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# Redressing the Challenges of Environmental Risk Management and Remedial Response in Nigeria

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## Abstract

Environmental risk simply refers to the disaster which affects lives and properties within environment as a result of the actions of man and other natural phenomenon. Environmental risks in Nigeria are of different types ranging from pollution, Ozone layer depletion, land degradation, flooding, global warming, deforestation, soil erosion and atmospheric contamination. These problems are classified as natural, developmental and socio-economic. This study reflects on critical issues relating to flooding and wind erosion in Nigeria such as causes, impacts and remedies. On this parlance, an evaluation is done on environmental risk management as a remedy to curtailing flooding and wind erosion menaces in Nigeria. The study examines various strategies of environmental risk management which include risk avoidance, risk retention, risk transfer, risk reduction, diversification and establishment of risk management monitoring teams and factors responsible such as rapid population growth, urbanization, poor urban planning and climate change especially in increased frequency and intensity of rainfall. The study recommends the adoption of the European Union framework which requires allconstituting states to prepare flood hazard/ risk maps, it is stronglyrecommended that legislation that requires each State of Nigeria toproduce a flood hazard or risk map will strengthen existinginstitutional frame work and enhance increased responsibility towardsflood risk management among the various states.

## 1. Introduction

The hazards being generated from human activities in the environment have constituted a major concern to world leaders especially in theindustrialized Nations of Western World. Over the periods, 1985 to 2021,flooding in Nigeria had affected more than 11 million lives with a total of 1100 death and property damage. Lagos State had experienced most of the floods while more frequent floods are recorded in Niger, Adamawa, Oyo, Kano and Jigawa States possibly due to the influence of Rivers Niger, Benue, Ogun and Hadeja[1]. Arguably, the rate of flooding and wind erosion occurrence in recent times has been unprecedented especially in Oyo State Benue State, Imo State, Lagos State, Edo State, River State and others where a lot of lives were rendered homeless.

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[1] Nkwunonwo U.C, Malcolm W, Brain B, Flooding and Flood Reduction in Nigeria: cardinal Gaps. 5, *University of Nigeria, Enugu J. Geogr Nat Disast*, (2015) 1

In Nigeria, addressing challenges of flooding and wind erosion are critical issues. Eventually, the Country has experienced devastating floods which affected millions of people and caused fiscal losses amounting to billions of US dollars[2]. These hazards were generally linked to poor urban planning and climate change especially in increased frequency and intensity of rainfall[3].

In our environment, a lot of activities take place on daily basis such as roadconstruction, oil exploration, deforestation, mining, quarrying, farming andother industrial activities. These activities have constituted a lot ofenvironmental risks to man and other living things in their environment. Such risks include flooding, land degradation, pollution, global warming, Ozone layer depletion, soil erosion and atmospheric contaminationresulting to accident, death, sickness and financial loss. However, thisresearch focuses only on the risk of flooding and wind erosion. Anevaluation is carried out on the various strategies of environmental riskmanagement with the sole aim of reducing flooding and wind erosionhazards in Nigeria[4].

On this premise, some factors have been identified as contributory factorsenhancing flooding and wind erosion in Nigeria. Again, this research alsorecommends possible ways of reducing flooding and wind erosion as well asits attendant risks or hazards.

## 2. Factors Enhancing Flood and Wind Erosion

Some factors have been identified as factors enhancing the risk of flooding and wind erosion in Nigeria. These factors need to be tackled in order to mitigate flood and erosion hazards. The fundamental idea of flood risk reduction is to build the resilience of human population to flooding[5]. In the US, UK and Netherland, it can be argued that this idea is underpinned by much profound measures for tacking flooding. In Nigeria, there are potential efforts for flood and wind erosion risks management but in the light of best practices of risk management, there are flaws which are addressed in this research. These factors are referred to as the gaps and limitations[6].

**A.** Poor Attention to Flood Modelling and Assessment of Vulnerability to Flooding

Flooding in Nigeria which dates back to the early 1950s are fluvial, coastal and pluvial in nature and have been a major cause of concern for rural areas and cities within the country.[7] Fluvial and coastal flooding both ofwhich affected mainly coastal environments are influenced by seasonalinterruption of major rivers and water overtopping their natural andartificial defences and overflowing areas not submerged[8]. Fluvial floods and wind erosion account for the majority

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[2] NEMA (Nigerian Emergency Management Agency); Report on Flood Disasters in Nigeria; Abuja-Nigeria Government Press, (2013).

[3] Adeloye AJ; Rustum R; Flooding and Influence of Urban Planning: Urban Design and Planning, Lagos, Nigeria, 2011, 175-187.

[4]Frank Jorome Glago, Flood Disaster Hazards; Causes, Impacts and Management: A State of the Art Review 2021, DOI:10.5771/intechopen.95048

[5] Htt://www unisdr.org/files/657-Iwr1.Pdf

[6] Nkwunonwo U.C, Malcolm W. and Brain B, Flooding and Flood Reduction in Nigeria: Cardinal Gaps. 5 University of Nigeria, *Enugu J. Geogr Nat Disast*, 2015 p. 7

[7] Bashir O., Oludare H. And Aloysios B., *Floods of Fury in Nigerian Cities Vol. 5*: *Nigeria, Journal of Sustainable Development, 2012*, 69-79. Douglas, Alam K., Maghenda M., Mcdonnell, Y. And Mclean L.; Unjust Waters: Climate Change, Flooding and The Urban Poor in Africa; *Environment and Urbanization Vol*. 20, 2008.187-2005.

[8] Akintola E.; Flooding Phenomenon. Ibadan Rex Charles Publication, 1994. 244-255.

of the flood threats experienced in locations along the plains adjoining major rivers in the country, including rivers Nigeria, Benue and Hadeja. The States in Nigeria mostly affected by such floods are Adamawa, Kano, Niger, Jigawa, Kaduna, Cross River and Kebbi[9]. In 2006, the worst fluvial flood in Nigeria was the Kaduna flood disaster which affected hundreds of thousands of human lives with economic loss worth millions of US dollars[10].

Costal floods in Nigeria affect the low-lying areas in the Southern part of the country comprising for example Rivers, Bayelsa, Akwa Ibom and Delta States. The Impacts of such floods have been severe due to the number of human populations exposed following the attractions of coastal areas foreconomic and social reasons.[11] Today, flooding risk is growing worse and worse in the various states of Nigeria. Nigeria is globally ranked with the top20 Countries whose present population and future sceneries includingclimate change and socio-economic factors are exposed to Coastalflooding[12].

Following the recent occurrences of flooding and wind erosion in some States of Nigeria, the realization is that flooding hazard in this Country is alarming. In Port-Harcourt in River State a lot of families, churches and offices were displaced as a result of flood that occurred. Vehicles at Federal Road Safety Commission Offices in Mile one in Port Harcourt Submerged in flood[13].

In Delta State, over 500 students of Government College at Bomadi in Bomadi Local Council of Delta State have been displaced by a raging floodwater from River Niger which has overflowed its bank. Public and private schools in Delta had resumed for the 2017/2018 academic session on Monday September 11th 2017 but the floodwater submerged the school compound to about four feet deep. Even the access road to the school and neighbouring buildings were affected. Expectedly, students were warming up to resume their classes after the assembly when suddenly the overflowing water from River Nigeria overwhelmed them.

Furthermore, it was reported to Journalists by a community leader and former member of the Post Primary Education Board (PPED) Mr. Thomas Ogobri that the flood has threatened the entire community adding that their children were no longer safe to attend classes. While expressing fearsof the unknown, especially the fear that the school might remain closed until the water recede. The community leader and the Principal of theSchool Mrs. Christiana Ogundimu therefore called on the State Governmentto construct a high road to the school and community. In a relateddevelopment, crops worth millions of naira were at the time destroyed bythe overflowing River Niger. One of the affected farmers, Alfred Agbah, saidthe overflowing River

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[9] Iloje N.PA New Geography of Nigeria, Lagos, Longman Publishers, 2004 Agbola B.S; et al; The August 2011 Flood in Ibadan, Nigeria; Anthropogenic Causes and Consequences. *International Journal of Disaster Risk Science*, Vol. 3, 2012. 207-217.

[10] Adebayo A.A and Oruonye E.D; An Assessment of the Effects of the 2012 Floods in Taraba State, Nigeria Paper delivered at the Annual National Conference Organized by the Association of Hydrological Science at University of Agriculture, Abeokuta, Ogun State Nigeria, 2013. 13-18.

[11] Adelekan O. Vulnerability of Poor Urban Coastal Communities to Flooding in Lagos, Nigeria, Environmental and Urbanisation Vol. 22. 2010. 433-450.

[12] Nicholls R., Hanson J.S et al. "Ranking of Port Cities with Higher Exposure and Vulnerabilities to Climate Extremes". *OECD Environment Working papers, No. 1* University of Southampton, United Kingdom, OECD Publishers, 2008

[13] Vanguard Publication, Flood Sacks Homes, Churches in Rivers, Monday July 24, 2017. 1, 5 & 40

Niger swept away all their crops especially the yam and appealed to Government and well-meaning Nigerians to come to theiraid. Investigation revealed that houses within the River Niger bank havebeen completely submerged when the river started overflowing its bankalthough no life was lost, farm crops within Oko and Head Bridge were destroyed[14].

Pluvial floods usually occur annually during rainy seasons between July and October and affect mainly the urban areas in Nigeria. Such floods which are arguably unprecedented in recent times are caused by more frequent and severe rainfall which overwhelms the efficiency of drainage systems and soil infiltration capacity[15]. That of the urban areas in the economic and political development of Nigeria is generally acknowledged, its enhancement however, is a critical anthropogenic influence on climate change and hydrological cycle in the Country given that much impervious surface, increase surface water runoffs and reduce soil infiltration capacity[16].

Recently, the National Emergency Management Agency (NEMA) raised alarm over impending flood in Anambra, Abia, Delta and Bayelsa States. Thewarning was passed barely 24 hours after the Niger Basin Authority (NBA) released an alert on River Niger to the effect that further rise in water levelin Niger republic would spread to Benin Republic, then Kainji Dam inNigeria. Prior to the flood alert, major dams in the country includin8 Shiroro, Kainji and Jebba had reportedly been full and spilling water.

The NEMA Director General, Mustapha Maihaja, during a stakeholdersmeeting on the flood situation had on the 13$^{th}$of September in Abuja notedthat Nigeria was facing an imminent disaster and there was the need for the State Governments to be prepared for any eventuality[17]. According to him, about 27 states have been affected by flood while windstorm and rainstorm have affected 10 states in the Country adding that over 40,161 people have been displaced.

The Director General expressed regret that the State Emergency Management Agencies (SEMAS) lack adequate capacity and preparedness to address the disaster if it eventually happens. The Director of Engineering Hydrology, Clem Onyeaso explained that the Niger Basin Authority issued the alert on September 7", 2017 and it would take nine days for the water to come into Nigeria. It was pointed out that Abia, Anambra, Imo, Rivers and Bayelsa States are all part ways for River Niger to pass before it empties into the Atlantic Ocean.[18]

On the Banuel River axis, he, Onyeaso said that there was no cause foralarm yet as water was still being impounded in Lagdo Dam in Cameroonadding that if water was released from the dam, the entire Country wouldbe engulfed in managing flood. He expressed regret that the country hasonly 200 dams which are not enough to dam all the rivers to curtail flood.

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[14] The Guardia Publication, Flood from Overflowing River Niger Sacks 500 Students in Delta, Friday, September 15, 2017. 38

[15] Houston D. Werritty A., Bassett D., Geddes A. And Hoolachan A.,Pluvial Rain-Related, Flooding in Urban Areas; The Invincible Hazard. York, UK, Joseph Rowntree Foundation, 2011.

[16] Shuster W. D; Bonta J, et al; "Impacts or Impervious Surface on Watershed Hydrology: A Review", *Urban Water Journal Vol. 2*. 263-275.

[17]Ibid

[18]Ibid 14, According to Clem Onyeaso, in his statement said that States were already confronted with coastal flooding and any additional water would spell doom for the people.

In China, there are more than, 1000 large earth dams. Ghana also haveabove 700 dams but Nigeria that is on the downstream of a larger riverdoes not have adequate dams to checkmate flood.

The Director General of the Nigerian Meteorological Agency (NIMET), Abubakar Mashi warned that there might be flash flood in Kebbi, Niger, Kwara, Kogi, Nasarawa, Plateau and the entire South-South and South-East States. He disclosed that there would be early cassation of rain in the far Northern States among others, warning that there would be extended rainfall in all the South-South and South-East regions[19].

Being as it were, the rapid population increase in many Nigerian cities is also a global concern within the context of flooding in urban area. It is estimated that more than half of the world's population has been residing in cities since the last 6 years and by 2030 the number of people living in urban areas of developing countries will grow to 5 billion, that is, 60% of the world's population[20]. Regrettably, a major challenge with rapid population growth and urbanization in Nigeria which also seems to influence the risk of flooding in the Country both presently and in the future, if not addressed, has been poor urban planning particularly inadequate drainage system and the range of poorly serviced urban utilities[21].

Thus, it is pertinent to state the reality of wide spread flooding in Nigeria together with the mind-set of people carrying the notion that floods and wind erosion are inevitable phenomena which can never be fully curtailedwithin the natural environment appears to overwhelm efforts towards finding a solution.The crucial gap in flood risk reduction in Nigeria is poor attention to floodmodelling and assessment of vulnerability to flooding[22]. Flood data isfundamental to tackling flooding and wind erosion in Nigeria.

B. Corruption and Lack of Supervision

The Nigeria's Institutional approach to risk management of flood and winderosion is acutely flawed. Most times the Institutional framework is gearedtowards response to victims of flooding and wind erosion instead ofstrategizing preventive measures.

Key roles within the approach has consisted of facilitating the emasculationof victims affected by floods and providing them with urgent humanitarianneeds, the level of dissatisfaction and agitations from large numbers of theflood victims, especially the internally displaced persons query theeffectiveness of institutional approach in Nigeria. This research reveals thatthe weakness of this institutional approach in Nigeria is a majorcontributory factor leading to more

[19] The Guardian Publication, Flood Disasters Loom in Bayelsa, Anambra Abia, Delta States-NEMA says 27 States Already Affected by Flood. Vol.34, No. 14, 139, Thursday, September 14, 2017. 1&6

[20] Huong HTL, Pathirana A., Urbanization and Climate Change Impacts on Future Urban Flood Risk in Can Tho City, Vietnam, Hydrology and earth System Sciences Discussions, 8, 2011. Pp 10781-10824 United Nations World Population Prospects; The 2006 revision Executive Summary Department of Economic and Social Affairs Population Division, United Nations: New York, 2007.

[21] Olorunfermi F.B; Managing Flood Disasters Under a Changing Climate Lessons from Nigeria and South Africa NISER Research Seminar Series, NISER, Ibadan-Nigeria, 2011.

[22] Nkwunonwo U.C, Malcolm W, Brain B, Flooding and Flood Reduction in Nigeria: Cardinal Gaps. *5 University of Nigeria, Enugu J. Geogr Nat Disast*, 2015, 1

frequent flooding in the country. TheNigerian Meteorological Agency (NIMET), National Emergency ManagementAgency (NEMA), State Emergency Management Agencies (SEMAS) shouldrestructure their legal framework towards preventing flood and winderosion rather than the structural framework of responding to flood victimsonly. This alone without more S not satisfactory to the internally displacedpersons. Sometimes even the relief materials given to mitigate the uglysituation are diverted from the victims who ought to be the beneficiaries.

Thus, in Makurdi in Benue State, thousands of Internally Displaced Persons (IDPs) at the international market had on the 12th day of September, 2017prevented the alleged diversion of relief materials by camp officials.According to the report[23], the protest started when a truck, two Hilux vans,a bus and a saloon car loaded with relief materials from the campwarehouse were about to drive out of the camp.

The protesters overpowered the security guards at the camp and blocked the camp entrance to prevent the vehicles from moving out with the materials. The angry protesters reportedly accused camp officials of diverting the materials and abandoning them to die of hunger. Some of the internally displaced persons (IDPs) claimed they were not given any food items for three days. One of the IDPs, James Tarkende said;

> *When Governor Samuel Ortom and the Tor Tiv, Prof. JamesAyatse, visited us they told us that nobody should divertmaterials out of the camp that is why we are Protesting. In this camp, only few People sleep on mattresses but we are not complaining. We are suffering but because of the situation at hand we understand with the Governor but the camp officials have gone too far this time. This is not the first time they are doing this, most times they do it in the night.*

The commissioner for Water Resources and Environment, Joseph Utsev said the State Government would investigate the incident. The Government had earlier removed the camp manager over allegations of irregularities. Thus, the above can be likened to a case of corruption and lack of proper supervision by relevant Agencies. Corrupt practices among those appointed to administer relief materials in order to savage the bad situation of flood victims are now also making the situation to grow worse due to corruption. Arguably, Institutional framework with a complex chain of action which characterizes Nigeria is not ideal for a country with urgent needs to address the threats of flooding. The widespread flooding in Nigeria requires less complex framework with reduced chain of action and increased authorityand responsibilities towards flooding and ways of managing its threats as is the case in the United States, UK and Netherlands where a centralized authority such as FEMA, Environmental Agency (E.A) and Rijkswaterstaat respectively operates within the Institutional framework of institutional approach with more abundant resources towards addressing the challenges of flood risk.[24]

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[23] The Guardian Publication, Benuel IDPs Protest Against Diversion of Relief Materials, Thursday, September 14; 2017, 12

[24] Nkwunonwo U.C, Maicolm W. and Brain B., Flooding and Flood reduction in Nigeria: Cardinal Gaps. *5 University of Nigeria, Enugu J. Geogr Nat Disast*, 2015, 7.

The vulnerabilities of Local communities to flooding in Nigeria may indicate among other factors an overwhelming level of irresponsibility towards flooding and ways of addressing its challenges.

## 3. Risk Management Strategies

Risk can be defined as a chance of loss or as chances of events having the possibility of occurring or not occurring. Environmental risk therefore means disasters that affect lives and properties within a particular environment which are caused by the activities of man and other natural occurrences.

According to Okonkwo, environmental risk management strategies are those techniques for managing environmental hazards or risks.[25]According to Mba, environment is the sum total of all conditions that surround man at any point in time on earth. Environmental risk management is the identification, evaluation and economic control of those risks that threatens lives and properties in an environment.[26]The different strategies for managing environmental risk are discussed as follows.[27]

### *A. Risk Avoidance*

Simply means foregoing the activity associated with the risk and opting for the activity considered to result to minimal adverse effect. It is a transtic and an extreme method of dealing with risk. It involves avoiding the event that could generate loss.

### *B. Risk Reduction*

The term risk reduction refers to decreasing the chance of loss producing event and the size of the associated losses. The philosophy behind maintenance culture, Road Safety Corps, Police Force, Security Men, Proper Planning, environmental sanitation[28].

### *C. Risk Retention*

Risk retention refers to the situation where risk cannot be avoided such that the consequences of the risk are retained or assumed. Risk retention can be called risk assumption.

### *D. Risk Transfer*

Risk transfer means shifting of the financial liability for loss, injury or damage to another person. In the world, insurance companies are the professional risk bearers. It involves passing on the burden or risk toanother person who undertakes to bear them in accordance with the termsof the agreement[29].

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[25] Okonkwo V. I., "Introduction to Insurance: A Nigeria Perspective" Hossana Publication. Enugu.

[26] Mba C; and Ogbazi J. "Urban Planning Perspective and Emerging Concepts: The Principles and Practice of Urban and Regional Planning in Nigeria, Awka, Anambra State. Mekshink Publishers. 1979/1996

[27] Sunday C.N; "Strategies of Environmental Risk Management in Nigeria". *Global Advanced Research Journal*, 3(1) Ebonyi State University-Abakaliki 2014. 011-015.

[28] Nwite S.C., "Element of insurance". Immaculate Publications Ltd, 2005

[29] Okonkwo V. I., Environmental Risk Management in Nigeria Journal of Banking and Finance Ebonyi State University. 2, 1

### *E. Risk Diversification*

This has to do with diversifying into many activities with the aim of offsetting loses from any activity by a compensation gain from the other activities. This strategy of handling risk sums up the facts about not puttingyour eggs in one basket.

### *F. Risk Combination*

Risk combination involves two specific processes grouping of similar homogenous risks into exposure units and predicting the combined chances of loss. Thus, predictable loss is then shared proportionately by all the units in the combination.

### *4.* Disaster Management Process

Disaster management involves many diverse activities[30]. These activities can be grouped into five main stages viz; Assessment, Mitigation, Preparedness, Response and Recovery. The first three activities are performed before the occurrence of disaster while the fourth and fifth take place during and after the occurrence of disasters respectively.

### *A. Assessment*

This involves inventorying (identification and recording) the sensitivity and vulnerability of a region to ascertain types of hazards. At this stage, the levels of risks, the danger to human life, environment and structures are considered and determined. The assessment will provide identification of development that increase them, thus establishing the culture of prevention.

### *B. Mitigation*

This entails making necessary provisions to ensure that the region is less vulnerable to known risks and danger. Mitigation activities may include; and use and planning, moving settlement away from areas susceptible to such risks and dangers such as flood and storm areas and the establishmentand enforcement of building code.

### *C. Preparedness*

This involves planning of emergency aid, development of scenarios and monitoring systems and establishment of early warning system, public information and awareness of likely hazards, community involvement in disaster management programmes, establishment of disaster management and reduction at local, State and National Levels and proper communication channels.

### *D. Response*

This happens after the occurrence of the disaster which would have caused untold human suffering and damages to the environment. At this stage, rescue teams will attempt to save lives, injured people will be cured and nursed and reliefs will be supplied to traumatized survivors. This is the most sensational stage of disaster reduction and management system.

[30]Augustine Chukwuma Emeribeole, Managing Flood Disasters in Nigerian Cities: Issues and Strategies Towards Meeting the Challenges in the Modern World-A Case Study of Owerri Metropolis Imo State. Nigeria (7587) Sofia, Bulgaria, From the Wisdom of the Ages to The Challenges of the Modern, May 2015, 17-21

### *E. Recovery*

This stage involves assessment of damages, rehabilitation, cleaning of theenvironment and social and economic reconstruction. It also entails the firstthree stages of disaster management process viz: assessment, mitigation and preparedness, all of which are central to strategic development aimed at preventing or minimizing the effect of future disasters.

## 5. Legal and Institutional Basis for Checking Flood and Flooding

Institutional approach towards addressing the threats of flooding in Nigeria dates back to the early 1960's with the establishment of Federal and State Ministries of works[31]. However, the increasing frequency and severity offloods across the country prompted the establishing of the Federal Environmental Protection Agency (FEPA) as a unit in the Federal Ministry of Works and Housing in 1988[32], and the Federal Ministry of Environment (FME) in 1999. Among other things, the key roles of FME towards flooding risk management in Nigeria is to assess the flooding potentials as well as design, determine, develop and authorize the development of appropriate flood reduction measures for the country.[33]

NEMA[34] is basically a coordinating body for disaster management in Nigeria actions towards addressing the threats of flooding which the Agency coordinates include but not limited to policy formulation leasing hath and assessing the state of preparedness of all other relevant Agencies, data collation from relevant Agencies, education of the general public on flooding and interaction with SEMA towards the distribution of relief materials to disaster victims within states and Local Government Areas. Thus, on this premise, a memorandum of understanding was signed with NESREA and NOA to intensify efforts towards flood risk management in Nigeria.[35]

The protection and development of the environment, risk management of flood and wind erosion is the key responsibility of NESREA,[36] it is the Agency that enforces all environmental laws, guidelines, Policies, Standards andRegulations in Nigeria, as well as enforcing compliance with provisions ofinternational agreements, Protocols, Conventions and treaties on the environment to which Nigeria is a signatory. Whilst the provision of humanitarian needs such as shelter, clothing and floods for internally displaced persons is anchored by the National Commission for refugees (NCR), the importance of Local Communities being aware of flooding and actively participating

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[31] Ibitoye M; The Need for Planning of Peri-Urban Growth in South Western Nigeria: The Surveyor's Perspective Symposium Organized by the Nigerian Institution of Surveyors (NIS) University of Lagos, Lagos State, Nigeria. 2007.

[32] Obeta M.C; Extreme River Flood Events in Nigeria: A Geographical Perspective of Nigerian Journal of Geography and the Environment Vol. 1; 2009. 170-179.

[33] Federal Ministry of Environment (FME); Bulletin on Ecological Disasters, Abuja, Nigeria. 2012.

[34]With the FME, Came various Ministries and Agencies for tacking flooding in Nigeria which include; Federal Emergency Management Agency (FEMA) National Emergency Management Agency (NEMA), State Emergency Management Agency (SEMA), Local Emergency Management Agency (LEMA), National Orientation Agency (NOA), National Commission for Refugees (NCR), National Environmental Standards and Regulations Enforcement Agency (NESREA) which by 2009, Nigerian Acts Supersede the FEPA, Nigerian Meteorological Agency (NIMET), Nigeria Hydrological Services Agency (NIHSA), Nigeria's Response to Climate Change (BN RCC).

[35] Nigeria Emergency Management Agency-Report on Flood Disaster in Nigeria. Abuja-Nigeria, Government Press. 2013.

[36] Ibid

in discussions and decisions which might increase their resilience and adaptability to the hazard highlights is the role of National Orientation Agency which re-orientates and keeps Nigerians informed about ways of taking part in issue that affects them.[37]

The poor perception of flooding in the country should be of a serious concern of this Agency. Issues relating to flood insurance are co-ordinated by Federal Emergency Management Agency (FEMA), the Agency makes Federally fundedinsurance protection policy available for property ownership Nigeria.Policies relating to assisting flood victims at State and Local GovernmentLevels are Co-ordinated by State Emergency Management Agency (SEMA) and Local Emergency management Agency (LEMA).[38] As Climate change is complicit with other factors that influence flooding in Nigeria, Building Nigeria's Response to Climate Change's (BNRCC) key role is to collaborate with other agencies to promote the capacities of the generality of human populations within the Country to cope with all effects of Climate Change. Nigeria Environmental Study/Action Team (NEST) undertakes continuous research required for enhancing decisions and robust measures towards addressing flooding in Nigeria[39].

Some actions which characterize a cross section of Nigeria such as the as the failure to comply with environmental laws and regulations and to adhere toweather warnings and alerts are possible situations where lack ofresponsibilities of the general public is highlighted.[40]Thus twelve communities in Boki Local Government Area of Cross Riverwere flooded following two days heavy rain while more than 3000 farmlands were equally destroyed.[41] The incident which occurred were reportedto have rendered hundreds of residents homeless as properties worth millions of naira were destroyed. Mr. John Inaku, the Director General of Cross River State Emergency Management Agency (SEMA), told the NewsAgency of Nigeria (NAN) during an inspection of the affected areas that theeconomic survival of residents of the submerged communities had beenseriously affected. The Director General Stated that more than, 1,000 people were displaced and were taking refuge in nearby communities. According to him, the State Government promised to address the plight of the people.[42]

Thus, some of the communities affected are Bago, Unu, Bagabo, Bakie,Bufua and Kakwe-Beebo Communities.

This deluge of September 18 and 19, 2017 had caused massive flooding in 12 communities in Cross River. Properties worth millions of naira were destroyed in the process. The flood also destroyed farmlands, crops such as Banana, Cassava, Plantain, Yam, Cocoa and others were affected while some bridges were washed away. The worst aspect of the flood was that it also destroyed streams which served as the only source of drinking water for the people while the main access road was washed away as a result of landslide. Furthermore, one of the victims. Mr.

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[37] Ibid
[38] Ibid
[39] Kolawole O.M; Olayemi A.B. and Ajayi K.T; "Managing Flood in Nigerian Cities: Risk Analysis and Adaptation Options-Ilorin City a Case Study". *Archives of Applied Science Research*, 3:
[40] Aderogba K.; "Qualitative Studies of Recent Flood and Sustainable Growth and Development Cities and Towns in Nigeria". *International Journal of Academic Research in Economics and management Science, 1, 2012,* .11-25.
[41] Ibid
[42] Ibid

Bette Obi, Chairman of Cross River Forestry Commission told News Agency of Nigeria (NAN) that the flood had wreaked serious havoc on residents of the area. Obi, who said his cocoa and plantain farms were destroyed by the flood appealed to the State and Federal Government to come to their aid. Thus according to him; 'As we speak, our farmlands have been washed away by flood. The streams were we fetch water for drinking has been polluted. We urgently need Government's assistance in our Communities to ameliorate our plights'. Another victim, Mr. Gabriel Ofre, traditional ruler of Bago Community said the flood had displaced his entire household and that his property and other vital materials destroyed as well. Ofre appealed to State Emergency Management Agency (SEMA) and National Emergency Management Agency (NEMA) to come to their aid saying that residents of the area werepeasant farmers who live on the meagre earnings from their farm produce[43].

It is pertinent to recall that in Nigeria, flood and wind erosion has been occurring for many decades destroying properties communities andfarmlands but no adequate remedy has been proffered especially by thevarious Agencies owing to the damages and loss being caused by flood and wind erosion every year,[44] the Agencies need to review their risk management strategies by shifting from post-disaster reaction to pre- disaster response or reaction. Between July and October in the year 2012, flooding and wind erosion in Nigeria pushed rivers over their banks and submerged hundreds of thousands of acres of farmlands. By mid-October,[45]the floods had already forced 1.3 million people from their homes and claimed 431 lives, according to Nigeria's National Emergency Management Agency (NEMA), Oguta Local Government Area and Ohaji/Egbema Local Government Area in Imo State Were Among the areas that were affected by the said floods. It shattered both the built environment and theundeveloped areas[46]. Another area that was adversely affected by the 2012 flood is the Isoko ethnic group of Delta State in Nigeria. So many towns and villages in Isoko land were flooded whereby homes, offices, churches, market places and schools were displaced. Properties such as buildings and crops were destroyed as a result of the flood.[47]

## 6. Conclusion

The effect of environmental hazards cannot be over emphasized. Floods and wind erosion are among the most devastating natural disasters in the world today, claiming more lives and causing more property damage than anyone would imagine. In Nigeria, floods and wind erosion affect and displacemore people than any other disaster and also cause a lot of hindrances to economic activities, damages to property such as buildings, economic crops and trees.

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[43] The Guardian Publication, Flood Sacks 12 Communities, Destroys 3,000 Farmlands in Cross River. Monday. September 25, 2017,.12.

[44] Ibid

[45] Ibid

[46] Augustine Chukwuma Emeribeole., Managing Flood Disasters in Nigerian Cities: Issues and Strategies Towards Meeting the Challenges in the Modern World-A Case Study of Owerri Metropolis Imo State. Nigeria (7587) Sofia, Bulgaria, From the Wisdom of the Ages to The Challenges of the Modern, May 2015, 17-21.

[47]Among the communities that were affected, to mention but few were, Ozoro, Oleh, Uzere, Oyede, Ozoro, Oleh, Uzere, Oyede, Ivrogbo, Emede, lgbide, Enwhe, Uro, Bethel etc.

We conclude in this research that environmental risk management is very important in any Nation especially in a developing Nation like Nigeria. It should be seen as a major remedial response to flooding and wind erosion menace in Nigeria.

## 7. Recommendations

The followings are recommended in this study:

A. This study recommends the creation offlood statistic data to tackling flooding and wind erosion and also the provision of more dams by the Government of the Federation to curtail flood. And its ravaging environmental risks

B. The study recommends thatthe Government and its Agencies should shift their risk managementstrategies from post-disaster reaction or response in providing reliefmaterials to flood victims to pre-disaster reaction in curtailing flood. Governmental policies must be proactive and not reactive. It is usually said that prevention is better than cure. This entails assessment of risk posed by environmentalhazards of flooding and wind erosion, long term preparedness andprevention plans and warning system.

C. The ministry of information and orientation should develop anextensive public enlightenment campaign or programmes to educate thepublic about flood and wind erosion risks or hazards.

D. Rivers channel should not be used as dumpsite for refuse disposal.Environmental Agencies such as National Environmental Standards andregulation Enforcement Agency (NESREA), National EmergencyManagement Agency (NEMA) and State Emergency Management Agency(SEMA) should all seat up in their responsibilities to the environment toensure that structural development within the flood plain are stopped.

E. The European Union framework which requires allconstituting states to prepare flood hazard/ risk maps, it is stronglyrecommended that legislation that requires each State of Nigeria toproduce a flood hazard or risk map. This will strengthen existinginstitutional frame work and enhance increased responsibility towardsflood risk management among the various states.

F. Another area of attention is that enforcement of environmentalstandard and laws is often a vital tool towards curtailing adverse effects of climate change with regard towards eradicating indiscriminate waste disposal, construction along flood plain, falling of trees and indiscriminate car parking among others anthropogenic activities which influence flooding and wind erosion. The relevant environmental Agencies should embark on arrest, prosecution and imposition of appropriate fine on all who violate the provisions of the law.

G. It is also recommended in this study that the Nigeria Environmental Study (NEST) should be reviewed in terms of its research strategies with respect to how relevant they have been and how they can be further strengthened to promote more scientific researches towards ways of addressing the challenges of flood and wind erosion menaces in Nigeria.