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GLOBAL WARMING AND CHALLENGES OF FLOODS IN LAGOS METROPOLIS, NIGERIA

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ABSTRACT

Global warming and extreme weather events have caused havoc to lives and property in recent years. Research and development, workshops, conferences, seminars and others have also been focused on these global phenomena. The objective of the paper is to study incidences of flooding in Lagos metropolis. Parameters of floods were studied. Effects of urbanization and living habits of the urban dwellers were studied. Topographic maps of the Metropolis were perused. Literature on climate change, urban floods, and Lagos Metropolis were read. Interviews were conducted with the urban dwellers and two Local Government Chairmen of the Metropolis. There was a questionnaire that was administered among 2,000 Lagosian. It collected data about the frequency, sizes and havoc caused for most of the time it occurred. The Metropolis is on low land with an average gradient of less than 1:100,000. Run-offs are increasing in volume and areas of coverage but relatively drainage channels are inadequate; and they have been blocked through the living habits of the urban dwellers. Waste waters from homes, hospitals and maternity homes, markets, Schools and colleges, manufacturing industries and others are contributing as base water to rain water in the drainage channels. There are grievous consequences of flooding at some localities. All forms of transportation are affected each time it comes. Weather–related disasters are becoming increasingly common. Lagosian and the governments should not allow global warming to compound the challenges of flood in the metropolis.

Key words: Climate change, Floods, Living habits, Challenges, Lagos Metropolis

INTRODUCTION AND RATIONAL FOR STUDY

From China to Mexico, Indonesia, United States of America, United Kingdom and Nigeria, there is no doubt that the world is under serious threat from the environment. But analysts have argued that the environment was only responding to the abuses heaped on it by man's activities (Christopherson, 1997 p.423). The concern is that the world may be getting close to extinction through natural disasters unless immediate actions are taken; and the signs are just too apparent to be ignored, (Christopherson, 1997 and Oyegbile, 2008). Specifically, in May 2008, floods triggered by torrential rains killed dozens of people across China, while thousands of others were victims of landslides caused by the downpours. China is not alone. In the United States of America, the Mississippi River caused lots of damages put at several millions of dollars when it over flew its banks, flooding some cities, towns, farmlands and major industrial installations over a distance of about 250km and ravaging Iowa before it heaped downstream. Amtrak, the national passenger train had to halt its services on the California-Zephyr route between Chicago and Denver, its Empire Builder line between Chicago and St Paul, Minnesota, and its south-west chief route between Chicago and Kansas City because of the flood. Apart from the Mississippi-Missouri River Systems of 1993, and that of 1995, world records of flood

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has it that recently, severe floods were experienced in Norway, China, Bangladesh, Ghana, the Netherlands and South Florida, (Christopherson, 1997). In February 2000, a cyclone swept across Mozambique which left some 950,000 people homeless as floods devastated huge areas of low-laying land. Roads, homes, bridges and crops were destroyed. Journalist, Greg Barrow, flew over the striking area and filed this report for BBC:

> *as if a huge tidal wave of brown water has swept through the Save River valley. Trees uprooted, houses lie in ruins and debris are floating. Those who survive the flooding have been stranded on rooftops and in trees. Beneath them the bloated corpses of livestock float in the waters…. to rescue the survivors. Pilots say some people have been trapped in trees for days without food or water…... the people wave frantically, motioning to their moths and stomachs with their hands to show that they are hungry. When the rescue helicopters come to winch them to safety, there is a desperate scramble …… lifted around 300 survivors to higher ground but their work is difficult, fuel supplies are low …. There is lack of coordination in caring for the flood victims. ….up to 40,000 people are believed to be trapped by the flood. (*Kerski, and Ross, 2005)

In India, over 14 million Indians were victims to the flood of August 2007 in Sathya Sai Baba, a major human settlement, of that region, (http://www.awakenedwomen.com/flood.htm). The nation's government could not organize any emergency relief immediately. Rather, it spent over $1.6 billion on Hawk Jets. Hunger and diseases stalked the India children and the poor in the region. Wright (2011) reports the devastating flood of Lahore, Pakistan in July 2011 where transportation systems were halted and businesses were closed down for days.

In Nigeria, apart from the Ogunpa Stream in Ibadan that killed several people and completely grounded socio-economic activities, recently (August 2008), the residents of Makurdi were thrown out of their residences and their farmlands left impoverished after two days of heavy down pour of rainfall. It was described as very disastrous, (Taiwo, 2008). He also reported in Thisday (August 18) that at least five hundred people were rendered homeless and properties worth several millions of Naira were destroyed when a flood, occasioned by torrential rainfall ravaged Babura, a town in Jigawa State in a period of two days. Akani and Bilesanmi (2011) reports how a Lagos flood forced Lagosians to relocate as a result of heavy rain of 7th and 8th of July 2011 not knowing there was going to be a more devastating torrential rain that will result in "more disastrous floods in Lagos Metropolis" in the following week, (Mordi, (2011 and Amaize, (2011).

Apart from the recent occurrences and experiences of flood, there is this long time occurrence of flood though creationists model which is often criticized for being too vague to have any predictive value of it, (Brown (1997). All models and theories about the flood said a lot of things about flood, its destructive power, suddenness, occationality and others though there are several questions that remain unanswered: How could that large number of animals travelled such long distances, and even for such large diverse carnivores to come to live near their preys and Noah; and how was the Ark loaded (Genesis 7:4-10); and how were the animals catered for throughout the period the flood lasted? That Ark specified in the Bible would not have been large enough to carry a cargo of animals and food sufficient to repopulate the earth especially if animals that are now extinct were to be aboard, (Isaak 1998). He asserts that if the flood model were not riddled by all its problems, why should one accept it? According to him and Woodmorappe (1996), Whitecomb and Morris (1961) and Brown (1997), what it does attempt to explain is already explained far more accurately, consistently and thoroughly by conventional Geology and Biology and the flood model leaves many other things unexplained, and unexplainable. Isaak (1998) in particular quarried, 'if God is omnipotent, why not kill what He wanted to kill directly? Why resort to a roundabout method that requires innumerable additional miracles? The whole idea was to rid the wicked people from the world. Did it work?' A literal interpretation of this flood story in the Book of Genesis in the Bible however, supply certain physical consequences which can be tested against what can be observed, and the implications of such an interpretation can be investigated (Whitecomb et al 1961).

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However, from the whole old worldwide story from the book of Genesis and the recent experiences and records, it is clearly known that a flood is a high water level that overflows the natural (and or artificial) levees along any portion of a stream. It is common throughout the world and it is a perfectly natural response of a river that has too much water to cope with. Heavy rainfall (combine with snow melt in the temperate regions) causes channels to be overtopped, and flood waters surge over the neighboring floodplain. It is usually 'very large body of water covering the land that were usually dry and beyond its banks' - destroys farm lands, property, industrial installations, roads, railways, residences and it carries people away. In other words, it is usually abrupt, accidental, destructive and harmful. It may be very devastating to any community and or nation that it might affect economically and socially. Though, sometimes, it is not without some advantages. Both floods and flood plains as they might occupy are rated statistically for the expected time intervals between floods. Thus we may have '5-year flood,' '10-year flood,' '50-year flood' and others, (Christopherson 1997 pp.446).

The preponderance of occurrences of flood in the Lagos Metropolis in recent times have been a great concern and challenge to the people and Governments. There have been journalistic and non-quantitative reports of flood for several parts of Nigeria including Lagos. But they are superficial and lack directions for professionals and policy makers. Above all, there is none, of recent, to describe the magnitude and criticality of the phenomena with the attendant problems. The works of Adeaga (2008) and Oyebande (1983, 1990 and 2008) are either disjointed or sectional. They are not laconical. Adeaga (2008) in his recent work on *Flood Hazard Mapping and Risk Management in Part of Lagos N.E* is only on mapping of the hazards caused by flood in the North Eastern part of the metropolis. The entire Metropolis and the Central Business District require attention (Akosile 2008; Adeaga 2008 and Aderogba and Afelumo In Print). More importantly, the frequency of occurrence and in several parts of the metropolis with the attendant havocs call for concern and serious attentions too, (Akani and Bilesanmi, 2011; Alao, 2011; and Adegboye, 2011). The objective of this work is to study the peculiarity of the incidences of flooding in Lagos Metropolis, its challenges; and proffer solutions for sustainable development in the metropolis in the face of global warming.

MATERIALS AND METHODS

The Metropolis sprawls over large islands separated by creeks on a vast lagoon on the Bight of Benin, bordered by the Atlantic Ocean. The entire region lies within the coastal low land of south western Nigeria – generally less than 100m above sea level; and the average gradient is less than 1:100,000. The entire region is drained southward into the Atlantic Ocean. The climate is tropical continental with rainfall throughout the year, and with double maxima. Rainfall is increasing in amount, intensity, spread and duration, though there is inclement warmth. Run-offs are increasing in volume and areas of coverage. The natural vegetation is salt water mangrove swamp forest. But, this has been replaced by concrete surfaces, building and roofs of buildings, transportation land use, and at best, ornamental plants. What remains of the natural vegetation and landscape is insignificant. The challenges of Global Warming are obvious and threatening, (and Aderogba, 2010 and Rudrappan, 2011).

The conurbation has spread inland to include , Ajah, Ikeja, Surulere, Mushin, Oshodi, Maryland, Ketu, Egbeda, Ipaja, Agege, Ijaye, Ogba, Ijaiye Ketu, Ojota and others to the North, Northwest and Northeast and along the coast up to a stretch of over 100km east, west and northward. The population was 500,000 people in the late 1960s; and home to three million people by 1975. Its population currently stands at 7.938 million. It is still growing at an average rate of 5% per annum, (Nigeria, 2007). Explosive population growth defines Lagos: the city qualifies as a 'mega city' joining the likes of Sao Paulo of Brazil, and Cairo of Egypt. The population of about 7,937,932 people made Lagos to be the most populous conurbation in Nigeria, that is, by the 2006 census. It has also been ascertained that it is the second fastest growing city in Africa (and the 7th fastest growing in the world, immediately following Bamako). The Government estimates Lagos' population could be 25 million by 2015 as rural Nigerians turn their backs on the countryside to move to the country's biggest city.

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Table I: Local Government Areas that Form Lagos Metropolis and their Population Densities.

Local Government Area	Land Area (km2)	Population (2006 census)	Population Density (inhabitant/km)
Agege	12.2	459,939	41,671
Ajeromi – Ifelodun	12.3	684,105	55,474
Alimosho	185.2	1,277,714	6,899
Amuwo-Odofin	134.6	318,166	2,364
Apapa	26.7	217,362	8,153
Eti-Osa	192.3	287,785	1,496
Ifako-Ijaiye	26.6	427,878	16,076
Ikeja	46.2	313,196	6,785
Kosofe	81.4	665,393	8,174
Lagos Island	8.7	209,437	24,182
Lagos Mainland	19.5	317,720	16,322
Mushin	17.5	633,009	36,213
Ojo	158.2	598,071	3,781
Oshodi-Isolo	44.8	621,508	13,886
Somolu	11.6	402,673	34,862
Surulere	23.0	503,975	21,912
Metropolitan Lagos	999.6	7,937,932	7,941

Source: National Population Commission, Abuja.

The city is the economic and financial capital of Nigeria. With a total of 999.6 km^2, the metropolis is made up of 16 Local Government Areas - all in Lagos State. Eti-Osa has the largest land area of 192.3 km^2 followed by Alimosho and Ojo with 185.2 km^2 and 158.2 km^2 respectively. See Table I and Figure 1. The total population that made up the metropolis has the largest concentration at Alimosho, (1,277,714) followed by Ajeromi - Ifelodun (684,105) and Mushin (633,009). The average population density for the entire metropolis is 7,941 persons per Km^2.

See Table I and Figure 1. The density however is highest at Ajeromi Ifelodun (55,474) followed by Agege (41.671). The density is lowest at Eti-Osa (1,496 per km^2) and Amuwo-Odofin (2364 person per km^2). Interestingly, the population of the metropolis is fast increasing per day because of the continuous emigration of people, skilled and unskilled, Nigerians and non-nationals into this mega

Figure1. The 16 Local Government Areas that made up Lagos Metropolis.

Source: Lagos Stae Ministry of Environment and Physical Planning, Alausa , Ikeja, Lagos

city of West Africa. There is rarely no nation of the world that is not represented in Lagos. The citizens of the ECOWAS member states are the most plentiful. Lagos State may be the smallest of all the 36 States of Nigeria, and has none of the oil riches like the Delta Region, its 'unique energy' has made it the economic powerhouse of the county and given it increasing clout within the wider region. Nigeria now accounts for 50% of West African GDP, and much of that is attributed to the economic strength of Lagos Metropolis. The State Government is based on the island of Ikeja that is within the Metropolis. It is the city's industrial nerve centre. Lagos Island where most of the large banks, multinationals, department stores and key businesses sit is the financial, commercial and cultural centre of Nigeria. Though her statue as Federal Capital had seized since1990 when the Capital was moved to Abuja, many of the ministries and diplomatic missions are still based in Lagos. The Government has got to deal with the transport chaos, pollution, energy and power, waste management, poor drainage, flood and poverty that the uncontrolled growth causes. Not only does the lack of adequate public infrastructure made the lives of Lagosians more arduous than they need be, it also acts as a significant control on the economic growth, and deters domestic and foreign investments. The State (Lagos State) accounts for about 12% of national economic output, and is the second most important contributor to national economic activity after the oil–rich River State.

Incidentally, all of the inadequacies started since when Lagos ceased to be the political capital of Nigeria. Its infrastructure has not risen to respond to the growing population. Thus, there are huge gaps that need to be filled in the forms of roads, railways, ferries, health care, education, sport facilities, water, waste management, drainage and floods in particular.

At the moment, Lagosians who can make up for the woeful provision of services sinking boreholes for water and install generators as alternative to the city's dire supply. While some of these self sustaining efforts have been doing fairly well, waste management, poor drainage network, resultant floods and their consequences have been major bane to the government and people.

It is not unlikely that it is the large population coupled with the inability of the metropolitan governments to provide adequate infrastructure, and the living habits of the inhabitants that compounded the issues of wastes. Apart from the few designated Dumps, wastes litter roads, streets, markets, store areas, schools and office premises, gutters, erosion passages, drainage channels and pathways – to the points of embarrassment, (Adejuwon, 1979 and Aderogba et al, In Print).

The pattern and parameters of flood in the metropolis were studied for over ten years. The depth and width of the floods were determined by measuring distances on both sides of the channels from the centre of channels; and the marks made on walls of buildings and electric poles along the flood lines. The rain of July 2011 was observed; and substantial data and information were obtained from the 10th and 11th July 2011 torrential rains and the consequent floods. The State Ministry of Environment and the Department of Environment in the sixteen Local Government Councils of the Local Government Areas that made up the metropolis provided information on the historical development of the Metropolis, drainage systems, floods, challenges and consequences. Members of the public, two thousand (2,000), that were randomly selected in randomly selected locations responded to questions on causes, extent, severity and periodicity of flood and its challenges. They also offered suggestions.

Newspaper cuttings, reports and journal publications were cleverly perused, shrewdly and extensively used. Over 80% of the Study Area was toured between 11th and 13th of July 2011 following the torrential rainfall on the metropolis. Measurements were made of the heights and width of the flood and what remains of the floods. The residents were able to give accounts of how it happened, and ravaged the communities; and expressed fears for the rest of the season. Most of the time, they were also quick to suggest temporary and permanent solutions. Records of three Meteorological Stations were used. Using the Isikawa Fish Bone Cause and Effect Analysis, the causes and effects and solution were brain stormed with twelve (12) experts in Urban and Regional Development, Urban and Regional Planning, Urban Transport Planning, Environmental Sciences, Water Resource Management, Geography and Hydrology, Climate Change, Health Care Delivery, Trade and Commerce, Government, and Trade Unions. They were able to come out expertly with the causes, the

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effects and solutions to the menaces of flood in the metropolis and elsewhere in the world. Directions for urban dwellers and policy makers are indicated.

RESULTS

Table II shows a few of the flood parameters in selected locations of the Metropolis: width in meters; highest height ever recorded in meters; frequency per annum; and longest lasted duration ever experienced in days. The means for the entire metropolis are 137.35meters, 2.43meters, 6.13 times per annum, and 22.87 days respectively. There is nowhere it is less than 100 meter wide any time it comes. The widest are at Apapa (Mile 2), 210 meters with a height of 2.26 meters. The longest period of time it has lasted is 20 days and for about 10 times a year. The highest has been at Agege (Oke-Odo), 3.88 meters with a frequency of 5 times in a year; and the longest time it had ever lasted is 4 days.

Frequency of occurrence per annum is highest at Apapa Ajegunle (10 times), Ijora, Iju Agege Road, Idi-Araba (LUTH) Oshodi (NITEL), Victoria City Garden (VGC) and Mushin (Idioro), where it occurs 8 times on the average. The longest duration the flood lasted were at Egbute Meta (Oko Baba), is 132 days. It is flash floods at Iyana Ipaja, Agege, Alagbado, Isheri and Maryland where it lasted three (3) to four (4) days only. It has become permanent features of some localities, namely, Oko Baba, Ajegunle, Idi Araba, Lekki, VGC and Apapa. But Table III is an array of the causes of the floods, mostly namely: Torrential Rains (94.10%), filled/silted/Dirty Drainage Channels (87.15%)

Table II. Selected Flood Parameters in Selected Locations.

Location	Mean Width (meters)	Highest Experienced Height (meters)	equency (Per Annum)	Longest Durations ever lasted (days).
Victorial Island (Ajose	138.00	0.98	6	5
Iyana Ipaja (Ige Street)	109.00	3.80	4	4
Agege (Oke Odo)	116.00	3.88	5	4
Alapere (Origun)	135.00	3.40	6	5
Surulere (Adeniran Oguncanya)	107.00	2.25	7	5
Akoka (Afolabi-Brown)	161.00	2.16	6	5
Alagbado (Cassio Bus Stop)	111.00	2.10	6	3
Isheri (Riverview Estete)	109.00	3.40	6	3
Apapa (Mile 2)	210.00	2.37	5	71
Egbeda (Akin-Olugbade)	102.00	2.25	2	5
Lekki (Phase 11)	148.00	2.26	3	105
Lagos Island (Obalende)	118.00	1.68	3	11
Bariga (Abule)	122.00	2.35	4	13
Mushin (Idi-Oro)	161.00	2.18	8	10
Ojuelegba	128.00	1.92	3	86
Ebute Meta (Oko Baba)	128.00	2.40	6	132
Oworonshoki	108.00	2.18	3	12
Victiria Garden City (VGC)	111.00	1.73	8	13
Marryland (Arowojobe)	118.00	3.15	4	4
Oshodi (NITEL)	113.00	2.03	8	5
I di-Araba (LUTH)	183.00	2.22	8	11
Iju-Agege Road	107.00	3.20	8	7
Ijora	135.00	2.21	8	7
Apapa (Ajegunlle)	191.00	2.26	10	20
Mean	**137.35**	**2.43**	**6.13**	**22.87**

Source: Aderogba, K. A. 2011: Field work.

Blocked Canals (97.55%), Inadequate Drainage Channels (94.30%), Non-compliance with Environmental Laws, (81.45%), and Nature of the Physical Terrain (90.55%), Planlessness (88.95) and Encroachment on Drainage Channels (90.90%). Climate change and global warming might be adequate explanation for the unusual and frequent torrential rains, (Bailey 1989; Brown 1997; Dow and Dowing, 2006; and Kershi and Simon, 2005).

Table III. Selected Causes of Floods in the Metropolis.

Causes	No of Respondents	%Proportion
Torrential Rain	1882	94.10
Base Water Flow	116	5.80
Spring Water Flow	110	5.50
Car-Wash Operations	88	4.40
Watering Flowers	68	3.40
Filled/Silted/Dirty Drainage Channels	1643	87.15
Social Cultural Activities	1012	50.60
Ocean/Lagoon Surge	1185	59.25
Illegal Channelization of Drains	1211	60.55
Constructions and Reconstructions	1075	53.75
Blockage of Canals	1941	97.55
Inadequate Drainage Channel	1886	94.30
Mon-Compliance with Regulations	1629	81.45
Illegal Structure on Drainage Channels	1779	88.95
Encroachment	1818	90.90
Negligence	1177	56.85
Collapsed Bridges/Culverts	75	3.75
Farming along Flood Plains	81	4.50
Nature of Terrain	785	34.25
Others (Specified)	66	3.30

Source: Aderogba, K. A. 2011. Field Work.

It is estimated that the required drainage channel is short by about 45%; and the existing ones are only about 30% maintained. The floods usually bring about economic, social and religious activities to standstill as motorists would have to snail through flooded roads while pedestrians would wade through shoulder-high rain water wherever it is possible at all. An estimated 27% of the entire land area was covered by water. Reptiles, birds, insects and others, apart from man, are usually driven out of their natural habitats.

The rain of 10th and 11th July 2011 started at about 5:00 am in most parts and lasted throughout the day, nonstop for over 17 hours. As it persisted, there were unusual rise in the water levels of both the Atlantic Ocean and the Lagoon. A resident in Ajose Adeogun (Victoria Island) has this to say:

> *The water level has rose incredibly so that the channels that are meant to discharge water from the roads and drainages are completely locked because of the high tide and because both the Atlantic Ocean and Lagoon that receive water from other channels have risen more than usual.*

Mordi (2011) gave a journalistic summary of the last flood incidence in the metropolis as a result of the Sunday 10th/ Monday, 11th July, 2011as follows:

> *Lagos counted 10 dead …. from the rains which cascaded on the state continuously for 17 hour …. Residents, businesses, and the government …. counting their loses, as flood water rendered thousands homeless, cars damaged, and shops and roads filled with silts …..the most devastating flood. All public*

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> *schools and private ones were closed …. At least 10 persons drowned in a canal because they could not distinguish between the roads and the drainage channels. ….. a woman and her baby aged few months. Thousands of others were sacked ….. Some are temporally sheltered in churches and mosques……collapsed and buried a teenager in the rumble…..a man died instantly when a fence fell on him…..22-yr old boy was retrieved…..from sewage cistern…..five girls were found dead in a restaurant on Allen Avenue…..rainfall made them to pass the night in a poorly ventilated room where they inhaled fumes ….. Channels Television did not air its Sunrise Daily News package as its presenters could not make their ways to ……Rhythm 97.7fm……was temporally shot down ….. submerged vehicles, generators and equipment…..major markets were deserted as ….people weeping and shedding tears……properties had been damaged……commercial hubs, including Victoria Island, Lekki, Obalende, Ikeja, Ojuelegba, Oshodi and Alagbado were grounded. Banks, companies and schools sent their workers and pupils back home….. Ikeja, Ojuelagba were flooded and all the workers were asked to stay at home.*

Governments, individuals and organizations remarked sorrowfully and passionately:

> *we did not sleep in our house yesterday night, the rooms were taken over by flood; we were scared because the rain did not stop until about 11pm……to run to our church……where we passed the night. …..came back from church service at about 7pm to meet our one room apartment…..overtaken by flood…..lost almost everything…..only retrieve the cloths I hung before I left for church. If I had known that the rain would fall the whole day….*

Another resident of the metropolises who rued stepping out of his home on the Sunday has this say:

> *…..wanted to go through Oworonsoki, but just decided to pass through Ojota, it was one experience I regretted. I spent 6 hours from Ojota to Anthony…..it was like the end of the world. The flood at Ketu was scary.*

Another resident at Ikotun, that is, towards Northwest of the Mainland narrated his ordeal:

> *I trekked from Cele Express to Ikotun; I wouldn't have done that for a million Naira on a good day…. choice…..waited for over two hours for a bus, but it didn't come……Saw people trekking - women, men, boys and girls…..ended up trekking for another 2hours until I got home 12:30am on Monday morning.*

Alarmed by the volume of floods, Lagos State Government issues an advisory alert. It warned residents to stay off the roads; and declared holidays for all public schools in the entire State. The Governor, Babatunde Fashola, inspected some of the areas affected; and emotionally sympathized thus:

> *Those who are in buildings marked as structurally unstable or those who built on canals should leave the buildings immediately because we are coming to take possession, we are not going to risk human lives anymore. My sympathy goes to the people affected in the flood. I condole with people who lost children and property; they should know that I am with them. …. appeal to President ….. to help with funds, to relocate and resettle flood victims. …… write to the Federal Government on the failed portion of the Lagos-Abeokuta expressway…..have virtually lost that road and traffic will be terrible.*

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A resident of Oregun sent a distress SMS to the Punch Newspaper; and it reads thus:

> *"Please call the authorities to send held to the people of Oregun behind Total Filling Station. They are all floating and their houses are flooded. Children are screaming, mothers are crying. To worsen it, they are in the dark and hoodlums are moving in". Most roads were rendered impossible.*

See the Appendix. It shows the captions, opinions, titles and others in Nigeria dailies and magazines that report the flood incidence in print media. Meanwhile, the Federal Meteorological Agency warned and alerted the inhabitants of yet another impending torrential rainfall in the weeks ahead. These are pointers to palliative measures that must be applied; and urgently too.

DISCUSSIONS

In some distant past, the Metropolis experienced floods that will come and last for weeks on roads, streets, lanes and crescents; and sometimes became exclusively permanent features of some communities. The pattern has changed in the recent past to flash floods whereby the flood will come and disappear in less than three to four hours in few locations within and around the Metropolis. There is a third phase of it now. Particularly occasioned by torrential rains, floods are now becoming reoccurring incidences leading to great threats to urban lives; loose of lives and property and rendering thousands of residents homeless; changing the face of the earth and disrupting the unsustainable traffic of the Metropolis, among others. The rain of the week of July 10th, 2011though forecast, took the residents aback: The flood took over, shut down and grounded the Metropolis and incurred agony on the residents and governments as all count losses. The habitat of animals and plants were affected greatly: Insects, reptiles, rodents and vermin were driven out of their natural habitats, sought alternatives and became dangerous to man. It was bad incidence that the State Government had to declare holiday for the public schools. It may be said to be next to Tsunami. For some days it became major new items in the national and international dailies and magazines. See the Appendix showing the prevalent newspaper headlines, captions, editorials and others of the week. However, the heavy downpours of July 10th and 11th were not peculiar to Lagos Metropolis alone, it covers reasonable parts of the country particularly the South, as news papers report across the country. For example the followings are some of the Newspaper captions for other parts:

GRA Efuru, Delta state
Ministry of Health, Enugu cuts off
Impassable Enugu-Onisha Express way
Orhuwhorun Road, Warri Delta state
East-West Road, Uumuokoro, Port-Harcourt
Panic as flood sacks Agbor
The two faces of flood

Over 27% of the land surface was covered by flood, at least for over ten hours. In over 38.33%, one cannot see where the roads were and where there were drains. Houses were submerged and cars were seen tumbling and stumbling.

This work may not be able to establish and affirm that the torrential rain is as a result of the general global warming. But, the living habits of the residents, the planlessness or near it of the physical environment, none conformance to the natural physiographic characteristics of the landscape and generally poor living habits of the inhabitants – at homes, manufacturing industries, offices, markets and stores, workshops and others leave the drains blocked leading to flooding. It is of interest to note, for instance, that canals and drainage channels have been silted and filled up with sand, plastic cans and bottles, sachets of pure water, carrier bags and others that will never degrade.

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People, organizations, businesses, and even governments have not been abiding by the environment laws. One of the ripple effects is flood. It may certainly not have been as enormous as it were if the drainage channels were adequate and the aspects of blockages of the existing drainage channels and canals were not there. It has not been recognized by all that each house or drainage in any street or along any road is part of a whole community. The last 30 years have experienced considerable physical development without any appreciable infrastructures such as drainages, roads and canals.

For the negative aspects of flooding, it is important to recognize that annual floods have been promoting settlements based on thriving agricultural communities in river valleys. A case in point is the annual floods of River Nile in Egypt that gave rise to the whole civilizations that depended absolutely on the fertile silt settling on floodplain**.** But dwelling along flood plains is high risk**.**

CONCLUSION AND RECOMMENDATION

The metropolis has come a long way in history; it is seat of governments; the cultural, business, financial and economic capital of the nation; and above all, it inhabits well over 10% of Nigerians living in Nigeria and a host of other nationals. The city is fast expanding with increasing urban activities. It must therefore be capable of standing the test of time and meeting the millennium goals.

Towards averting the annual tragedy of floods often occasioned by torrential rains and living habits of the residents, the three ties of government should step up rehabilitation activities that would ensure major roads and drainage channels across the metropolis are free of encumbrances and serviceable.

The Ministry of Works and Infrastructure, and the Lagos State Public Works Corporation (LSPWC) should be tasked by the Governments to ensure free drainage channels and erosion passages. The Ministry may have to enforce the drainage clearing through “persuasive approach”, while LSPWC must beef up supervision of any identified problem areas.

Residents, manufacturing industries and assembly plants, offices, markets and stores, hospitals and maternity homes, schools and colleges and others should be compelled to ensure that their surroundings are clean, clear and free of refuse before, during and after the raining seasons. That is, everyone must cultivate the habit of daily clearing of drains in his surroundings.

Particularly, it is imperative that:

- There must be urgent government intervention to remedy the situations in Lagos Metropolis to safe the mega city from more serious calamity. There must be dredging and re-dredging of canals and drainage channels. Government is the only authority that can identify illegal structures. It is better late than never; and the time is now to clear the drainage channels, canals and erosion passages of illegal structures;

- Residents, as group and individuals, and corporate bodies should be implored and encouraged to embark on some palliative measure such as dredging and re-dredging of drains, erosion passages and others; and construction of embankments and channelization of some routes that are prone to flooding; and direct clearing of some existing drainages;

- While canals may be further opened and widened, side drains and gutters could have removable precast concrete or steel cover for ease of maintenance;

- Waste management remain a serious issue in Environmental Management; and there must be legislations that must deal with the use of plastic bottles and cans, sachets, such as pure water sachets, carrier bags and other non-degradable material not only in the Metropolis but throughout the country;

- Oshodi-Apapa Express-Way require urgent attention, the Federal and State Governments should deploy reasonable human and material resources to free it from incessant floods;

- The Government of Lagos State and the Ogun-Oshun River Basin Development Authority should be magnanimous enough to provide the engineering and technical solutions that can effectively take care of flooding in the Isheri North Axis; and

- It is high time Nigerians and particularly Lagosian heed to the forces of nature and any natural changes in the system when predicted.

In conclusion, it should be noted that natural disasters such as floods have destructive power; could be very sudden, occasional and so on in characteristic. These therefore suggest appropriate planning and forecast. For the Metropolis and Nigeria generally to achieve the ambition of improving environmental management and accelerated development, there must be redoubled efforts to scale up climate change mitigation and adaptation initiatives.

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APPENDIX

Selected Headlines, Captions, titles, cartoons and editorials on the flood of Lagos Metropolis

The followings are selected headlines, captions, titles cartoons, editorials, opinions and other on the floods of the week of 10th July, 2011 in Lagos Metropolis:

"Floods ravage Lagos"
"One drowns at Ketu"
"Hoodlums attack hapless victims"
"Residents take refuge on rooftops"
"Flood: Fashola orders pupils to stay from public schools"
"Canoe operators charge ₦100 per drop at Surulere"
"Government appeals for clam, blames Atlantic Ocean, Lagoon"
"How three year-old boy died in Lagos flood... two days after birthday"
"Lagos floods... on Sunday"
"Deaths, destructions trail Lagos savage floods"
"11 children drown in canal, three adults die"
"Thousands displaced, section of express way collapsed"
"Fashola tours affected areas, promises to seek FG help"
"David's death brought two important social issues to the fore"
"Flood of pain, tears: 'Monkey bridges' to the rescue"
"Floods: Lagos residents go fishing"
"Oshodi-Apapa Express Way: Matters arising"
"Four waitresses, baby died on wet night"
"No road: The ever busy Alaba-Oshodi express way trapped in the flood at Rainbow Bus Stop"
"Arowojobe residents cry out, count losses over blocked canal"
"Umbrella, shower cap sales boom"
"The case of flood in logos metropolis"
"Lagos floods..... on Monday"
"Blaming Governments for Lagos flood"
"Flood, flood, flood, flood, everywhere flooded"
"Lagos and flood"
"Killer floods: cities under threat"
"A Tsunami in the making"
"The Day the Heavens open up in Lagos"
"The damage was avoidable"
".....and caused a breach of traffic protocol"
"Heroes of the flood"
"Confronting the Flood Menace"
"Sacked from their homes by flood"
"Flood: Senators urged FG to release ecological funds to Lagos"
"Heavy down power yesterday destroyed several property and virtually shut down Lagos state"
"The flood on Apapa-Oshodi Express way yesterday"
"Flood sacks Lagos"
"Lagos flood: Fashola declares holiday for public schools"
"Flood takes over Lagos after a heavy rainfall, yesterday"
"Nightmare as heavy rain sacks Lagos"
"Agony in Lagos as city is flooded after heavy rain"
"All-Sunday rain exposes Lagos underbelly"
"Residents count losses as rain persists in Lagos"
"Two-day rain grounds Lagos"

Source: Aderogba, K. A. 2011. A Compilation from the Nigerian Dailies and Magazines of the week of 10th July, 2011