

## Floods of Fury in Nigerian Cities

Odufuwa Bashir O.<sup>1</sup>, Adedeji Oludare H.<sup>2</sup>, Oladesu Johnson O.<sup>3</sup> & Bongwa Aloysius<sup>4</sup>

<sup>1</sup> Department of Urban and Regional Planning, College of Engineering and Environmental Studies, Olabisi Onabanjo University, Ogun State, Nigeria

<sup>2</sup> Department of Environmental Management and Toxicology, Federal University of Agriculture, Abeokuta, Nigeria

<sup>3</sup> Department of Fine and Applied Arts, College of Engineering and Environmental Studies, Olabisi Onabanjo University, Ogun State, Nigeria

<sup>4</sup> Institute for Housing and Urban Development Studies (IHS), Erasmus University, Rotterdam, the Netherlands

Correspondence: Odufuwa Bashir O., Department of Urban and Regional Planning, College of Engineering and Environmental Studies, Olabisi Onabanjo University, Ogun State, Nigeria. E-mail: olubashy22@yahoo.com

Received: January 30, 2012 Accepted: June 1, 2012 Online Published: June 18, 2012

doi:10.5539/jsd.v5n7p69

URL: <http://dx.doi.org/10.5539/jsd.v5n7p69>

### Abstract

Flooding is a phenomenon that sometimes has devastating effects on human livelihoods. Impact of floods is more pronounced in low-lying areas due to rapid growth in population, poor governance, decaying infrastructure and lack of proper environmental planning and management. Flooding is also exacerbated by climate change and inadequate preparedness. However, flooding in most Nigerian cities is a major environmental challenge that has continued to defy solution as more people are rendered vulnerable to hazards involved. The implications of recent flooding in Nigerian cities include among others; loss of life and properties, spread of diseases, deformed livelihoods, assets and infrastructure. This paper therefore provides an overview of how Nigerian cities have been affected by flood incidences. The paper contends that prevailing effects of climate change, particularly flooding affecting almost everything in cities demands urgent attention in form of environmental and infrastructure planning, effective policy, improved and effective management of ecological fund, enhanced environmental disaster insurance, effective professional practice, 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 impact. It also argued for the need to reinvent Nigerian cities through good governance towards creating sustainable cities in the country.

**Keywords:** cities, urbanization, flood, infrastructure, climate change and sustainable city

### 1. Introduction

A city can be regarded as a living system that is made up of different interacting parts, and functioning through the interplay of different sectors. It has been acknowledged that cities are focal points that enhance economic and social activities of the people and society at large. Watson (1993) reiterated that cities are not simply bricks or mortar; they are places of dreams and fancy, of nostalgia and imaginations, of emotions and desires. They are viewed as magnets that attract World's best thinkers and innovators. Explaining the importance of cities towards liberating people from the shackle of poverty; UN-Habitat (2003) posited that "cities makes countries rich". This implies that the economic and social wellbeing of any nation lies on the development status of cities. It can therefore be conceived that without cities, countries or nations cannot exist or function efficiently. Jane Jacobs cited in (Neal & Curtis, 2008) emphasized that "without cities we would all be poor". According to Pacione (2001) cities can be seen in different ways by residents, tourists, workers and children. For the homeless person, the city may be a cold, anonymous and inhospitable place; for the elderly, a spatially restricted world; and for the wealthy a cornucopia of opportunity and well-being (Pacione, 2001). Indeed, cities are repositories of knowledge and agents of socio-political change (Tibaijuka, 2008). They serve as nexus of production, innovation and specialized services, as well as generating new forms of social organization, cultural integration and dialogue.

Urbanization particularly in developing countries is an inevitable issue of discourse in most cities because of the rapid and uncontrolled rate at which the process is affecting the fabrics of cities most especially in developing countries. For instance, the persistent migration of people from deprived areas; coupled with poor urban

governance has put unprecedented pressure on cities' resources and infrastructure. It goes beyond doubt that, failure to manage the impacts of rapid urbanization in most cities is threatening human health, environmental quality and urban productivity. This is coupled with the general global climate change that is responsible for an unpredictable weather condition resulting to an increase occurrence of natural disasters, such as floods, storms and forest fires. Within the cities, human activities such as rapid industrialization and urbanization, population growth, exploitation of natural resources and location of infrastructures exacerbate the occurrence of floods. Although flood is a natural occurrence, it often leads to disasters as a result of human-created vulnerability, which is a consequence of human-environment interactions.

Floods are the most recurring, widespread, disastrous and frequent natural hazards of the world. It is worthy to note that all floods are not alike, while some floods develop slowly and last for a period of days; flash floods can develop quickly, sometimes in just a few minutes and without any visible signs of rain. Urban flooding has resulted in major loss of human lives; destruction of economic and social infrastructure such as water supply, electricity, roads and railway lines (means of livelihood). Flooding is an important factor responsible for the spread of diseases such as diarrhoea, typhoid, scabies, cholera and malaria.

Worldwide, there has been rapid growth in number of people killed or seriously impacted by flood disasters (UN-Water, 2011). Indeed, the amount of economic damages affects a large proportion of people in low-lying coastal zones or other areas at risk of flooding and extreme weather condition. According to UN-Water (2011) floods, including urban flood is seen to have caused about half of disasters worldwide, and 84% disaster deaths in the world was attributed to flooding. Askew (1999) reiterated that floods cause about one third of all deaths, one third of all injuries and one third of all damage from natural disasters. It is displeasing to note that, Urban areas in Nigeria are particularly vulnerable to flooding due to inadequate drainage system; changes in ecosystem through the replacement of natural and absorptive soil cover with concrete; and deforestation of hillsides, which has the effect of increasing the quantity and rate of runoff, and through soil erosion and the silting up of drainage channels. Low-lying coastal areas such as Lagos, Nigeria and other cities like Ibadan and Abeokuta where the flood-plains have been abused due to haphazard physical developments, illegal erection of buildings and other structures as well as unhealthy habit of dumping refuse and solid wastes in open channel drainage systems are particularly prone to flood disasters. Flooding in most Nigerian cities is a major environmental challenge that deepens the horizon of poverty both directly and indirectly; and widens the inequality gaps between the have and have-not. The implications of recent flooding in Nigerian cities include among others; loss of life, spread of diseases, deformed livelihoods, assets, and infrastructure.

This paper provides an overview of how Nigerian cities have being affected by effects of climate change particularly, increase in urban flood. Arguments raised in the paper will be instrumental in guiding decisions for integrating climate-sensitive city planning and management policy. The paper is divided into six sections including this introductory part. Section two and three deals with theoretical issues and the need to understand the impact of climate change on cities with focus on flood. The need to reinvent Nigerian cities towards achieving sustainable cities is presented in Section four. A number of policy recommendations and conclusion were provided in the last section.

## **2. Sustainable Cities: A Brief Theoretical Discourse**

The principles of sustainable and healthy cities are characterized by the recognition of the pivotal role of city. The efficiency and effective interplay of different sectors in cities; determines to a great extent the attractiveness and level of competitiveness of cities. Ompad et al. (2006) buttressed this point by explaining that the physical and social environments that define the urban context are shaped by multiple factors and players at different levels. Thus, sustainability of cities is not just an ecological or environmental issue, but equally captures economic and social issue. The theory according to SIEMEN (2010) rests on four pillars: (i) competitiveness (ii) environment (iii) quality of life and (iv) good governance. For cities to attract investments opportunities and to be competitive, they need modern, abundant skilled labour, efficient infrastructure, improved information and communication technologies, access to quality housing, transport, education, water and electricity supply, etc.

It should be mentioned that the bedrock of sustainable cities; lies within the concept of sustainable development. It has been a leading theme of international conferences for over two decades. It is generally constructed around; environmental, economic, social and cultural dimensions that target the preservation of the overall environment (Gbadegesin, 2005). The concept has become a catchword for discussion and action among scholars, professionals and policy makers. This stemmed on the fact that, it captures a widespread feeling that "the state of the earth is somewhat precarious" (Pugh, 1996). Sustainable development is commonly understood through the definition given by the World Commission on Environment and Development (WCED, 1987). Sustainable development

seeks to meet the needs and aspirations of the present generation without compromising the ability to meet the needs of the future generation. It is a process in which the exploitation of resources, the direction of investment, the orientation of technological development and institutional changes are all in harmony and enhance both current and future potential to meet human needs and aspirations. It entails the alleviation of poverty and the maintenance of environmental and ecological equilibrium in the process of exploiting resources for the provision of jobs, income, food and social services that promote the quality of human dignity, for the present and future generations (Segynola, 2005). Sustainable cities approach unveils the notion of developmental activities that is environmentally, socially and economically friendly. To attain a sustainable city requires an overhauling of environmental, economic and social justices that uphold the necessity of adequate and managed infrastructural facilities for city dwellers, particularly the vulnerable groups. To actualize this, both behavioural and structural changes that guarantee social equities between and within cities needs to be pursued.

It should be noted that, the concept recognizes that, economic growth is intricately linked to the environment; and development in any given country as well as growth must be geared towards proper management of natural and human resources. Ressa (1989) elaborate that sustainable development is a positive socio-economic change that does not undermine ecological and social systems upon which city's developmental activities depends. It is imperative to note that achievement of sustainable cities requires concerted efforts of integrating planning and developmental policy into different human activities. This is important particularly in Nigeria and other developing countries because of the persistent rate of deforestation, loss of biodiversity, destruction of ozone layer and accelerating rate of waste generation and improper management.

Above all, a sustainable city can partly be assessed by the level of wealth created within a given period, and how much income opportunities accrue to cities inhabitants. Dunford and Greco (2006) emphasized that development, wealth and income of an area depends on the interaction of a four sets of factors that include;

- (i) Natural and created resource endowments (natural resources, infrastructures, population, skills, degree of development of the forces of production, etc) which determines the activities in which its inhabitants specialize and their role in wider divisions of labour
- (ii) The degree and effectiveness with which resources and an area's human potential are mobilized. (technologies and skills, institutional and social relations, capacities and performance)
- (iii) The extent to which inhabitants can command and control resources of others based on the degree of unequal exchange and extent of wealth transfers
- (iv) Recognition of the fact that, resources are created conserved and reproduced through development

### **3. Climate Change: Why Does It Matter?**

Climate change is an issue that is related to economic, social, cultural and physical environment of any nation. It is a vital environmental factor that shape and re-shape various activities of human beings in a society. The United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as a change of climate which is attributable directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over a comparable time periods (Ayoade, 2004; African Institute of Applied Economics, 2009; IPCC, 2001; Odjugo, 2009). Odjugo (2009) posited that human factors (industrialization, technology development, urbanization, deforestation and burning fossil etc) and natural factors (solar radiation quality and quantity, astronomical position of the earth) are notable causes of climate change. Climate change is making weather less predictable, especially in developing countries like Nigeria where facilities to predict and manage weather conditions are not adequate. The unpredictability of rainfall in recent times has caused untold hardship during the raining season. Climate change works in an indirect way to aggravate urban flooding by altering the pattern of flooding in the flood prone areas (ActionAid, 2006).

It however go beyond doubt that climate change and its impacts such as increase in sea level have direct impact on urban and coastal floods, and it have continuously disrupts the social fabric of cities and exacerbates poverty particularly in most developing countries, including Nigeria. People are indeed becoming increasingly vulnerable as the urban population increases and the poor ones are push into the fragile areas which are prone to flooding. Heavy rains accompanied by thunderstorms appear to be on the increase in most urban areas probably because urban built up surfaces attain higher temperature than surrounding areas, and create a local air circulation that proceeds an "urban heat Island" dust particles caught up in that circulation act as nuclear on which moisture in cloud condenses, forming rain droplet that eventually may develop into the large rain drops of a major thunder storm (Nolan & Marron, 1995).

The primary cause of flooding in many parts of the world is directly or indirectly related to rainfall and the catchment areas of major river systems. Climate change also works in an indirect way to aggravate urban flooding (ActionAid, 2006). However, urban flooding is not just related to heavy rainfall or extreme climatic events; it is also related to changes in the built up areas themselves. Potschin (2009) asserted that land use is an important determinant of the state of the natural environment. Abuse of urban land through development is a major factor that influences the incidence of flooding in urban areas. The Millennium Ecosystem Assessment (MA, 2005), has shown that at global scales the conversion of ecosystems through human activities has adversely affected not only biodiversity, but also a range of ecosystem services.

Despite the knowledge of climate change and its impacts especially in urban environment, it is disheartening to note that, most Nigerian cities find it difficult to provide in advance resilient and adaptation measures that will cater for the hazards such as increased floods resulting from global climate change. Meanwhile, adaptation within the realm of climate change include actions taken by people in response to, or in anticipation of changing climate conditions in order to reduce adverse impacts or take advantage of any opportunities that may arise (Mani et al., 2008; Nzeadibe et al., 2011). Thus, the need for, type and scale of adaptation depends on the kind of cities management change taking place, as well as the vulnerability of people and natural systems to this changes.

#### **4. Tragedies of Floods: A Contemporary Discourse in Nigeria**

Flooding is becoming an increasingly severe and more frequent problem in African cities. Unfortunately, the impact is more felt by the urban poor in such a way that recovery is unlikely to be achieved without external aid (Blaikie, 1994). In other words, urban poor are the most vulnerable to impact of flood because they occupy the floodplains for settlements (informal). Coupled with lack of attention to household waste collection, construction and maintenance of drainage channels, flood disasters is becoming more pronounced (Satterthwaite et al., 2007; Douglas et al., 2008; Potschin, 2009). It should however be noted that, flooding is a natural phenomenon that has surmounting effects on human livelihoods. Nelson (2001) viewed flood as a natural consequence of stream flow in a continually changing environment. Sada (1988) defines flooding as unusually high rates of discharging; often leading to inundation of land adjacent to streams, and it is usually caused by intense or prolonged rainfall. 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. Flooding is often exacerbated by human activities (Olanrewaju & Fadairo, 2003) such as the presence of riverside infrastructure (dams, piers, and lands); and by poor development practice including riverside development, excessive cleaning, encroachment upon water ways, dredging which may cause changes in the hydrological balance of water-ways involved (Nolan & Marron, 1995).

In Nigeria, particularly cities; flooding is a critical environmental problem or major hazard that is continuously affecting effective functioning of urban environment, especially in the areas of sustained infrastructure and services, which are germane to sustainable livelihood. It often arises as a result of the extension of urban areas unaccompanied by development of strong drainage systems, adequate planning and disaster management strategies. Indeed, flooding is one of the most devastating hazards that are 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:

- (i) Localized flooding- occurring many times in a year due to few and blocked drains
- (ii) Small streams in urban areas rise quickly after heavy rain, but often pass through small culverts under roads
- (iii) Major rivers flowing through urban areas
- (iv) Wet season flooding in lowland and coastal cities

In Nigeria, flooding occurs in three main forms; river flooding, urban flooding and coastal flooding (Gwary, 2008; Adeoti, 2010). 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. It should be mentioned that flooding in cities can contaminate water supplies and intensify the spread of epidemics diseases, diarrhea, typhoid, scabies, cholera, malaria, dysentery and other water-borne diseases (e.g. ascariasis see Figure 1 & 2). Frequent occurrence of floods can be attributed to the impositions made by cities on their environment. In some cases, natural ecosystems are often destroyed owing to demand for renewable resources, such as water, fossil fuels, land and building materials (development). Also, human influences in urban areas have considerably altered the hydrological system and nature of the ground surface causing destructive flood disaster and its attendant

physical and socio-economic outcomes (e.g. disruption of socio-economic activities, loss of properties, inaccessibility and reduction of the aesthetic quality of the environment).



Figure 1. Flooded house and coping strategies



Figure 2. Adapting to flooded apartment

Tragedies associated with flood disasters in Nigeria have significant effects on the people, city infrastructure and urban governance. In recent time most city residents felt the impacts of floods directly or indirectly, and the pathetic stories were captured by different newspaper headlines in Nigeria (see Box 1). Table 1 also reveals that floods has become a major problem in Nigerian cities since the first flood hit Ibadan, the headquarters of the old western region (now the capital of Oyo State) in 1948. Subsequently, series of serious tragedies of floods have occurred in Ibadan and other parts of the country between 1963-2011. Figures 3 and 4 shows scenes from flooded area in parts of Lagos in 2011.

Ibadan floods washed away 2,105 buildings (*The Punch*, 24<sup>th</sup> 2011, p.14). flood kills eight in Katsina and 100 families rendered homeless; five hour downpour triggers panic in Ibadan; Boy dead, dad, sister hospitalized in school fence collapse. Floods of fury in cities. Lagos calls for calm, Lagos ask pupils to stay away from school; (*The Nation*, July 11<sup>th</sup>, 2011). 10 dead in Lagos floods; Lagos/Abeokuta road cracks (*The Nation*, July 12<sup>th</sup>, 2011). Bakery, 10 buildings collapse. How Doctor, three kids died. Senator concedes with families of victims (*The Nation*, August 30<sup>th</sup>, 2011). Ibadan floods: six residents still missing as death toll hits 32. Lagos lawmakers seek Fed. Govt. intervention on flooding (*The Nation*, August 30<sup>th</sup> 2011). Four waitresses, baby die on wet night. Floods: Lagos residents go fishing (*The Punch*, July 12<sup>th</sup> 2011). Where do I start life from? Asks Ganiyat Hussein, revenue collector who lost all (*The Nation*, September 3<sup>rd</sup>, 2011). Floods: Residents count losses as canoe operators rake money (*The Punch*, October 7<sup>th</sup>, 2010). Flood: Sokoto council evacuates 6,000 residents (*Daily Times*, August 26<sup>th</sup>, 2011). I thank God I lost my business and all, but not my life (Ajibade Adewale, *the Nation* September 3<sup>rd</sup>, 2011). Ogun/Lagos flood national disaster, says President. FG launches 'flood early warning system' for food security (*The Guardian*, August 2<sup>nd</sup>, 2011). Govt. distributes relief materials to victims. Oyo CAN, senator mourn. Flood threatens Oyo residents (*The Nation*, August 29<sup>th</sup>, 2011). How we saved a 102-yr-old woman and 15 kids Ibadan floods death toll up as more bodies surface. Man loses eight children. Another loses four kids, father (*The Nation*, August 29<sup>th</sup>, 2011). Oyo: Politics of flooding, relief materials. (*The Punch*, September 19<sup>th</sup>, 2011). 'How we survived the flood of sorrow' (Oladele, Bisi). Our heart was in our mouth. We were so afraid because we were close to death (Felix Ero-*The Nation*, September 3<sup>rd</sup>, 2011). Man drowns in Odo Ona. Ajimobi to demolish buildings. UI loses ₦10b property. (*The Nation*, August 31<sup>st</sup>, 2011). 12-year-old girl drowns in Lagos floods, typhoid cases rise. Lagos relocates 681 (*The Punch*, October 12<sup>th</sup>, 2011). Floods sack residents of highbrow Ikoyi, Victoria Island. (*Punch*, July 3<sup>rd</sup>, 2011). Lagos residents panic as fresh downpour causes floods (*The Punch*, July 18<sup>th</sup>, 2011).

Box 1. Pathetic newspaper headlines on flooding in Nigeria

Table 1. Tragedies of flood and associated impacts in selected cities in Nigeria

States	Tragedy	Associated Impacts	Causalities Recorded	Years
Abia	Rainstorm	Houses	500 people	2001
Adamawa	Flood	Houses & Farmlands destroyed	500 people	2001
Akwa-Ibom	Flood & Rainstorm	367 houses washed away	4000 people	2001
Bayelsa	Flood	Houses, Schools, Markets & Farmlands submerged	2/3 of the population	1999, 2001
Delta	Flood & Rainstorm	Houses, Schools, Markets & Farmlands submerged	Half of the population	1999, 2001
Edo	Flood & Rainstorm	560 Houses destroyed	820 people	2001
Kano	Flood & Windstorm	Schools, Houses, Farmlands & animals destroyed	300,000 people	1988, 2001
Lagos	Flood	Buildings collapsed, markets submerged, properties destroyed.	300,000 people affected	1970's, 2011
Oyo	Flood	500 Houses demolished, properties destroyed & bridges collapsed	50,000 affected	1978,1980, 1985,1987 1990, 2011
Taraba	Flood	80 Houses totally swept off. 410 houses extensively destroyed	Over 50,000 displaced	2005
Zamfara	Flood	Building submerged, Farmlands destroyed, properties damaged	12,398 affected	2001

Source: Adapted from Etuonovbe, (2011).



Figure 3. Flooded street obstructing source of livelihood



Figure 4. Flooded Classrooms

### 5. Reinventing Cities: A Paradigm for Sustainable Cities

Sommers (2010) affirmed that African cities have perplexed and dismayed many visitors and scholars. Simone (2004) also assert that African cities “*don't work*” and for many urban residents “*life is reduced to a state of emergency*”. Ritner (1960) posit that African cities “...work, but they work for decay instead of growth.” Hope (1998) also contends that African cities make no sense in economic terms, as they are more urbanized than their level of economic development would justify. Kaplan (1996) also describes West African cities as ....“*high density concentrations of human beings who have been divested of certain stabilizing cultural models, with no*

*strong governmental institutions or communities to compensate for the loss*". With emphasis on Nigerian cities, Agbola (2002) cited in Aribigbola (2008) explained that Nigerian cities are reputed to be the dirtiest, most unsanitary, least aesthetically pleasing and dangerously unsafe for living. They are characterized by non-functioning infrastructure facilities, most poorly governed, intensively dotted with illegal structures, while physical growth and development of cities had not been properly managed or controlled (Aluko, 2000; Aribigbola, 2008). A high proportion of the urban poor who could not afford the cost of land within the cities, alternatively settle on sites such as the floodplains or wetlands, which are at risk from floods.

SIEMENS (2010) explained that, redesigning cities could positively influence up to 70 percent of humanity's ecological footprint. Meanwhile, challenges of functional city can best be understood within the realms of infrastructural facilities that can transform the socio-economic activities of the society, good governance and sustainable livelihoods. Thus, crumbling roles of Nigerian cities seems to acquire an added urgency partly due to unmanaged urbanization. Most cities are faced with increasing demand for services and infrastructure towards improved livelihoods of citizens and enabled economic development. Unguided population growth and poor governance act as multiplier and significantly exacerbate negative impact of climate change, particularly flooding. The point worth mentioning is that unguided urbanization and poor management, forces development to take place in dangerous areas. Lack of economic strength and low level of preparedness in Nigeria increases the level of vulnerability, by limiting the ability to minimize and adapt to the impacts of climate-related hazards.

Furthermore, Nigerian cities often lack risk management plans, monitoring and early warning systems. Local authorities do not have the capacity to respond promptly to natural disasters. Due in part to inadequate enforcement and poor human and financial empowerment, existing laws or plans for disaster response are in most cities are rendered ineffective. Meanwhile, the level of vulnerability of an urban area to climate change risks depends in part on how much of the city's population and economic assets are located in high-risk areas (i.e. physical exposure). Exposure to tragedies of flood can be linked to the following:

- (i) Inadequate land-use planning
- (ii) Unregulated development of disaster prone areas
- (iii) Weak structural defense mechanisms
- (iv) Neglects of building codes
- (v) Substandard housing and physical structures
- (vi) Unethical behaviour of professionals in charge of creating and managing sustainable and healthy cities.

It is imperative to note that most Nigerian cities have failed in the area of city planning and management. A point of note is the neglects of the spatial dimension of rapid urbanization and urban forms. Good city governance and planning can improve resilience to climate change impacts through effective funding of adaptation and coping measures, enhanced institutional and capacity development. Cities with poor governance systems – as a result of political instability, are especially vulnerable to climate change impacts. Adebayo (2002) noted that many African governments are sectoral in operation and lack proper coordinating mechanisms within their management structures and institutions at national, local and community level, creating fragmented development. In many cities throughout developing countries, populations continue to grow in the absence of effective urban planning, resulting in living conditions that prompt climate change impacts and development in areas at risk from sea-level rise, flooding and coastal storms. Similarly, weak building codes and standards (or lack of enforcement) increase the vulnerability of individual households and entire communities to natural disaster.

Vulnerability of cities to tragedies of floods depends partly on the level of preparedness. Vulnerability is a product of exposure of people to such changes (which is influenced by the limits they face in being able to reduce this exposure) and limited or no capacity to cope (the immediate responses) and adapt (longer-term responses). Indeed, preparedness may be linked to governance, institutional capacity and the availability of information to residents. It is however not necessarily the case that poorer countries or cities will always be less prepared. As expatiated by ActionAid (2006) in Lagos, both slum dwellers and local government believe that constant clearance of drainage channel would prevent the pooling of water. However, provision of standard drainage facilities along the major roads and streets would help to reduce the tragedies of floods. Thus, governance can be viewed as "the management of the course of events in a social system" (Burriss et al., 2005). It is also "the sum of the many ways individuals and institutions, public and private, plan and manage the common affairs of the city" (UN-HABITAT, 2002).

Governance reflects social structure and acts as one of the social mechanisms that sort people into unequal health outcomes by upholding existing distributions of resources like power, money and knowledge (Burriss et al., 2002).

A point worth mentioning, particularly in Nigeria is that governance is not working effectively towards harnessing the economic realities or gains of climate change. Meanwhile, challenges facing cities in this century demand multi-sectoral and multidisciplinary approaches, rather than the traditional reliance on “silos” of policy and practice (Walker, 2008). In a more advanced country like the Netherlands, the government strives to improve flood risk awareness and also encourage a desirable shift in behavioural pattern among the Dutch based on the 1953 devastating flood disaster in the country. The Netherlands is often seen as world leader in flood management, with hundreds of years of experience in building flood defenses. Bočkarjova et al. (2009a; 2009b) emphasized the need for a shift of some responsibilities of flood risk reduction measures from public to individual domain. It is interesting to note that, approaches, policy and philosophy of managing the flood threat are evolving. A number of processes can be distinguished; the most important of which, is the revival of attention towards potential flood consequences that seemed to be forgotten during the victorious triumph of the Delta Works. In most Nigerian cities however, responses to flooding include among others: bailing water out of houses, digging trenches around buildings, placing children on higher objects in the house, construction of dykes or trenches, use of waterproof recycled materials, relocation to secure higher part, use of sandbags and distribution of relief materials (ActionAid, 2006).

Reinventing cities for sustainable livelihood or healthy living is an issue that deals with building relationships among stakeholders, sectors and redistribution of resources towards meeting the needs of the people. This process will involve adequate participation of city dwellers in decision-making process, effective professional practice or inputs, good and responsive governance. Professionals in the field of city management must apply their skills and knowledge diligently towards making cities more vibrant, inclusive and environmentally viable. It should be mentioned that building resilience to increasing climate variability, particularly flooding is the most significant environmental challenge facing most countries, including Nigeria. Stem on this fact, cities managers need to integrate climate risks and climate change adaptation into their development plans, and consider the range of interventions that will increase preparedness and resilience to climate change. Interestingly, adequate planning is central to managing flood risk. In other words, locations and designs of physical development can have resultant effect on flood risk. Therefore, risks from flooding can greatly be reduced by a well-maintained flood control, effective sanitation, improved infrastructure and enhanced public health measures (IPCC, 2007).

## 6. Conclusion

Flood disasters are going on unabated mostly in Nigerian cities, and the government drainage clearance option have not provided concrete solution to this menace. This situation is making urban dwellers, particularly the poor more vulnerable to environmental, social and economic problems. Thus, forcing them into the shackle of poverty. The incessant urban flooding is a stumbling block to achieving the UN 2020 goal (significant improvement in urban livelihoods). It is unwise for governments at various levels to ignore the global impact of climate change, particularly floods in our cities. Therefore, planning emergency measures through flood management can only reduce disastrous consequences (Andjeikovic, 2001). It should be understood that, flood management is a broad spectrum of water resources activities aimed at reducing potential harmful impacts. Proper management and control of urban flood is of vital importance, and this can be feasible if there is proper and effective flood or disaster planning and management through adequate preparation and monitoring. It is worth mentioning that prevention, mitigation and preparedness are very important issues in tackling problems of flooding. These approaches are better than disaster relief and response that overwhelm the activities of environmental management in Nigeria. Preparing for the occurrence of any known disaster such as flooding is seen as a part of mitigation measures; and it lies along a continuum of other disaster management activities like relief, rehabilitation, recovery and reconstruction. Disaster preparedness as a preventive development can be established through adequate sensitization of people who are often affected by natural hazards.

Furthermore, 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. 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 disaster. It should be emphasized that corrupt environmental practices at all levels should be properly addressed. 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 disasters. Adequate and long-term environmental and natural resource management practices can help to reduce the risk and vulnerability of people in disaster prone areas.

Also of importance, is the establishment and collaborations between local communities, NGOs, voluntary groups, local and international donor organizations towards managing floods. 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. Dangerous political interventions in land use planning and management should grossly be avoided in order to protect the occurrence of avoidable disasters and blaming of innocent professionals.

## References

- ActionAid. (2006). Climate change, urban flooding and the rights of the urban poor in Africa: Key findings from six African cities. *A report of ActionAid International*, October.
- Adebayo, A. (2002). Viewpoints. *Cities*, 19(5), 351-355. [http://dx.doi.org/10.1016/S0264-2751\(02\)00043-4](http://dx.doi.org/10.1016/S0264-2751(02)00043-4)
- Adeoti, A., Olayide, O., & Coster, A. (2010). Flooding and welfare of Fisher's household in Lagos State, Nigeria. *Journal of Human Ecology*, 32(3), 161-167.
- African Institute of Applied Economics. (2009). *Implications of climate change for economic growth and sustainable development in Nigeria*. A debating policy options for national development. Enugu Forum Policy Paper 10.
- Agbola, T. (2002). *Urban violence, urban insecurity and challenges of good governance: The evolving disturbing scenario from Abuja, Nigeria*. Proceedings of the 33rd annual conference of the NITP, held at Ilorin, October 30th-1st November.
- Aluko, O. (2000). Development control in Nigeria's new civil rule programme. *Journal of the Institute of Town Planners (JNITP)*, 13, 78-88.
- Andjeikovic, I. (2001). *Guideline on non structural measures in urban flood management*. Technical documents in hydrology. UNESCO, Paris.
- Aribigbola, A. (2008). Improving urban land use planning and management in Nigeria: The case of Akure. *Theoretical and Empirical Researches in Urban Management*, Year 3, Number 9.
- Askew, A. J. (1999). Water in the International Decade for Natural Disaster Reduction. In Leavesley et al. (Eds.), *Destructive Water: Water-caused Natural Disaster, their Abatement and Control*. IAHS Publication No. 239.
- Atedhor, G. O., Odjugo, P. A., & Uriri, A. (2011). Changing rainfall and anthropogenic-induced flooding: Impacts and adaptation strategies in Benin City, Nigeria. *Journal of Geography and Regional Planning*, 4(1), 42-52.
- Blaikie, P., Cannon, T., Davis, I., & Wisner, B. (1994). *At risk: natural hazards, people's vulnerability and disasters*. London: Routledge.
- Bočkarjova, M., van der Veen, A., & Geurts, P. A. T. M. (2009a). *A PMT-TTM model of protective motivation for flood danger in the Netherlands*. ITC Working Papers Series Paper 3 - November 2009.
- Bočkarjova, M., van der Veen, A., & Geurts, P. A. T. M. (2009b). *Reporting on flood risk perception in the Netherlands: An issue of time, place and measurement*. ITC Working Papers Series Paper 1 - November 2009.
- Bočkarjova, M., Steenge, A. E., & van der Veen, A. (2007). Flooding and Consequent Structural Economic Effects; A Methodology. In S. Begum, M. J. F. Stive, & J. W. Hall (Eds.), *Flood Risk Management in Europe: Innovation in Policy and Practice*, Springer.
- Douglas, I., Alam, K., Maghenda, M., McDonnell, Y., McLean, L., & Campbell, J. (2008). Unjust waters: climate change, flooding and the urban poor in Africa. *Environment and Urbanization*, 20(1). Retrieved from [http://www.actionaid.org.uk/doc\\_lib/urban\\_flooding\\_africa\\_report.pdf](http://www.actionaid.org.uk/doc_lib/urban_flooding_africa_report.pdf)
- Dunford, M., & Greco, L. (2006). *After the three Italies*. Wealth, inequality and Industrial change. Oxford: Blackwell.
- Etuonovbe, A. (2011). The devastating effect of flooding in Nigeria. *Paper presented at the FIG Working Week*. Marrakech, Morocco, 18<sup>th</sup>-22<sup>nd</sup> May.
- Environmental Resources Management (ERM). (2002). Predicted impact of global climate change on poverty and sustainable achievement of the Millennium Development Goals. *Report prepared for DFID*.
- Federal Environment Protection Agency (FEPA). (1999). *National Policy on the Environment Abuja: FEPA*.

- Gbadegesin, A. (2005). *Minimizing Risk and Sustaining the Environment: The Role of Sustainability Science. Faculty lecture*, Tai Solarin University of Education Ijagun, Dec. 2005.
- Gwary, D. (2008). *Climate change, food security and Nigeria Agriculture. Paper presented at the Workshop on the challenges of climate change for Nigeria*. NISER 19<sup>th</sup>-20<sup>th</sup> May, 2008.
- Intergovernmental Panel on Climate (IPCC). (2001). *Climate change 2001: Synthesis report, contribution of working groups I, II and III to the third assessment report of the intergovernmental panel on climate change*.
- IPCC. (2007). *Climate Change Impacts, adaptation and Vulnerability, Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change Assessment Report, Summary for Policymakers*. Retrieved from <http://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-spm.pdf>.
- Kaplan, R. (1996). *The ends of the earth: A journey at the dawn of the 21<sup>st</sup> century*. New York: Random House.
- Kolawole, O., Olayemi, A., & Ajayi, K. (2011). *Managing flood in Nigerian cities: Risk analysis and adaptation options-Ilorin city as a case study. Applied Science Research, 3(1), 17-24.*
- Langdon, S. (1994). *The Political Economy of dependence: Notes towards analysis of Multi-national Corporations in Kenya. Journal of East African Research and Development, 42, 121-125.*
- Lankao, P. (2007). *Are we missing the point? Particularities of urbanization, sustainability and carbon emissions in Latin American cities. Environment & Urbanization, 19(1), 1-17.*
- Leitmann, J., Bartone, C., & Bernstein, J. (1992). *Environmental management and urban development issues and options for third world cities. Environment and Urbanization, 4(2), 131-140.* <http://dx.doi.org/10.1177/095624789200400213>
- Neal, P., & Curtis, W. (2008). *Century of the city: No time to lose*. New York: Rockefeller Foundation.
- Nelson, S. (2001). *River systems and causes of flooding. Geology 204 Tulane University*. Retrieved October 23, 2011, from [www.tulane.edu/sanelson/geo/204/subsidence.pdf](http://www.tulane.edu/sanelson/geo/204/subsidence.pdf)
- Nolan, B., & Maron, R. (1995). *History, Causes and significance of changes in the Channel geometry of Redwood Greek, North western California, 1936 to 1982. United States Geological Survey Professional, Paper 1454N, USA.*
- Nzeadibe, T., Egbule, C., Chukwuone, N., & Agu, V. (2011). *Climate change awareness and adaptation in the Niger Delta Region of Nigeria. African Technology Policy Studies Network: Working paper series No. 57.*
- Odjugo, P. (2009). *Quantifying the cost of climate change impact in Nigeria: Emphasis on wind and rainstorms. Journal of Human Ecology, 28(2), 93-101.*
- Olanrewaju, D., & Fadairo, G. (2003). *Flooding as an induced environmental problem: A case study of Ala River in Akure, Nigeria. Journal of Nigerian Institute of Town Planners, XVI, 85-96.*
- Pacione, M. (2001). *Urban Geography: A global perspective*. Routledge, Canada. <http://dx.doi.org/10.4324/9780203454626>
- Potschin, M. (2009). *Land use and the state of the natural environment. Land Use Policy, 26S, 170-177.* <http://dx.doi.org/10.1016/j.landusepol.2009.08.008>
- Pugh, C. (1996). *Sustainability, the Environment and Urbanization*. London, Earthscan.
- Ritner, P. (1960). *The death of Africa*. Macmillan, New York.
- Sada, P., & Odemerho, F. (1988). *Environmental issues and management in Nigeria development*. Evans, Ibadan.
- Satterthwaite, D., Huq, S., Pelling, M., Reid, H., & Romero Lankao, P. (2007). *Human Settlements Discussion Paper Series Theme: Climate Change and Cities - 1: Adapting to Climate Change in Urban Areas. The possibilities and constraints in low- and middle-income nations*. Retrieved from [http://www.rockfound.org/initiatives/climate/climate\\_change.html](http://www.rockfound.org/initiatives/climate/climate_change.html)
- Simone, A. (2004). *For the city yet to come: Changing African life in four cities*. Durban: Duke University Press.
- Skilling, D. (2007). *The Economic Effects of Climate Change: Positioning New Zealand to respond*. Zealand: The New Zealand institute.
- Sommers, M. (2010). *Urban youth in Africa. Environment and urbanization, 22(2), 317-332.*
- SIEMENS. (2010). *Sustainable Cities: Sustainable Development for Urban Infrastructures*. Siemens AG, Munich.

- Segynola, A. (2005). Promoting Food Security in Nigeria through Sustainable development. In Onokerhoraye, A., & Omuta, G. (Eds.), *Perspectives on Development*. CPED; Benin City.
- Tibaijuka, A. (2008). The challenge of urbanization and the role of UN-Habitat. *A lecture delivered at Warsaw School of Economics*, April 18<sup>th</sup>, 2008.
- The Nation Newspaper, July 11<sup>th</sup>, 2011.
- The Nation Newspaper, July 12<sup>th</sup>, 2011.
- The Nation Newspaper, August 30<sup>th</sup>, 2011.
- The Nation Newspaper, September 3<sup>rd</sup>, 2011.
- The Punch Newspaper, July 12<sup>th</sup> 2011.
- The Punch Newspaper, September 19<sup>th</sup>, 2011.
- The Punch Newspaper, July 18<sup>th</sup>, 2011.
- The Punch Newspaper, 24<sup>th</sup> 2011.
- UN-Water. (2011). Cities coping with water uncertainties. *Media Brief*. UN-Water Decade Programme on Advocacy and Communication.
- UN-Habitat. (2011). Cities and climate change: Policy directions. *Global report on human settlements 2011 (Abridged Edition)*. UN-Habitat, Earthscan, London.
- UN-HABITAT. (2010). State of the World's Cities Report 2010/2011. *Press Kit*. Retrieved October, 20, 2011, from <http://www.unhabitat.org/content.asp?cid=8051&catid=7&typeid=46&subMenuId=0>
- UN Water. (2010). Policy Brief. Climate Change Adaptation: The Pivotal Role of Water. Retrieved October, 20, 2011, from [http://www.unwater.org/downloads/unw\\_ccpol\\_web.pdf](http://www.unwater.org/downloads/unw_ccpol_web.pdf)
- Walker, D. (2008). A call for leadership in an urban world. In Neal, P., & Curtis, W. (Eds.), *Century of the city: No time to lose*. Rockefeller Foundation. New York.
- Watson, S. (1993). Cities of dreams and fantasy: Social planning in a postmodern era. In Freestone, R. (Ed.), *Sprited cities: Urban planning, traffic and environmental management in the nineties* (pp. 140-149). Sydney: Federation Press.
- Welcome, R. L. (2005). River Fisheries. *FAO Fish Tech Paper*, 262, 330.
- World Health Organization. (2008). Our cities, our health, our future: Acting on social determinants for health equity in urban settings. *A report to the commission on social determinants of health*. World Health Organization, Centre for Health Development.
- WCED. (1987). *Our Common Future*. Oxford: Oxford University Press.