The Menace of Flooding and Environmental Degradation in Oyigbo Local Government Area of Rivers State.

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Abstract

Flood menace in Oyigbo have become a normal and re-occurring phenomenon which has devastating impacts on human livelihoods and infrastructural development. This study evaluates the menace of flooding and Environmental Degradation in Oyigbo Local Government Area of Rivers State, which is guided by five objectives, research questions and hypotheses. The Study adopts a Narrative and Historical Approach and Data were collected from Primary and Secondary sources. The findings of this study reveals that flooding is caused by natural and human activities namely excessive rainfall, terrain and nature of soils, over flow of Imo river, poor housing and environmental planning/monitoring, deforestation, poor waste disposal practices amongst others. To this end, the present study suggested that government should ensure that environmental management policies are properly enforced in the Local Government Area. Erecting facilities such as factories, Hospital, Malls and shops, recreational centers, institutions and churches should be in line with appropriate Town planning Regulations and Building byelaws.

Finally, regular environmental education should be given priority in the society.

Background To The Study

Flooding, according to Geo-science Australia (2013) can simply be described as "water where it is not wanted". It can also be conceptualized as a situation that results when a part of the earth surface that is usually dry is inundated and covered with water due to high amount of rainfall or the over flowing of a water body. Furthermore, flooding was expounded by pagasa.dost (2013) as a "natural hydrological phenomenon and its occurrence is usually the aftermath of metrological events such as seismic activities, astronomically influenced phenomena (high tides coinciding with occurrence of high rainfall), construction of temporary dams, as well as the failure of hydraulic and other control structures." The effects of floods are always debilitating, though their intensity and scope vary depending on terrain, intensity of human activities, quantum of water and the level of preparedness by the stakeholders. In many natural systems, floods play an important role in maintaining key ecosystem functions and biodiversity. They link the river with the land surrounding it, recharge groundwater systems, fill wetlands, increase the connectivity between aquatic habitats, and move both sediment and nutrients around the landscape, and into the marine environment (Apan, et al., 2010). For many species, floods trigger breeding events, migration, and dispersal. These natural systems are resilient to the effects of all but the largest floods. The environmental benefits of flooding can also help the economy through things such as increased fish production, recharge of groundwater resources, and maintenance of recreational environments (Bunn and Arthington, 2002).

Flooding has been a long-term issue which affects the inhabitants of Oyigbo. The environmental resources in Oyigbo most especially the land and soil resources are greatly threaten by flooding. This flooding menace has destroyed arable land for agricultural and Trading purposes which are the major socio-economic activities of the Ndoki's and Asa people of Oyigbo. The government in its attempt to curb the situation has constructed a drainage system some meters away from the major road to redirect and channel all the water flowing to the erosion sites into the drainage system which is emptied into the river. Despite all this effort, the situation still remains the same. Areas that have been highly modified by human

activity tend to suffer more deleterious effects from flooding. Floods tend to further degrade already degraded systems. Removal of vegetation in and around rivers, increased channel size, dams, levee bank and catchment clearing all work to degrade the hill-slopes, rivers and floodplains, and increase the erosion and transfer of both sediment and nutrients (Douglas, et al., 2005). While cycling of sediments and nutrients is essential to a healthy system, too much sediment and nutrient entering a waterway has negative impacts on downstream water quality. Other negative effects include loss of habitat, dispersal of weed species, the release of pollutants, lower fish production, loss of wetlands function, and loss of recreational areas (Kingsford, 2000).

Flooding is one of the environmental problems that have confronted man since immemorial. Flooding is a widespread and age long phenomenon. In Oyigbo flooding has created and causes untold hardship such as destruction of building and properties, interruption of socio-economic development of the area. The above flood consequences is endemic in Oyigbo and in terms with Jon (2011), that defined flooding as a condition, which exist when any overland flow over an urban or rural area, that is sufficient to cause property damage, health hazard, nuisance and the obstruction of the socio-economic activities in the area. He went further the types of flooding to include rivers flood, flash flood, splash flood and flood bondages. It is against this backdrop the researcher was motivated to Investigate the Menace of Flooding and Environmental Degradation in Oyigbo Local Government Area of Rivers State.

Occurrence and causes of flooding in Oyigbo

Flooding is becoming an increasingly severe and more frequent problem in Oyigbo especially the western part of the Local Government which bothers Obio-Akpor. Unfortunately, the impact is more felt by the urban poor in such a way that recovery is unlikely to be achieved without external aid. In other words, urban poor are most vulnerable to impact of flood because they set up homes in the floodplains.

The occurrence of flood represents a major risk to riversides populations and floodplains, in addition to causing substantial impacts on the environment, including aquatic fauna and flora, and bank erosion. It should be mentioned that

flooding in cities can contaminate water supplies and intensify the spread of epidemic diseases, diarrhoea, typhoid, scabies, cholera, malaria, dysentery and other water-borne diseases. Human activities such as rapid industrialization and urbanization, population growth, exploitation of natural resources and location of infrastructures exacerbate the occurrence of floods.

Flooding is one of the most devastating Physical hazard faced in Oyigbo which has threatened the socio-economic life of the inhabitants. Flood menace is not only an environmental problem peculiar in Oyigbo but has also affected other parts of Rivers State and is likely to increase in many regions of the world partly due to global climate change and poor governance. According to ActionAid (2006) four types of urban flooding can be recognized: (a). Localized flooding which occurs many times in a year due to few and blocked drains; (b). Small streams in urban areas rising quickly after heavy rains, but often passing through small culverts under roads; (c). Major rivers flowing through urban areas; (d). Wet season flooding in lowland and coastal cities. According to Gwary (2008) and Adeoti (2010), flooding occurs in Nigeria in three main forms which are: river flooding, urban flooding and coastal flooding. The heavy rainfall coupled with bad human activities in relation to the environment and lack of drainage infrastructure in most Nigerian cities has left hundreds of people distressed and homeless. The Nigeria Hydrological Services Agency in its annual flood outlook defines the major causes of flooding in Nigeria as follows: soil moisture, extreme weather conditions owing to climate change, how dams are functioning, especially those close to the country's borders, and topography. Adegboyega et al. identify changes in land use, such as urbanization, as a trigger to urban flooding. Abolade et al. found extreme precipitation to be a natural cause. These authors submitted that human causes include inadequate drainage, dumping of refuse on waterways, building on waterways and river/dam overflow. Onuoha (2023) identified the main causes of flooding in Oyigbo LGA as blockage of canals, inadequate drainage systems, torrential rain, Building on surface run-on paths, Undefined terminal points of drainage canal, improper disposal of Solid waste, Deforestation and encroachment among others. Agbonkhese et al. find excessive or heavy precipitation to be the major cause of flooding; others include climate change and anthropogenic activities. Komolafe et al. find that two natural causes are heavy

downpour and river storms. Broken water pipes, inadequate drainage systems, and dam overflow are anthropogenic causes.

Impacts of Flooding in Oyigbo

The impacts of floods are more pronounced in low-lying areas. In more recent years,2019 to date appears to be the worst incidence of flooding in Oyigbo with a lot of reported cases indicating how flood menace ravaged the ASA and Ndoki community of Oyigbo LGA. Although the Nigerian Meteorological Agency (NIMET) had alerted that there would be an above normal rainfall which might lead to flooding incident, yet nobody gave consent to that warning. The impacts of flooding are felt by the individual and by society, through loss of property and infrastructure, damage to farmland, displaced water-living wildlife posing threats, contamination of drinking water, spread of waterborne diseases, fatalities and loss of wellbeing, loss of livelihoods, economic depression, and hindrance in achieving social development goals such as safety and eradication of poverty. Other categories of impacts are as follows:

1. Impacts on Health

All sorts of Health related challenges and diseases are associated with floods. During flooding, fresh water sources and reservoirs are polluted so is potable water. The major illnesses/diseases associated with floods are malaria, diarrhea, pneumonia, cough, and skin disease. (Ogboi 2013) Due to the absence of medication, these disease opportunities may ten to increase. A study by NISER- Assessing the Impact of Climate Change on Health and made some interesting correlations between measles, pneumonia, malaria and diarrhea with seasonal variations in weather and rainfall. In some areas rainfall has been declining with wells drying earlier than expected and inducing certain disease opportunities like diarrhea. Temperatures have also been increasing in some areas also inducing opportunities for mosquitoes to run amok and become even malignant. Some studies have indicated that for many victims of floods, their major concern is not shelter and food but health concerns. There is definitely need for more comprehensive and incisive studies on the health implications of floods, and particularly how climate change and changes in ecosystems could affect the geography of diseases and the public health implications arising from this (Singh, 2010).

Flooding directly impacts poverty and increases vulnerability to hunger while hunger is a precursor for disease outbreaks due to weakened immunity, among other factors. Flooding has both direct and indirect impacts on health. Increased deaths and injury are direct effects of flooding with 90% of these direct effects having occurred in developing countries like Nigeria (Zorn 2018). Nigeria's fledgling health sector suffers setbacks from annual flooding disasters. Water-borne life-threatening disease epidemics like Typhoid, Cholera, and Dysentery are common during flooding (Okaka and Odhiambo 2018; Rieckmann et al. 2018). Floods provide a perfect breeding ground for parasites like mosquitoes which leads to a rise in the incidence of parasite borne diseases like Malaria. Women and children are especially vulnerable to these diseases which can lead to death. Flooded homes provide a good damp environment for mildews and molds to grow sporadically which triggers upper respiratory illnesses for people who have allergies and episodes for asthma patients. Such health problems mostly affect the elderly and children. Power outages post-floods in developed countries force people to resort to fossil fuel-powered generators. When the generators are run without adequate ventilation, deaths due to Carbon Monoxide (CO) poisoning can occur (Prevention 2017). Even after floodwaters recede, health risks and threats remain. For example, when electrical wires become immersed in water, there is increased risk of electric shock. Debris like twigs, woods, broken tiles, falling walls, and weakened structures can cause physical injury. Pollutants like insecticides and pesticides, animal, and human feces, sewage, fertilizers, and other contaminants are rife in floodwaters which also carry disease causing micro-organisms (Oriji 2015). Contact of contaminated waters with agricultural crops and food items elsewhere makes food unsafe for human and animal consumption. Power outages are common during flooding disasters and this affects food stored in the home and may cause serious health threats (DFTE 2017). During floods in Nigeria, water sources become polluted. The ground becomes waterlogged and wastewater and sewage treatment plants become overburdened with the contaminated floodwaters causing backflow into homes and lower lying surroundings. Private septic tanks and wells are common in Nigeria and become overfilled with polluted water during flooding and become a harbinger of diseases and infections.

Physical and emotional trauma are triggered by floods (Alderman, Turner, and Tong 2012). Tong (2017) highlighted the numerous ways mental health is affected

by flooding events. Tong cites studies that show increased stress-related and mental health illnesses like post-traumatic stress disorders, anxiety, depression, and even behavioral shifts like aggression, sleeplessness, anger, hyperactivity, and suicide among flood victims. Long-term psychological distress, even years after flooding, is very common (Rufat et al. 2015).

2. Socio-economic Impacts

The SDG goal 8 aims to enhance sustained, inclusive, and sustainable economic growth, full and productive employment and decent work for everyone (UN 2016). This goal is undermined by flooding that destroys people's means of livelihood. The impact of flooding on economic growth is well documented (Chapagain and Raizada 2017; Jongman 2018; Matemilola and Elegbede 2017; Mwape (2009); Olanrewaju et al. (2019). Disease incidence associated with flooding also means that manpower availability is limited as a sick person cannot contribute to the labor force.

In a flood impact study by Mwape (2009), 94% of the respondents who were primarily farmers had their farms devasted by floods, providing an insight into the high vulnerability of farming families. In another study by (Ikechukwu 2015) in Port Harcourt, Nigeria, the income of 30% of the research respondents has been negatively impacted while 29.4% had their buildings destroyed by flooding which is a regular occurrence in the rainy season. A significant proportion of different forms of assets are lost to the floods including both productive assets like fishing and farming equipment, as well as nonproductive assets such as furniture, electronics, and clothing. Loss of income is experienced by flood victims as their sources of livelihoods which yield household income are affected (Kwari, Paul, and Shekarau 2015; Mwape 2009). Property damage is the most pronounced economic aftermath of floods (Sardar, Javed, and Amir-ud-Din 2016). Also, the diversion of resources to reconstruction and rehabilitation tasks clogs the wheels of economic growth. The economic impact of flooding goes beyond the short term and usually extends beyond the affected region (Jongman 2018). Illnesses caused by flooding also impact the economy, and a Cost-of-illness (COI) method is commonly applied to determine economic effects. The COI approach looks at the indirect and direct impact of disease on the economy, and indices include cost of medical care (diagnosis, medication, procedures, in-patient and out-patient care,

etc.), non-direct medical costs like transportation for treatment and care, non-personal costs for instance information, research, and communication, education, etc., and income losses due to illness (Jo 2014). Flooding can also affect city infrastructure as services can be interconnected – water supply and electricity are usually connected, thus electricity outage can affect telecommunications and interrupt water supply. The geographical effect of such network interruptions often reaches far beyond immediately affected areas (Hammond et al. 2015).

3. Impacts on Education

In the developing world, there is even more need to promote education as the literacy levels fall well below that of the developed world (Winthrop and McGivney 2015). To that effect, there are numerous campaigns to promote universal basic education for all, especially for young children, but flooding disasters undermine this right to education of children (Mudavanhu 2014). Displacements due to flooding cause children in disaster areas to become educationally disadvantaged at the crucial school age, which sets them up for continued economic disadvantage and opportunities later in life. There is evidence of overall poorer educational performances and outcomes, reduced level of educational levels, and general disadvantages that continue into adulthood (Erica, Jessie, and Stephanie 2018).

Flooding disrupts the schooling of children and the delivery of education in many ways, no matter the severity of the flooding. Even in non-major floods, parents are not keen to send their children to school as they fear them treading dangerous flood waters en route to schools. They cannot ascertain if storms or rainfall will increase the severity of floods when the children are away at school and so prefer to have them at home where they have greater control over their safety, should the severity of flooding increase or there be need of evacuation. The teachers are also not in the best psychological state to teach because they also have to handle terrible conditions either in the school, home, or emergency shelter to get their lesson notes ready. They also have to deal with their own flooded homes and damaged properties. Parents on their part cannot do much for their children's education at this period or help with teaching on the home front. Educational materials are destroyed and even after the floods recede or the waters dry up, longer term effects in the education system are experienced because it is not easy to replace damaged

educational materials especially in developing countries. In places prone to annual flooding, there might also be reluctance on the part of the authorities to replace these learning materials, knowing that it may be damaged again during the next flooding cycle.

In Oyigbo, schools serve as emergency shelters during disasters like flooding, so they cannot serve their primary educational purpose. The effects of flooding disasters in the education sector become more damaging in places where access to education is already inadequate. There are usually delayed reconstruction efforts for damaged schools in the worst hit developing nations. The effect of flooding on the education of young school children is much more profound in the areas that experience annual flooding of such a scale that is not classified as a major disaster, meaning that these children lose many months of school year every year. Also, disasters like flood bring severe hardship to poor families who might be forced to withdraw their children totally from school and push them into the labor market to work to help provide for their families basic needs which brings a halt to their formal education (Kousky 2016).

Remedial and Management strategies of flood and Environmental Degradation.
Control of Flood menaces in Nigeria have been on the increase in recent times. Proactive and preventive options involving structural and non-structural measures need to be adopted and implemented at curbing the menace of floods. The structural measures such as check dams, levees, flood walls and adequate drainage systems will help control periodic inundation in the areas that are liable to flooding in the following ways:
(a). The construction of structures for irrigation and the use of excess run-off water for inter-basin transfer as an alternative to absorb excess water from (b). Check dams will reduce peak flows
(c). Adequate drainage systems will reduce peak flow stages of flood and divert excessive flow.
(e). In communities were the rate of flow of storm water is high, embankments should be constructed to breakdown storm water so as not to result into floods. These embankments could be permanent or temporary, such as sandbags placed when a flood is imminent. However, the adoption of structural measures alone could lead to sub-optimal development of the flood plain and may

even invite greater loses when storms occur which exceed the design limits of the structures, as the collapse of the Bagauda dam in Kano clearly showed. Moreover, structural measures are expensive; hence there is also need to regulate floodplain development with the adoption of non structural measures.
Consequently, the following non structural measures could be adopted to curb the menace of flood in Oyigbo LGA.
(i) Floodplain management is seen to be the best approach. In finding solution to flooding using this approach, the first step is to construct a flood-frequency curve based on historical records and an examination of vegetation to determine how often on average a flood of a certain size occurs in a particular area. Although this approach does not tell exactly when floods will occur, but it gives an insight of how often they might occur based on past history. From the data obtained, a plan can be developed and applied to: (a). prohibit certain types of buildings or activities in flood high risk zones. (b). elevate or flood proof buildings that are allowed on the legally defined floodplains. (c). construct a floodway that allows floods to flow through the community with most minimal or no damage.

(ii). The National Inland Waterways Authority (NIWA) of Nigeria should urgently take steps to desilt waterways and tributaries which are sited and taken over by shrubs to allow for channels and easy flow of water to curb the ravaging flood in the coastal communities.

(iii). As is obtained in developed countries of the world particularly in America and Europe, there is always a standing taskforce that is set up to deal with the problem of snow once winter is approaching. In the same way, the Local Government Area needs to be proactive by setting up standing taskforce that will tackle the issue of flood once the rainy season is approaching.

(iv). Town planning laws should be properly enforced and strictly adhered to as this will go a long way to curbing the menace of floods. The Local government should always plan ahead of the population so as to avert the occurrences of unplanned houses and cities. This is necessary because deviation from the original master plan by prospective town developers do facilitate the occurrence of floods as investigations has shown that a lot of houses built today are erected on natural drainage channels/courses which are

often first sand filled by land developers before erecting their structures. The resultant effect of this practice is that these natural drainage channels/courses haven been blocked will afford storm water no channels/courses to pass through and thus the inundation of the areas that are liable to flooding.

(v). All roads should be constructed with adequate drainage facilities provided.

(vi). Drainage systems should be regularly inspected and monitored to take note of any failure with a view of effecting repairs. Also sedimentation and littering of the drainage systems should be guilded against while vegetations like trees whose rooting system tends to or are likely to distort, break or undermine the drainage system should be removed.

(vii). The immediate downstream culverts which helps to ensure effective runoff discharge and hence effective self-cleaning of the drainage systems should be desilted and properly aligned.

(viii). The Populace should realize that "Action and reaction are equal and opposite". To this end, they should properly dispose off their refuse/waste and not into drainage channels as improperly disposed refuse/waste which comprises discarded plastic, foot-wears, clothes etc. equally block the drains especially at their narrow ends or points. This equally results to overspill or overflow of the storm water in the drains leading to flooding that can burst into people's homes and farms destroying household property and crops.

(ix). Streams, rivers, etc. should be channeled by deepening, widening or straightening to allow more rapid runoff.

(x). There should be adequate sensitization of people who are often affected by flood menace towards adopting environmental best practices.

(xi). Concerted efforts must be geared towards adequate city planning, policy formulation, enhanced public enlightenment programmes, integration of environmental planning and education to curriculum of schools at all levels, capacity building towards adaptation and mitigation of climate change.

(xii). Government at all levels should ensure proper and effective use of ecological fund; and encourage the integration of environmental disaster insurance to take care of the fall out of flood menace.

(xiii). National disaster and emergency policies should be strengthened to facilitate effective disaster preparedness and response. This approach will not only save lives and livelihoods, but it will equally reduce vulnerability to flood menace.

(xiv). Adequate and long-term environmental and natural resource management practices can help to reduce the risk and vulnerability of people in disaster prone areas.

(xv). Collaborations between local communities, NGOs, voluntary groups, local and international donor organizations towards managing floods should be established.

(xvi). Within the realm of professional practice (good land use planning and management) professionals should undergo training and re-training programmes in related fields (human capacity development) and uphold the ethics of their profession, particularly avoiding corrupt planning practices that can jeopardize lives and properties of the people.

Conclusion

Floods are global events impacting quite adversely on the environment. In some cases, floods have beneficial tradeoffs through fertilizing floodplain soils and sustaining high crop yields, etc, however in most cases, the aftermath are calamitous than beneficial. Floods in Oyigbo, especially since 2012 has raked widespread havoc to agriculture, food crops and substantially ruined urban infrastructure, services and developments thereby retarding the economy of Oyigbo Local Government Area. Hundreds of people were displaced. Floods are natural and man-made disasters which may even get worse with climate change and global warming. The effects of floods in Nigeria have made the attainment of the SDGs on potable water supply, food security, hunger, poverty reduction and environmental sustainability even more difficult to attain.

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