scenario (Odubo and Raimi, 2019). Bayelsa State has witnessed successive flood occurrences between 2012 and 2018, out of the eight (8) Local government areas in Bayelsa state, seven (7) were heavily inundated by flood and some studies revealed that public and private properties, infrastructure and facilities worth billions of naira were fully or partly submerged and destroyed. Although government intervened by providing relief materials to flood victims, but their livelihood status seemed to be utterly deteriorating. According to the National Emergency Management Authority (NEMA), report of September 2018, over thirteen thousand houses were partially or completely destroyed by flood in the twelve affected states in Nigeria (NEMA, 2018).

In Port Harcourt, flooding has constituted one of the most severe environmental hazards. In the metropolis and its environs, the flood incidence of 2006, 2007, 2010 and 2012 are very fresh in the memories of most residents. For instance, from July-September 2012, most houses, workshops and commercial shops in Rivers State (including Bonny Island, Afam Street, Choba, Aba Road, Ikwere Road etc) were submerged under one meter inundation (Elenwo and Efe, 2014). It is widely believed that the entire coastal parts of Nigeria is susceptible to flooding and it is high time that efforts should be made to build resilience, take responsibility and contain the effect of the unavoidable disaster.

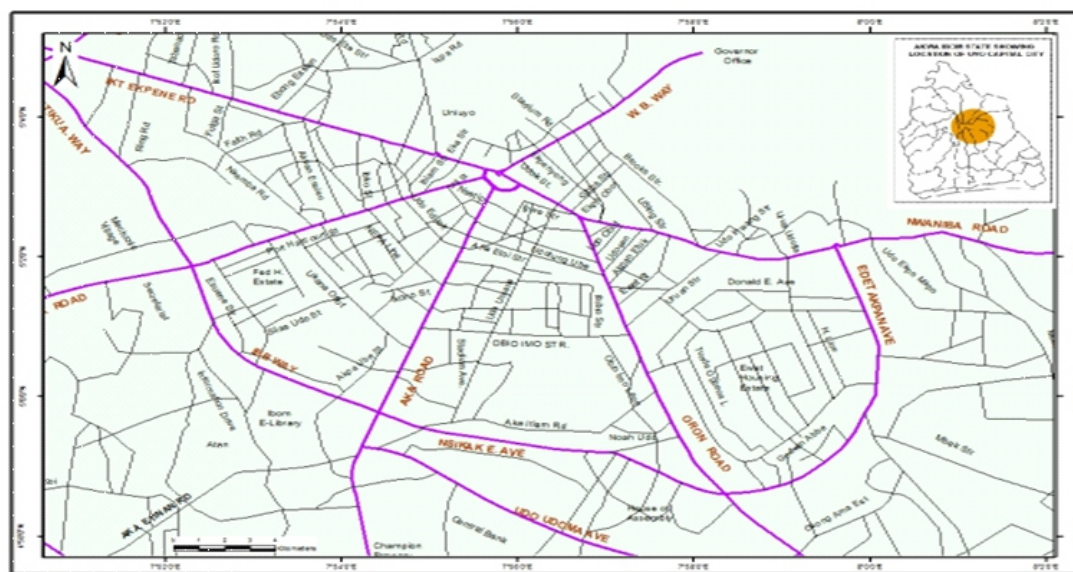
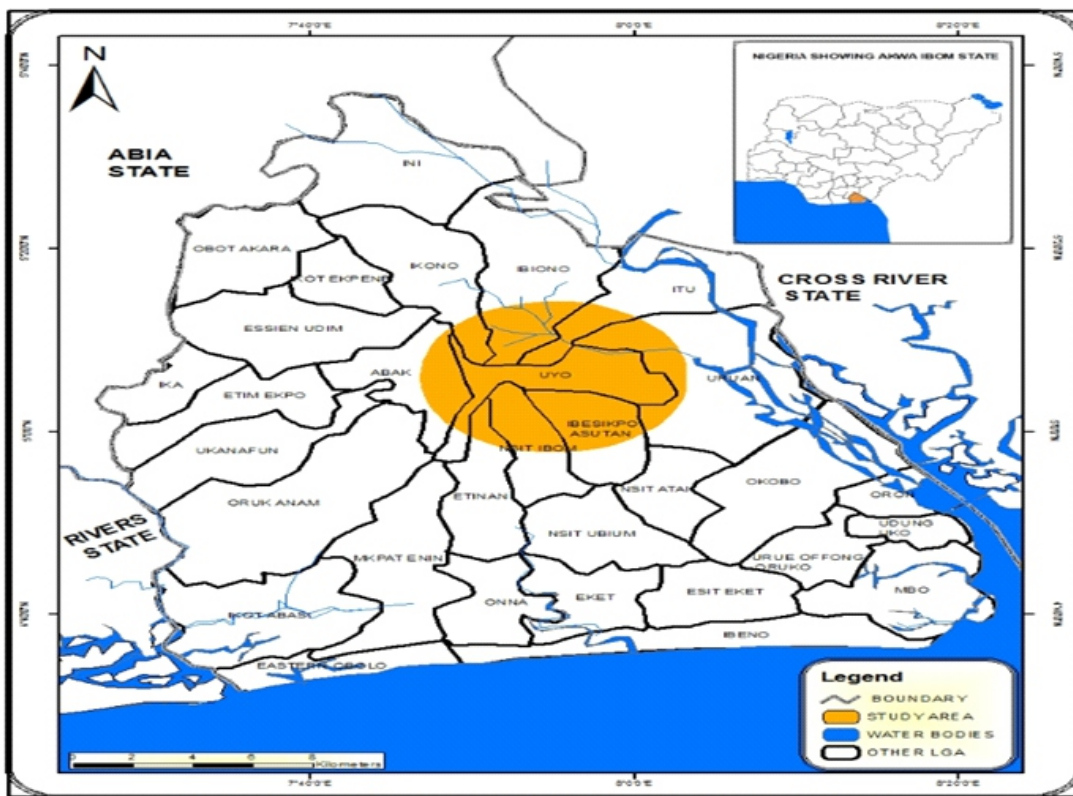
The conceptual underpinning is centred on sustainable city development which is a current paradigm in contemporary research. Sustainable cities depend on well-functioning economy and ecological resilience capacity. Urgent action is needed to address urban environmental challenges (Ade, 2018). The quality of the urban space is vital to sustainable livelihood and it is important to understand the correlation between sustainable development and flood occurrence especially in an expanding city like Uyo. The concept of sustainable city development was initiated to help cities cope with increasing environmental challenges. Sustainability as a global concept was coined in 1972 at the United Nations Conference on the Human Environment in Stockholm. If sustainable development entails meeting the immediate needs without mortgaging posterity's ability to supply their own need, therefore sustainable city development is a sine qua non. As long as a city is built on a physical environment, there is no escape route from environmental disaster and these factors would threaten not only economic development, but also socio-cultural and aesthetic values. In addition, as the population of cities becomes more urbanized and cities grow, urban planning becomes more critical (Ade, 2018). In Dubai, New York and other developed cities, urban master plans are effectively implemented and this has been one of the drivers of sustainable city development of these cities and attract tourist and investors. Unlike places in the developing economy, urban master plan is only design but not implemented.

In order to achieve sustainable development in urban centres, cities need to develop socio-cultural, ecological and economic structures that are highly resilient to external stress. (Ibrahim, 2019). However, urban areas are complex and are constantly changing. Many cities in developing countries have older forms of planning, and are surrounded by large informal settlements or slums (UNEP, 2018). This is the case in Uyo where most of the residential buildings have no plan and new streets are opened with inadequate drains to contend with the volume of storm waters. The extent of built-up area with paved surfaces is expanded as urbanisation intensifies (Charles and Paton, 2006., UN/ISDR,2004). Sustainable city development also ensures that urban drainage systems are given considerable attention. The planning system should take cognizance of possible impacts of climate change such as greater rainfall regime. Such issues should awaken planners to take good decisions on the locations of new development areas and other changes in land use (Adebayo, 2013). According to Abraham et al (2018) effective urban land use control and management particularly in areas with rapid urban sprawl is crucial to tackling growing land use problems such as slum formation, rising costs of land, accessibility to urban land for housing, incompatible use, storm water, overcrowding and congestion among others.

The concept endorses the combination of policy, regulatory, financial and ecological measures. These are the pillars of Sustainable city development. It also requires adequate planning and control to ensure harmonious development, functional land uses and settlements. To achieve this fundamental aim, layouts of various land uses such as residential, commercial, industrial, open spaces and recreation, as well as adequate drainages are undertaken to standardize and control physical developments and ensure harmonious growth.

### **Materials and Methods**

The study area is Uyo Urban in Akwa Ibom State. Uyo Urban harbours the capital city of Akwa Ibom State, Nigeria. The major roads radiate centrally from Ibom Connection and Ibom Peace Column. The study spans through four (4) roads arteries: Ikot Ekpene Road, Oron Road, Abak Road and Aka Road. The influx of population since the creation of the State on September 23rd 1987 is enormous and the government efforts in road channelization and flood control structures cannot cope with flood recurrent scenarios. Urban flooding in Uyo began as soon as urbanisation set in with a larger influx of people from within and outside the State. Many new roads were opened without a strict observance of drainage maintenance. Flood has affected more than 20 major streets in Uyo according to recent studies (Abraham, 2018). Although several government regimes have made attempts to mitigate flood menace in the study area, their efforts have yielded little result. This is as a result of poor environmental management most especially indiscriminate waste disposal by urban dwellers. People often channel their latrine, domestic liquid and solid waste into drains and this causes the sudden siltation of drainage. Moreover, in some places in Effiong Eno Street, Nkemba, Iboko Street and many others, there are issues of shallow depth and width of gutters which make it more difficult to accommodate the torrential storm water and when this occurs, surface runoff spills over everywhere in the environment and destroys a great number of persons and property. On the other hand, the former urban plan that was designed some years ago failed to address urban flooding city given that majority of the drainage facilities constructed between 1999-2007 were too inferior, faulty and undeveloped to curb the flood menace. It was not until 2010 that some efforts were made to rehabilitate old drains and fix modern day drainage such as the underground pipe jacking system. In spite of these, most of the old drains which need to be broken down and rebuilt have been abandoned and this has been one of the reasons for frequent flood in the affected areas. Similarly, the issue of concrete flooring, unnecessary fencing of buildings as well as building of houses along water channels also influence the sporadic occurrence of flooding in Uyo.



*Map of Uyo Urban showing flood Sites*

**Objectives of the Discourse**

The main intention of the discourse was first of all to espouse the theoretical linkages between Government as institutions, governance as processes, and accountability as outputs which amount to value addition to the citizens as impact.

**Methods**

Reconnaissance survey on four demarcated zones enables identification of twenty (20) active flood sites for effective data collection in the study area. 97 copies of structured questionnaires were administered to each of the four zones making a total of 388 in order to assess community resilience and adaptation strategies in Ikot Ekpene Road, Oron Road, Abak Road and Aka Road and the adjoining arteries. Five flood sites were selected from four demarcated zones making a total of twenty (20) flood sites. The study area was further mapped using GIS Software to identify area of active flooding.

**Results**

The study revealed that flood occurs every year and the people have adapted through various strategies ranging from scooping, channelization of drains, clearing of gutters, water retention pit, raising of household materials, relocation to safer zones, timely evacuation of drains and fencing. In most parts of the season, the flood intensity fluctuates from a very high to fairly high intensity. Chi-square manipulation revealed that there is significant community resilience on matters of recurrent flood disaster in Uyo Urban, Akwa Ibom State as accentuated by adaptation and coping strategies identified.

**Table 1: Flood Sites and their Coordinates**

Flood Sites	Latitude	Longitude
<b>Zone A- Ikot Ekpene Road and Environs</b>		
Urua Ekpa	5 <sup>0</sup> 11'43"N	7 <sup>0</sup> 58'37"E
Faith Tabernacle	5 <sup>0</sup> 10'0"N	7 <sup>0</sup> 59'0"E
Ikpa Road	5 <sup>0</sup> 12'22"N	7 <sup>0</sup> 58'08"E
Udo ette	5 <sup>0</sup> 11'17"N	7 <sup>0</sup> 57'20"E
Afaha Ube	5 <sup>0</sup> 13'03"N	7 <sup>0</sup> 58'12"E
<b>Zone B – Aka Road and environs</b>		
Aka Etinan	5 <sup>0</sup> 11'43"N	7 <sup>0</sup> 58'37"E
Atan Road	5 <sup>0</sup> 14'18"N	7 <sup>0</sup> 59'00"E
IBB Road	5 <sup>0</sup> 13'20"N	7 <sup>0</sup> 52'67"E
Aka Itiam	5 <sup>0</sup> 11'13"N	7 <sup>0</sup> 51'37"E
Afaha Ikot Obio Nkan	5 <sup>0</sup> 10'09"N	7 <sup>0</sup> 57'00"E
<b>Zone C – Abak Road and environs</b>		
Ukana Offot	5 <sup>0</sup> 09'43"N	7 <sup>0</sup> 50'07"E
Udotung Street	5 <sup>0</sup> 11'25"N	7 <sup>0</sup> 51'19"E
Effiong Eno Street	5 <sup>0</sup> 09'43"N	7 <sup>0</sup> 50'07"E
Nkemba	5 <sup>0</sup> 10'49"N	7 <sup>0</sup> 51'22"E
Iyah Street	5 <sup>0</sup> 09'52"N	7 <sup>0</sup> 53'40"E
<b>Zone D – Oron Road and environs</b>		
Nwaniba	5 <sup>0</sup> 12'00"N	7 <sup>0</sup> 51'33"E
Etim Okon Usanga Road	5 <sup>0</sup> 16'86"N	7 <sup>0</sup> 53'59"E
Mission Road	5 <sup>0</sup> 12'00"N	7 <sup>0</sup> 51'33"E
Anua Market	5 <sup>0</sup> 18'35"N	7 <sup>0</sup> 55'78"E
Nsukara by Lucky Filling Station	5 <sup>0</sup> 15'00"N	7 <sup>0</sup> 52'41"E

Source, Fieldwork, 2020

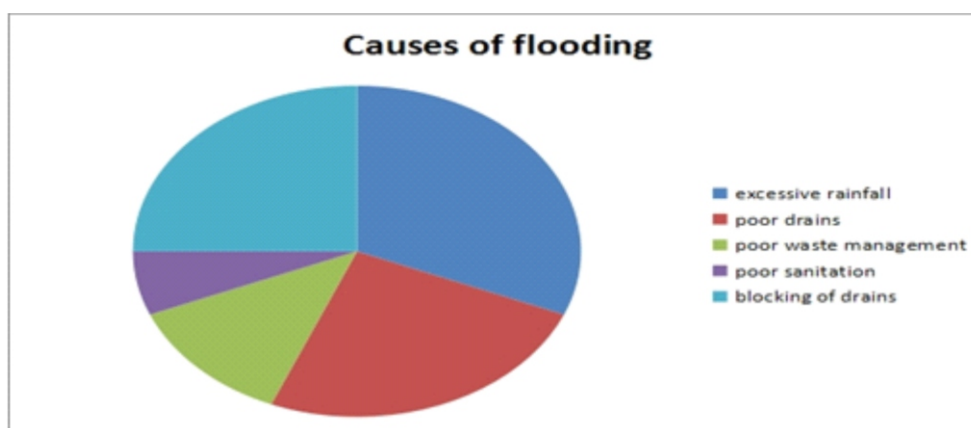


Figure 1 Causes of Flooding

From figure 1, excessive rainfall (31.25%) accounted for the causes of flooding, 27% on poor drains, 12.5% on poor waste management, 6.25% on poor sanitation as well as 23% on blocking of drains

**Table 2: Impacts of Flooding on Residents**

Impacts	Frequency	Percentage (%)
Destruction of lives and property	89	22.94
Erode social asset	24	6.2
Littering of waste on street	80	20.6
Truncate economic activities	28	7.2
Hinders economic development	76	19.6
Destroy biodiversity	51	31.1
Depreciation of real estate	40	10.3
Total	388	100

Source: Fieldwork, 2020

The table on impact of flooding on residents shows that destruction of lives and property accounted for 22.9%, 24 respondents (6.2%) on erosion of social asset, 20.6% on littering of waste on street, 7.2% on truncate economic activities, 19.6% on slow economic development, 31.1% on destruction of biodiversity and 10.3% on depreciation of real estate (see plates 1-5).

**Table 3: Frequently used Community Adaptation and Strategies adopted**

Frequently used strategies	Frequency	Percentage (%)
Scooping with bucket	73	18.8
Raising of household item	60	15.5
Raised pavement and fencing	80	20.6
Flood retention pit	45	11.6
Channelization	39	10.1
Planting of grasses/trees	21	5.4
Gutter	40	10.3
Frequent evacuation of waste from drain	30	7.7

Source: Fieldwork, 2020

From table 3, 18.8% of respondents agreed on scooping of water with bucket during flood as a frequently community adaptation strategy, 15.5% on raising of household items, 20.6% on raised pavement and fencing, 11.6% on flood retention pit, 10.1% on channelization, 5.4% on planting of grasses/trees, 10.3% on opening of gutter while 7.7% agreed on frequent evacuation of waste from drains.

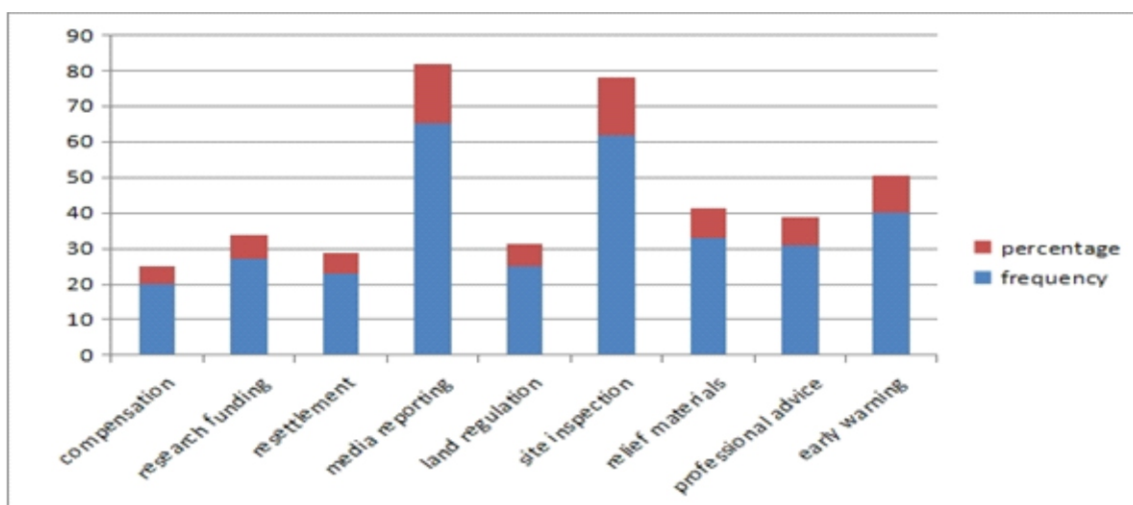
**Table 4: Community Capacity to Recover from Flood induced Shock**

Options	Frequency	Percentage (%)
Seek help from NGOs	40	10.3
Seek help from religious organisation	75	19.3
Seek help from government agencies	120	30.9
Seek help from love ones	68	15
Determination to live with the flood	17	4.4
Relocate to friend's apartment	40	12.9
Abandonment/outright sale of the property	28	7.2
Total	388	100

Source: Fieldwork, 2020



Table 4 shows that 10.3% of respondents agreed that flood victims often seek help from NGOs, 19.3% seek help from religious organisation, 30.9% seek help from government agencies, 15% seek help from loved ones, 4.4% summed up courage to live with the flood, 12.9% relocated to friend's apartment and 7.2% on abandonment/outright sale of property.



Source, Fieldwork, 2020

**Figure 2: Institutional Intervention on Flood Issues**

Figure 2 shows that 5.2% of respondents agreed on compensation of victims as a vital institutional intervention initiative in flood control, 7% on funding of researches, 5.9% on resettlement of victims, 16.8% on media reporting, 6.4% on land regulation, 16% on site inspection, 8.5% on provision of relief materials, 8% on professional advice while 10.4% agreed on early warning

**Table 5: Result of Statistical Computation using SPSS Package**

	Value	Df	Assymp. Sig. (2-sided)
Pearson chi-square	587.432 <sup>a</sup>	30	.000
Likelihood ratio	569.127	30	.000
Linear by linear association	11.626	1	.001
N of valid cases	2716		

**Discussion of Findings**

The study identified 20 flood sites in 4 demarcated zones in Uyo Urban (Table 1). Causative factors include heavy rainfall and dumping in gutters, poor sanitation and poor drains (Figure 1). Moreover, it has been revealed that the impacts caused by flooding and related hazardous scenarios include destruction of lives and property, erosion of social asset, littering of waste on streets, truncating of economic activities, hindering of economic development, destruction of biodiversity and depreciation of real estate (Table 2). The study also revealed that community adaptation strategies in the identified area include scooping with bucket, raising of household items, raised pavement and fencing, flood retention pit, channelization, planting of grasses/trees, gutter and frequent evacuation of waste of drain (Table 3). The study also made useful findings on how flood prone community respond to flood induced shock by seeking to understand how members of the communities recover from the negative stress either individually or collectively. The study noted that a greater number of respondents who happened to have been affected by flood sought for some form of palliative from government agencies (30.9%), followed by religious organisations (19.3%). Besides, many others derived some form of support from NGOs, loved ones as well as outright sale of the affected property (Table 4). Hence, this corroborates the findings from Idorenyin (2019), that flood casualties are desperately in need for

support and seek assistance from anywhere possible most especially their immediate friends and loved ones.

From the study, findings revealed that institutional interventions on flood issues include compensation of victims, funding of researches in flood control, resettlement of victims, building of flood control structures, media reporting, site inspection, provision of relief materials, professional advice and early warning (Figure 5). The study also noted that less interest is given towards economic recovery of flood victims. However, compensation accounted for 5.2%, resettlement of victims (5.9%) whereas, media reporting accounted for the highest with 16.8%, followed with site inspection (16%). This agrees with findings from Idongesit (2018) that the institutional intervention in urban flood management is lopsided wherein stakeholders are more concerned with site inspection and media reporting of flood scenario but with little or no effort to assist the victims to recover from the havoc. Furthermore, the result of statistical computation using SPSS, pearson chi-square value of 587.432 was obtained at  $p > 0.5$  and thus indicating that coping strategies adopted in urban flood control are significant.

### Conclusion

Urban flooding is a serious environmental challenge in tropical rainforest zones of which Uyo Urban is inclusive. Flooding has caused untold destruction to lives and properties and rendered many homes wretched. In Uyo Urban, many settlements have been abandoned following flood incidences. Many factors have been attributed to flooding including land use, deforestation, climate change, excessive rainfall, poor urban design, poor drainage facilities and many others. The study revealed that Uyo Urban is heavily inundated soon after every rain event, and the inundated area span from Abak road, Tabernacle Road, Nkemba, Nsentip even up to Ikpa lane. This has impacted negatively on the socioeconomic activities of the residents which at the same time have led to millions of Naira being lost in its wake. Although government has intervened to mitigate the effect of flood hazard, the residents have devised adaptation strategies common to them which include scooping with bucket, raising of household items, raised pavement and fencing, flood retention pit, channelization, planting of grasses/trees, gutter and frequent evacuation of waste from drains.

### Recommendations

Based on the result and findings obtained, the following recommendations are made;

- given the fact that Uyo Urban is located on a relatively low elevation with fragile soil easily washed by heavy rainfall; the government should take proactive measure to mitigate the storm waters by clearing the drainage channels on a regular basis;
- flood monitoring team should be put in place in the study area and restriction made for houses sited in flood prone areas;
- flood casualties should be compensated with reasonable packages and money so as to enable them restores their lost asset;.
- communities should be aided through training on how best to manage flood at local level;
- efforts should be made by the government to restore abandoned flooded areas for productive land use;
- government should also put up measures such as emergency relief fund in order to enhance timely intervention during flood events; and
- resilience capacity of communities living with flood should be strengthened through the concerted efforts of relevant stakeholders

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## Appendix



Plate 1: Flood Casualty at Tabernacle Road, Uyo



Plate 2: Abandoned Buildings in Udotung Street



Plate 3: Abandoned Buildings in Nkemba Lane



Plate 4: Abandoned Buildings in Urua Ekpa



Plate 5: Flood scenario in Urua Ekpa