

# Impact of Flooding on Riverine Communities: The Experience of The Omambala and Other Areas in Anambra State, Nigeria

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## Abstract

Globally, riverine areas are naturally prone to flooding. In the year 2012, flooding for the first time became a national disaster in Nigeria and Anambra state was identified as one of the most affected states. 7 million people were affected; 2.3 million people were victims of internal displacement while 363 people were reportedly killed. Out of the 21 Local government areas in Anambra state, 8 were affected. 5 out of these 8 comprise the Omambala area and were the most adversely affected area. Records revealed that house and other public and private properties, infrastructure and facilities worth billions of naira were fully or partly submerged and destroyed. Government in her intervention effort in the state provided 24- Internally Displaced People's refugee camps and supplied relief materials. International donor agencies like UNICEF, UN and EU as well as non governmental organizations and philanthropists, also supported with relief materials worth billions of naira. Till date, the living conditions of the dwellers remain deplorable. This study sought to examine the impact of flooding on the Omambala and other riverine areas with a view to determining its nature so as to evolve measures that can enhance the living condition of the people. Primary data obtained with structured interview and secondary data from State Emergency Management Agency (SEMA) were used. Taro Yamane (1967) formula was used to derived a sample size of 400 household heads was selected using the systematic sampling technique. Data was analyzed and the result revealed that flooding greatly impacted the economic life of the people; their social, cultural and the religious aspects of their lives. There were issues of lose of human and animal lives; destruction of agricultural products; housing, educational, transportation commercial and other infrastructural facilities worth billions of naira. Family and social ties and activities were also hampered while daily livelihood activities were disrupted, good sources of water were polluted and the environment degraded. Hunger, high cost of living, infestation of snakes, flies and other disease vectors and general deplorable living conditions were identified as some of the negative impacts of flooding in the area. Economic empowerments of poor riverine dwellers through cooperative societies coupled with Public participation in flood control activities among other mitigation measures were recommended.

**Keywords:** Impact, Flooding, Riverine communities, Omambala and other riverine areas.

## 1.0 INTRODUCTION

Floods occur when water particularly from rainfalls accumulates across an impermeable surface and cannot rapidly dissipate or evaporate. Floods can also be caused by a series of storms moving over the same area while dams can flood low-lying areas, often causing significant damage.

Globally, riverine areas are naturally prone to flooding. In the year 2012, the ravaging effects of flooding in Nigeria became so drastic that it was seen as a national disaster. Among the 36 states of the Federation, Anambra state was among the 34 states that had the bitter experience of the flood. Out of the 21 Local government areas in Anambra state, 8 were affected. 5 out of these affected 8 make up the Omambala area and were the most adversely affected. Houses and other public and private properties, infrastructure and facilities were submerged and destroyed, while many residents were displaced (NEMA, 2012, ANSEMA, 2012, NIHSA, 2013).

Studies on water, poverty and flood observed that there was an increasing rate of flood occurrences and severity in recent years; resulting to loss of lives, injuries, homelessness, damage to environment and infrastructure as well as impacting on agriculture, health and education (Abdul-Akeem Sadiq, 2012, Bariweni et al, 2012, England, the flood and water management Act, 2010, Tieney et al, 2001; USEPA, 2002, Thomson, 1964). This became evident in Nigeria for the first time in 2012. Apart from Ekiti, Katsina, States and the Federal Capital Territory (FCT), all the other states in Nigeria experienced the devastating effects of flooding. Other states affected include Zamfara, Yobe, Sokoto, Rivers, Taraba, Plateau, Oyo, Ogun, Osun, Ondo, Niger, Nasarawa, Lagos, Kwara, Kogi, Kebbi, Kano, Kaduna, Jigawa, Gombe, Edo, Ebonyi, Delta, Cross Rivers, Benue, Bayelsa, Bauchi, Anambra, Akwa Ibom, Enugu, Imo, Abia and Adamawa states. The 2013 Annual Flood Outlook (AFO) for Nigeria estimated an effect on 156 Local Government Areas in the country while stressing the need to minimize and turn flooding into an opportunity so as to transform society through a higher level of sustainable efforts.

## 2.0 LITERATURE REVIEW

### 2.1 FORMS OF FLOODING

Flooding is classified as **minor or major** depending on the degree of severity in terms of areas, extent or magnitude and in depth (Tieney et al, 2001; USEPA, 2002, Thomson, 1964). The various forms are:

- i. **Flash flooding:** Flash flooding can occur in steep catchments and is far more immediate. Flooding from rivers, particularly, in recognized floodplains, can easily be predicted with good accuracy. However flash floods from sudden downpours such as those in Carlisle continue to challenge the capability of detection and forecasting systems. Water over about 250 mm in depth may carry debris and can also be very cold. Even travelling at low speeds; this can be extremely hazardous to motorists.
- ii. **Tidal flooding:** Sea and river banks and defenses may be overtopped or breached by a combination of low pressure weather systems and peak high tides. Storms with high wind speeds cause very tall and powerful waves while low pressure fronts cause sea levels to rise above normal. High tide levels vary through the lunar and solar cycles and when superimposed upon other tidal variations, exceptionally high tides result. The onset of flooding from the sea and tidal rivers is often sudden and the extreme forces driving it present a significant danger to life. For instance, the east coast storm surge of 1953 claimed 307 people's lives in the UK and 1,835 in Holland. A similar storm surge tide in September 2007 came within a few centimeters of breaching a number of the UK's coastal defenses. It is often possible to forecast, with reasonable accuracy, this type of flooding due to the predictability of the tide and tractability of low pressure systems. The duration of this type of flooding is also limited by the cycle of the tides, where drainage is available (Dance and Hynes, 1980)
- iii. **Flooding from sewers:** Flooding from sewers may result from a failure of the sewerage system. It may also happen when the sewer system does not have enough capacity to take water entering the system from heavy rainfalls, river or highway flooding. This type of flooding occurs fast and are difficult to detect. Sewage water flowing into buildings is classified as internal flooding. When it floods a garden or other open spaces such as roads or public grounds, it is considered as external flooding and affects the sanitary condition of environments causing harm to residents.
- iv. **Ground water flooding:** Low lying areas sitting over aquifers may periodically flood as ground water levels rise. This type of flooding is often seasonal and therefore can be forecasted with good accuracy. It is often slow in its onset. Ground water flooding occurs when water levels underneath the ground rise above normal levels approaching to the surface. It is usually as a result of prolonged periods of rainfall. Ground water flooding can last for weeks and months. It differs from surface water flooding which occurs when heavy rain fall directly hits the ground surface.
- v. **Fluvial flooding:** This occurs in the floodplains of rivers when the capacity of water courses is exceeded as a result of rainfalls or snow and ice melts, within catchment areas and further upstream. Blockages of water courses and flood channels or tide locking may also lead to ponding and rising water levels. River defenses may then be overtopped due to increased water levels, or breached by large objects of debris carried at high water velocities. Flooding from rivers has in recent years been experienced in the Severn Valley, Sheffield, Hull from the river Humber in 2007 and Carlisle on the river Eden in 2006. The onset can be quite slow in some catchments with steadily rising water levels and increase with time Abdul-Akeem Sadiq (2012) and Bariweni et al (2012). Riverine areas of most countries including Nigeria are therefore faced with one or more of these forms of flooding.

### 2.2 CAUSES OF FLOODING

Floods are caused by significant and unexpected events such as rainfalls, dam breakages, or as a result of another natural hazard such as earthquake or volcanic eruption among others (Tieney et al, 2001; USEPA, 2002, Thomson, 1964). These causes can be categorized into:

- (a) **Slow Flooding:** Runoff from sustained rainfall or rapid snow melts exceeding the capacity of a river's channel. They are caused by heavy rains from monsoons, hurricanes and tropical depressions, foreign winds and warm rain affecting snow pack. Unexpected drainage obstructions such as landslides, ice, or debris can also cause slow flooding upstream if there is obstruction (USEPA, 2002)
- (b) **Fast Flooding:** They include flash floods resulting from convective precipitation (intense thunderstorms) or sudden release from an upstream impoundment created behind a dam, landslide, or glacier (Thompson, 1964). Floods commonly caused by a combination of sea tidal surges are caused by storm-forced winds. A storm surge, from either a tropical cyclone or an extra-tropical cyclone, falls within this category (Rosenberg and Snor, 1975). Floods can also be caused by severe sea storms, or as

a result of other hazards (e.g. Tsunami or hurricane). A storm surge, from either a tropical cyclone or an extra-tropical cyclone, falls within this category (Powell, 2009).

- (c) **Severe winds over water:** When rainfalls are relatively light, the shoreline of lakes and bays can be flooded by severe winds such as during hurricanes that blow water into the shore areas.
- (d) **Unusual high tides:** Coastal areas are sometimes flooded by unusually high tides, such as spring tides, especially when compounded by high winds and storm surges.
- (e) **Tsunamis:** Tsunamis are high, large waves, typically caused by undersea earthquakes, volcanic eruptions or massive explosions. It can cause flooding.
- (f) **Climate change:** Climate Change is also responsible for some forms of flooding especially when climate is warmer, it leads to (i) Heavy rains;(ii) Relative sea level will continue to rise around most shorelines (iii)Extreme sea levels will be experienced more frequently.  
Flooding in the riverine areas of most countries including Nigeria is caused by one or more of these categories.

### 2.3 THE IMPACT OF FLOODING

This has been categorized into two, namely:

(a) **Primary effects:** This includes physical damage on any type of structure, including bridges, cars, buildings, sewerage systems, roadways and canals.

(b) **Secondary effects:** This includes water supplies that are contaminated leading to water pollution. Hence, clean drinking water becomes scarce while unhygienic conditions and the spread of water-borne diseases are some of the resultant effects. The effects of flooding from the sources outlined above are felt by various 'receptors'. These include, people, buildings, infrastructure, agriculture, open recreational spaces and the natural world. In extreme cases flooding may result to loss of life. Abdul-Akeem Sadiq (2012) and Bariweni et al (2012) further stated that physical damage to property is one of the tangible losses felt when floods occur. They include the costs of damages to goods and possessions, loss of income and services in the aftermath of the flood and clean-up costs. Some impacts of floods are intangible and are hard to quantify in monetary figures. Intangible losses also include increased levels of physical, emotional and psychological health problems suffered by the flood-affected people (Tienny et al, 2001; USEPA, 2002, Thomson, 1964).

### 3.0 THE RIVERINE AREAS OF ANAMBRA STATE

The area called the "Omambala region" is the major riverine area of Anambra state. Omambala region is the local nomenclature for local settlements sharing boundaries with one another and situated within the shores of the great Omambala River, from which Anambra state derived her name (Nnai,2009). Anambra state which lies at latitude 6° 44' & 5°44' N & Longitudes 6°36' & 6°72' E has this Omambala region at its Northern senatorial zone (Wikipedia, Anambra State 2001). Initially, the region was named Anambra local government area but presently, it comprises of 3 Local government Areas namely; Ayamelum, Anambra East and Anambra West Local government Areas. It has a rural population of over 519,365 people whose main source of livelihood is mostly agrarian and thus the food basket of Anambra state (NPC, 2006). The area is richly blessed with water resources as the region is bypassed by the great River Niger and also accommodates the Ezu river, a major tributary of the Omambala River which is the largest left bank tributary of the River Niger and from which Anambra state derived her name. It also has many other major and minor rivers, streams, ponds and springs. Ogbaru local government area is another riverine area of the state as it is sited on the shore of the great River Niger and hence highly vulnerable to flooding. These account for the region being prone to seasonal flooding. Other riverine areas in Anambra state are minor and comprises of few rural and suburban communities such as is in Awka north local government area within the banks of the Ezu river as well as in Ekwusigo, Idemili and Ihiala local government areas which heralds the Idemili River and its tributaries. Due to the presence of these water bodies and topography of these areas, it normally experience flooding on annual basis but not to the extent of the year-2012 flood incidence.

### 4.0 FLOODING: THE EXPERIENCE OF THE OMAMBALA AND OTHER RIVERINE AREAS OF ANAMBRA STATE

The systematic sampling technique was used to select 400 household heads that formed the sample size determined with the Taro Yamane (1967) formula. Data collected and analyzed revealed that the flood had both positive and negative impacts on the riverine communities of Omambala and other areas in the state. Despite the wide-spread devastating impacts of the flood throughout the state; the respondents attested to its benefits, particularly in the areas of abundant harvest of fishes, consumable delicacies, sea and wild animals that were traded for financial gains. The respondents also noted with dismay that house and many public and private properties, infrastructure and facilities were submerged and destroyed, 368 people were reported dead while

thousands of households were displaced. A number of losses were enumerated by the respondents. They include the loss of roads, sources of good drinkable water, shops, local industries like cassava (garri) processing plants and other sources of family income. In addition, family and ancestral shrines were swept away by the ravaging flood. These led to a number of adverse effects. The people had never witnessed flooding of this magnitude before and the direction of flood upsurge was reported different from the usual direction of previous flooding in the area hence, confusing as they could not predict it and hardly knew what to do. They therefore looked up to the government for intervention. 98% of respondents claimed unaware of any flood warning while the remaining 2% claimed late arrival and poor handling of the flood warning signal by government officials. 100% of the respondents acknowledged that the state government quickly intervened by providing 24 flood refugee camps where rescued victims and displaced residents were evacuated and supplied with relief materials. Other groups like UNICEF, UN and EU coupled with donations from some non governmental organizations and philanthropists also came to the aid of the flood victims. The most adversely impacted aspects recounted by respondents include human and animal lives; industries, agricultural lands and products; housing, educational, transportation commercial and other infrastructures and facilities worth billions of naira. Family and social ties and activities were hampered, while daily livelihood activities were disrupted, sources of water polluted and the environment degraded. Hunger, high cost of living, infestation of the area by snakes, flies and other disease vectors and outbreak of cholera among other diseases as well as general deplorable living conditions had resulted. Despite their travail, the indigenes of these areas had insisted on remaining at these flood areas majorly due to their emotional attachments to their ancestral homes, socio-cultural attachments and means of livelihood.

## 5.0 CONCLUSION AND RECOMMENDATIONS

The result of the research revealed that the people were not well prepared in advance on flood management and control activities and so they watched helplessly as human and animal lives were lost, their entire sources of livelihood, their homesteads, sources of good water supply, roads and other infrastructure were all destroyed by the ravaging floods and the area infested by snakes, flies and other disease vectors. Though a number of efforts towards flood mitigation were put in by government and other donor agencies for the Omambala and other riverine areas in the state, a lot still needs to be done to prevent and effectively manage future occurrences of flooding disaster in these riverine areas of Anambra state, Nigeria. Areas of needs and special emphasis as reckoned by the respondents include the following:

1. Review and proper implementation of policies relating to flood management and delineation of flood zones and maps, while adopting effective public participation techniques which will involve the people of the Omambala and other riverine areas in the state.
2. Utilizing local peculiarity and administrative structure in achieving effective flood management strategies such as early warnings, relocation, land use plan, fumigation, creation and clearance of water ways and drainage channels among others
3. Construction of houses with durable building materials; away from the flood prone areas.
4. Organizing the riverine people into groups of cooperative societies for mutual support and benefits through capacity building, pulling resources together, education and information sharing and effective public participation in government programs. This will better equip them, empower and build resilience into them while curbing the tendency of rural-urban migration practices especially among the youths in the area.
5. The Ministry of Agriculture through the Cooperative groups in the riverine communities should provide quick maturing crop and animal species, as well as other inputs to farmers, while also providing Extension Services and quick harvest and storage mechanisms and facilities so as to encourage the Community members to expand, improve and cultivate more agricultural areas so as to enhance their living condition and food security.
6. Infrastructure should be put in place for the harvesting of excess or flood water through the provision of water reservoirs and treatment plants and construction of dams for irrigation, power generation and potable water supply for sustainable development.
7. Construction of canals and drainage channels should be drastically undertaken in the affected areas, for easy drains of water after rainfalls.

## REFERENCES

1. Abdul-Akeem Sadiq (2012): A look at Nigeria's Bourgeoning Emergency Management System: Challenges, Opportunities, and Recommendations for Improvement. Online Journal
2. Bariweni P.A, Tawari C.C and Abowei J.F.N (2012): Some Environmental Effects of Flooding in the Niger Delta Region of Nigeria. International Journal of Fisheries and Aquatic Sciences, ISSN: 2049-8411; eISSN: 2049-842x. Maxwell Scientific Organization.

3. Anierobi Christopher .M. (2010): An Assessment of Anambra state Environmental Protection Agency (ANSEPA) in urban environmental management of Anambra state, Nigeria.
4. **Dance**, K.W. and H.R.N Hynes (1980): Some effects of agricultural land use on stream insect communities. *Environ. Pollut. (Series A)*, 22:14-28
5. England, the flood and water management Act (2010): National Flood and Coastal Erosion Risk Management strategy for England (FCERM).
6. National Emergency Management Agency, NEMA (2012): Annual report on Flood, Official gazette, Abuja.
7. National Population Commission, NPC (2006): Population census figures for 2006. Official gazette, Abuja.
8. Nigeria Hydrological Services Agency (NIHSA) (2013): Annual Flood Outlook (AFO) for Nigeria. Official gazette, Abuja.
9. Nnai J.O Ijeaku (2009): The Igbo and their Niger Delta Neighbors: We are no second fools. <http://book.google.com.ng/googlebooks/image/closedhand.cure>
10. Powell, W.G (2009): Identifying Land Use/Land Cover (LULC) Using National Agriculture Imagery Program (NAIP) Data as a Hydrologic Model Input for Local Flood Management. Applied Research Project, Texas State University-San Marcos, Retrieved from <http://ecommons.txstate.edu/arp/296/>.
11. Rosenberg, D.M and N.B Snor(1975): Ecological Studies of Aquatic Organisms in the Mackenze and Procupine, River Drainage in Relation to Sedimentation, Environment Canada, Fisheries and Marine Serv. Tech. Report No.547, pp:86
12. Anambra State Emergency Management Agencies, ANSEMA (2012): Report on flood in Anambra state. Official report, Awka.
13. Taro Yamane (1967): Elementry sampling theory. First Edition, Published by Prentice Hall, USA.
14. Thomson, M.T (1964): Historical flood in New England. Geological Survey Water-Supply Paper 1779-M, United States Government Printing Office, Washington D.C.
15. Tieney, K.J, Lindell, M.K and Perry, R.W (2001): Facing the unexpected: Disaster Preparedness and Response in the United States. Joseph Henry Press, New York, N.Y.
16. United States Environmental Protection Agency (USEPA) (2002): Water Quality Monitoring for Coffee Creek (Porter County, Indiana). Retrieved from: <http://www.usepa/research.htm.modecode>
17. Wikipedia, Anambra State 2001.

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