



Research Article

An Assessment of causes and effects of flood in Nigeria

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Accepted 29 July 2014

Abstract

Recent floods and consequences all over the world are becoming too frequent and threat to sustainable development in human settlements. The objective of this study is to examine the substantive causes and selected effects of floods in south western Nigeria with a view to identify solution for sub sustainable development. The work is limited to the cities and town of the region. Read literature on floods. Flood occurrences and effects in major cities and towns of the region were observed and studied for thirty years. Living habits of the urbanities were studied. 6 monarchs and 240 other urban dwellers were interviewed. Documentaries on radio and televisions were listened to and used. Records of physical planning were pursued in the ministries of physical planning and environment/infrastructure in the states of the region. No city or town of the south western Nigeria is absolutely free from floods in any year. The numbers of occurrences, magnitudes, affected area and adverse socio-economic consequences have been increasing over the year. Living habits of the urban dwellers, urban policies and programmes. Government concerns and others have been unsustainable. There must be pragmatic physical planning and sustainable living habit of the urbanities otherwise, with global warming; the effects of floods in the region may be more grievous.

Keywords: Flood, Nigeria, Urban Dwellers, Global warming and Climate change

INTRODUCTION

Occurrences and reoccurrence of prolonged leave rain shows and the resultant floods all over the world in the recent time are becoming concerns to research and governments. (Christopherson, 1997; Action Aid, 2006; Adeaja, 2008; Aderogba, 2011 and 2012, Pilgrim and Cordery, 1993; Wright, 2011). Particularly in the rainy seasons, it is usually common story to read about in the dailies and magazines in united states of American (Dow and Dewing, 2006; Kersh and Simon, 2005); Pakistan and India (Wright, 2011) and even in Nigeria, (Taiwo, 2011; Akain and Bilesamin, 2011, Adeerogba, 2012a and 2012b). The frequency of this phenomenon is no longer news worldly at some instances. These are three schools fought about the preponderance of floods all over the globe especially in the tropics. The first is of the opinion that there is global warming and climate change that is directly and or indirectly increasing the amount of rain and ice melting that is increasing the amount of sun off. In this case, the only source of water that result in great sun off(floods). In West Africa, and indeed, south Western Nigeria will be rain water. The second school of thought is of the view that there have been a lot abuses heaped on the physical environment is only responding to the abuses heaped on it. The abuses include but not limited for poor planning of the physical environment drains for the built up areas and others. The third school has it that it is the combination of both global warming and climate change, and the abuses of man on the environment that are the causes of prolonged and torrential showers of rains and the resultant runoff that lead to devastating floods in America, Europe and Africa including Nigeria, and southwestern Nigeria. The facts behind the three schools are yet to be thoroughly researched and confirmed. (Dow and Dewing, 2006; Kersh and Simon, 2005).

There have been journalistic and non-quantitative reports of floods for several parts of Nigeria. But they are superficial and lack directions for professionals and policy makers (Aderogba, 2011). The works of Taiwo(2008), Amaize(2003),

Lola(1997), Atdhor et al. (2011), British Broadcasting Corporation(1999) and Ngordi (2011) are in this category they are generic in analysis of data and information, and in the recommendations for sustainable development. Above all, there is none of recent, to describe the magnitude and criticality of the phenomena with the attendant challenges. The works of Adeaga (2008), Oyegbile (2008) and Oyebande (1990 and 2005) are paraphrasing, disjointed or sectional. Adeaga (2008) is only on mapping of the hazards caused by floods in the North Eastern part of Lagos Metropolis. Similarly, the work Aderogba (2011) on the challenges of global warming and floods in Lagos Metropolis, Nigeria is only an expositing of the poor planting of the physical environment of Lagos Metropolis and poor living habit of the residents Vis-à-vis the resultant floods.

Probably because the entire nation requires attention for sustainable development in the face of incessant floods. (Akosile 2008; Adeaga, 2008; Aderogba et al., 2012) the study of Aderogba (2012) qualitative studies of recent floods and sustainable growth and development of cities and towns in Nigeria is on the country such as the south Western part of the country with the multiplying city of urban functions, and the peculiarity of urban growth, processes and development in the region. The region countries about 20% of the nations population; and about 47% of industrial establishments, (National population commission, 2007 and Mabunje, 1968). It is the growth pole of the nation; its growth and development needs to be sustainable.

Therefore, the objective of this work is to study the peculiarity of the incidences of floods and identify the substantive causes and effects in south Western region of Nigeria with a view to induce solutions for sustainable development in the region emphasis is on the cities and towns of the region.

The south western Nigeria

The south western Nigeria, the study Area, lies within the tropical region of West Africa. It is define by longitude $3^{\circ} 20'$ and $6^{\circ} 20'$ East and Latitude $6^{\circ} 18'$ and $9^{\circ} 11'$ North. The region metamorphosed politically from the colony and protectorate of southern Nigeria to Western region, Western state; and today, it is made up of Ogun, Oyo, Oshun, Ekiti, Ondo states. Lagos protectorate, now Lagos state, is part of the region. The region is bounded in the north by Kwara and Kogi states, in the east, by Edo State, and in the West by Benin republic.

The southern boundary is the Bight of Benin with a maritime claim about 27.65% of Nigeria's.

It is a region of contrast. The belief is lowland in the south, from the coast with an average height of between 0 and 200m above sea level. Inland, it is predominantly Yoruba (sometimes referred to as kukuruku) highland that is in Lagos cumulated to the height of about 750m above sea level. These are bounhadts that dotted the vast topography. Ogun, Oyan, Oghun, Owerri and Osse and their tributaries are the major rivers that drain the region southward into the ocean. Aside these, there are drainage channels and canals, natural and man-made, of various lengths and capabilities that drain the cities and towns. Supply of water into these channels are from trains, see page from the ground, springs, waste water from homes, hospitals and maternity homes, manufacturing plants, hotels, motels, brothers and recreation centers, car wash centers, school and college, research institutions and others. But over 75.50% come from train water. (Aderogba, 2012).

Human activities such as dam constructions, irrigation, bridges and others have negatively impacted can free flow of water in the drainage channels, rivers and streams, particularly at the urban centers, construction of roads, buildings, factories, manufacturing plants, bridges and culverts, farmlands and others have reduced drainage channels and erosion passages and or diverted the natural courses of other.

The climate is tropical continent; and the average annual rainfall is 300mm over Lagos in the south and not less than 2,500mm in other parts of the region. Temperature is 26°C , on the average, throughout the region. The vegetation follows the pattern of rainfall. It is slate water mangrove followed by fresh water mangroves that are found along the coast. The rest of the region is dominated by high rain forest with stratified vegetation, derived savannah with all grasses and thick backed trees, and guinea savannah to the extreme north, in that order.

However, the vegetations have been cleared for cultigens; and in the cities and towns for roads, railways, airports, industrial development and other urban activities and functions.

The cities and towns are characterized by multiplicity of urban functions that have to do recreation, research and education, marketing and sales and so on industrialization is concentrated at the Lagos-ota-Abeokuta-Ibadan axis where the largest manufacturing, assembling, chemical, bottling and other industries are located. Labour, skilled, semi-skilled and unskilled and markets for the products and services are readily available too. The population of the six states put together is 27, 511, 992, and (19.65% of Nigeria). It is made up of 14,049,594 males and females, (national population commission, 2007).

The assembly and manufacturing industries, schools, colleges and research institutes, markets and commercial centers, hospitals and maternity homes, recreation centers, hotels, motels and brothels, restaurants and bars, chemicals and food processing plants, households and others release and dump solid (degradable and non-degradable) and liquid

wastes into the imamate and distance neighborhoods indiscriminately. In these ways, the drainage channels, canals and erosion passages are blocked inadvertently and or deliberately. In these ways, the drainage channels, canals and erosion passages are blocked inadvertently and or deliberately.

Waste generation and management are challenges to both governments and urban dwellers. (Igabogunye, 1987; Oyebande, 2005; Aderogba, 2010). Potable water is also a challenge. These thus call for bottles and sachet of which are indiscriminately disposed in quantities by households, recreation centers, parks, public places and other. The quantities and spreads in every community are good indications of the extent of deity habits of the urbanities. (Mabogunye, 2987; Oyebande, 2005).

According to them, these have adverse environmental consequences at both urban and rural areas. The drainage channels, erosion passages and canals have been most affected.

Causes of flooding in Nigeria

Generally, causes of flood in Nigeria could be as a result of natural cause or human cause.

Natural cause

- Inform of heavy or torrential rains/rainstorm.
- Oceans storms and tidal waves usually along the coast.

Or human causes

- Burst water main pipes
- Dam burst levee failure
- Dam spills

Flooding occurs throughout Nigeria in following forms:

- Coastal flooding
- River flooding
- Flash floods
- Urban flooding
- Dam burst levee failures
- Dam spills.

Coastal flooding occurs in the low-lying belt of mangrove and fresh water swamps along the coast river flooding occurs in the flood plains of the larger rivers flash floods are associated with rivers in the inland areas where sudden heavy rains can change them into destructive torrents within a short period.

Urban flooding occur in towns located on flat or low lying terrain especially where little or no provision has been made for surface drainage, or where existing drainage has been blocked with municipal waste, refuse and eroded soil sediments, extensive urban flooding is a phenomenon of every rainy session in Lagos, Maiduguri, Aba, Warri, Benin and Ibadan.

Virtually every Nigerian is vulnerable to disasters, natural or man-made. Every rainy season, wind gusts arising from tropical storms claim lives and property worth million of naira across the country. Flash floods from torrential rains wash away thousands of hectares of farm land. Dam bursts are common following such flood. In August 1988 for instance, 142 people died, 18,000 houses were destroyed and 14,000 farms were swept away. When the Baguada Dam collapsed following a large flood. Urban flooding such as the Ogunpa disaster which claimed over 200 lives and damaged property worth millions of naira in Ibadan, are common occurrence.

Floods paralyze economic activities in many towns and cities in the country. Major roads, some linking states are flooded causing hardship to motion sits. When these roads were constructed, the flooding problems were not there, and the companies that constructed the roads probably did not anticipate the problem.

Areas affected by Floods (Northern Nigeria)

In the northern state of Sokoto, Nigeria in September 2010, flooding in a place called Kayara which is a small village near Gronyo town, worsened significantly. Basically the inhabitants of the village had their village and all their homes and all their crops and all their storage of food completely destroyed. The season that Kagara had been flooded, we believe, is because people had opened the gates on the dam had completely failed and so the consequence of that was Kagara getting flooded. The water came very rapidly demolishing houses, demolishing the building that people use to store their food, and destroying the crops. Tens of thousands of people have been displaced, roads, trees, buildings etc were submerged, tree submerged in aftermath of flood in Sokoto.

The flood led to the loss of thousands of houses and farmlands in 11 local government area of the state. Other areas

affected by the disaster include Isa, Kebbe, Sokoto-north, Sokoto South, Rabah, Biyi, Goronyo, Silame, Shagari, Biyi and Kware Local government councils.

Unconfirmed reports put the death toll at 49 while about 50 villages were submerged and more than 130,000 people displaced.

Also affected were the community secondary school and the corps members lodge which were completely submerged. Checks indicated that most of the corps members sewing in the community have since abandoned their assignment and relocated to Yenegoa, the state capital.

Devastating effect of flooding

In the last three decades, the impacts of flooding have increasingly assumed from significant to threatening proportions, resulting in losses sustained by the urban dwellers and flood victims, it is obvious from the available records (table 1) that irreparable havocs have been sustained by the citizen of Nigeria due to what has become perennial natural disaster in our cities. Apart from houses that collapse by flooding schools buildings and bridges sometimes collapse as well. Markets places and farmlands are submerged for weeks and sometimes are washed away.

The devastating effect of floods was not limited to houses and people. Many farmlands both arable and agro-forestry were swept away when schools and market places were submerged for weeks. Some animals lost their lives to flooding when many bridges collapsed and electric poles destroyed.

The effects could be classified as follows:

- Cause, aggravate and precipitate diarrhea water borne disease,
- Destroy farms, food and cash crops,
- Make the individual, communities and nation poor through disruption of services and the degradation of agriculture land.
- Destroy human life, animal's life and properties,
- Damage and destroy buildings, bridges, dams, embankments, drains, roads, railways etc.
- Degrade the environment,
- Spread infestations; soil and water are polluted by chemicals.
- Cause soil infertility through leaching and erosion of rich top soil.

RESULT AND ANALYSIS

Twenty two (22) causes were deduced and the randomly selected 240 urban dwellers responded to it. Each respondent picked more than one cause. See table 1, illegal structures on/across drainage channels, canals and more erosion passages (100%), inadequate drainage channels (100.00%) are the major substantive conservative causes of the floods. Others are land seckmation/encroachment (82.08%) collapsed dams/embankments and bridges (95.42%) construction and reconstruction (92.25%), poor physical planning (92.25%), and nature of terrain (96.24%) poor waste management (100.00%) is also a common challenge. Ocean/lagoon surge is picked by 75.58% of the respondents. See table 1.

However, the aforementioned led to the observed (and projected) flood parameters and antecedents.

Table 1. Substantive causes of flood

Substantive causes	No of respondents	% proportion
Illegal structure on/across drainage channels	240	100.00
Land reclamation/encroachment	221	92.08
None-heading to whether forecast	91	37.92
Poor physical planning	222	92.25
Inadequate drainage channel	240	100.00
Global warming	201	42.08
Blockage of canals/drains	240	100.00
Negligence	22	21.67
Govt. policies and programs	202	84.17
Collapsed dams embankment	229	95.42
Nature of terrain	231	96.24
Torrential rain storms	240	100.00
Base water flows	56	23.33

Continuation of Table 1

Water flows from car wash centers	31	12.92
Spring water flow	59	24.58
Watering flowers/farm irrigation	21	8.75
Construction and reconstruction	222	92.25
Illegal channelization of drainage channels	207	86.25
Social/cultural activities	86	35.83
Ocean/lagoons surge	191	78.58
Poor waste management	240	100.00
Others (specified)	201	83.75

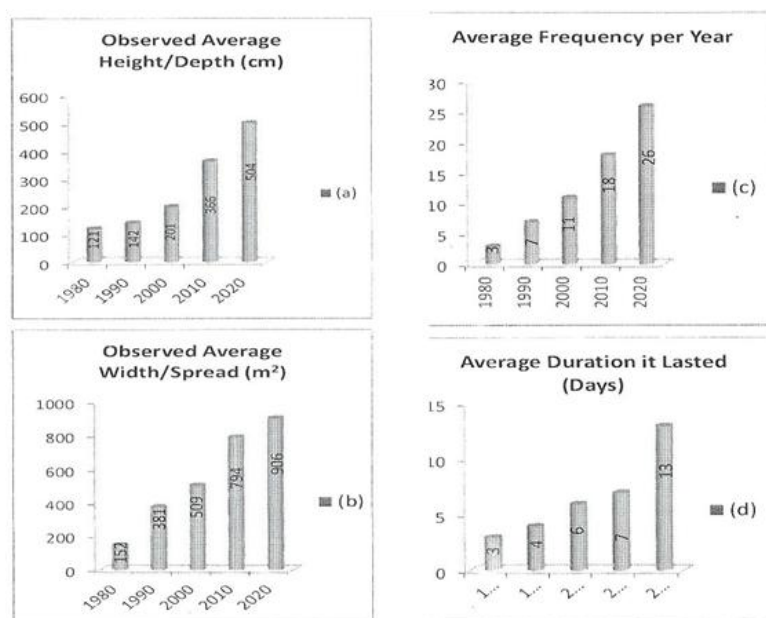


Figure 1. Observed and projected selected parameters of floods (1980-2020)

The average height/depth has been consistently increasing over the years from 121cm in 1980, to 142cm in 1990, 201cm in 2000 and 366cm in 2010. It is projected that it may increase to 504cm by 2020 if the spate remains unabated, see figure 2(a). Similarly the average width/spread was just 152cm in 1980. It spread may be as much as 906m in 2020 see figure 2(b).

Average frequency per annum increased from 3 in 1980 to 18 in 2010; and it may become 26 per annum in 2020. see figure 2(b).

Average frequency, per annum increase from 3 in 1980 to 18 in 2010, and it may become 26 per annum in 2020, see figure 1(d) summarize average duration floods; in 1980, it was three days in 2010, it became one week (7days) on the average. Duration may increase to almost two weeks (13days) on 2020 that is if the spate should remain unabated.

Incidentally, flood has become almost permanent feature of some localities that is, as long as the rainy season lasts. Communities thus live with it.

Table 2. substantive flood parameters in selected cities and towns

City/Town	Average frequency per year	Cost of last (N) (M)	Average width (M)	Cost of relief (m) (N)	Average depth	Av No. of days lasted	Estimated existing channels/drainage
Ile-ife	6	16	121.00	61	223	11	36.45
Oshogbo	8	18	111.00	48	357	13	41.56
Ede	4	16	94.00	35	201	4	40.35
Illesha	8	21	94.00	42	361	6	39.50
Lagos metropolis	10	102	747.00	207	271	25	45.20
Ikorodu	3	22	118.00	34	184	5	46.65
Badagry	4	30	104.00	29	201	4	47.10
Epe	3	25	124.00	24	195	4	46.66
Ibadan	3	88	54.45	145	368	11	43.22
Oyo	4	25	104.00	45	206	4	41.25

Continuation of table 2

Ogbomoshosho	8	18	118.00	147	277	11	45.42
Igbeora	2	5	84.00	211	142	2	21.45
Akure	3	6	101.00	52	194	4	44.15
Ikare	3	4	92.00	27	198	3	43.25
Ondo	8	18	124.72	35	290	11	35.67
Owo	3	11	101.00	21	162	4	25.56
Ado Ekiti	2	6	118.00	16	141	5	48.75
Ise Ekiti	3	24	96.00	19	136	3	13.50
Ido Ekiti	6	12	117.00	22	137	2	12.15
Erinjyan	5	4	85.00	47	144	2	12.15
Ijelo ekiti	4	6	88.00	37	139	2	28.85
Abeokuta	6	31	115.05	74	366	8	36.52
shayamu	4	5	101.00	23	220	5	35.53
shakimu	4	3	97.00	28	161	4	33.45
Aiyetoro	3	86.00	19	143	3	15.56	4.68
Mean	4.68	20.76	146.48	46.32	46.68	5.24	35.20

It is now permanent feature as long as the rainy season lasts in some communities.

Table II is an array of the average frequency per annum, cost of lost in Naira, average width in meters, average relief packages in naira, average height/depth in centimeters and average number of days it lasted for each of the 25 cities and towns.

Average frequency per annum is 4.68 times in a years cost of lost is 20.76 million; average width is 146.48 meters; relief packages is 46.32 million; height /depth is 216.68cm; number of days it lasted is 5.25; and estimated existing drain is 35.20% of the requirements. The average frequency is as high as 10 per annum in Lagos metropolis and 8 per annum at Oshogbo, Illesha, Ogbomoshosho and Ondo. It is west at Igboora (2) and Ado Ekiti (2).

Estimated cost of lost is highest in Lagos metropolis (N102 million) and Ibadan, (N88 million).

It is least at Ijebu Ode and Aiyetoro, ₦3 million each. Average width was least Erinyiyan, (85.00m), Aiyetoro (86.00m) and Ijero Ekiti (88.00m), but highest in Lagos Metropolis (747.00m) apart from ijebu Ode (94.00m) there is no other simplified city or town where it is less than 100.00m on the average. See table 2. Every year, affected communities have been relieved with relief packages by individual's communities, corporate organization and government.

Average relief package is highest in Lagos metropolis, #207 million. It is lowest in Ado Ekiti, #16 million. Average depth/height at Ibadan (368cm), Lagos (271cm), Abeokuta (366cm) and Oshogbo (357cm) were the highest.

The lowest heights were observed at Igbo-ora (142cm), Ado-Ekiti (141cm), Aiyetoro (143cm), Ado-Ekiti (137cm) and Ijero Ekiti (139cm). see table 2. It last for 11 days on the average at Ille-ife, Ogbomoshosho, Ondo and Ibadan. At Oshogbo, it last up to 13days but in Lagos it can last for as many as 25 days; and further observation shows that it has become permanent t feature in some localities. That is as long as the raining season lasts.

There is none of the cities and towns that have up to 50% of the built up areas connected with drains. The most connected are Ibadan (43.22%), Ogbomoshosho (45.42%), Ado-Ekiti (48.75%), Akure(44.149%) Epe (46.66%), Ikorodu (46.65%), Badady (47.10%) and Lagos Metropolis(45.20%), it is less than (20.00%) ay Aiyetoro (15.56%), Ise Ekiti (13.56%), Erinjiyan (12.15%) and Edo Ekiti (12.15%) in other words estimated exiting drains, canals, drainage channels and erosion passages, natural and man made in the sampled cities and towns is less than 50% in all the sampled cities and towns. Average for the entire region is just 35.20%.

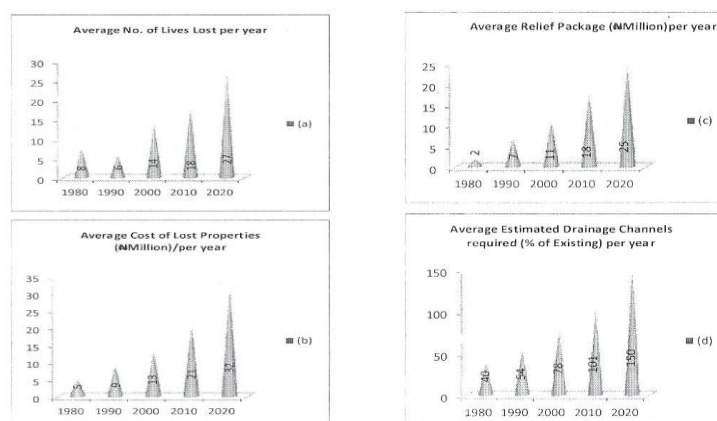


Figure 2. estimated and projected selected effect or floods (1980-2020).

Figure 2 (a), (b), (c) and (d) show a trend analysis of selected estimated and projected effects of floods; the number of lives lost has been increasing from 8, on the average in 1980 to 14 in 2000 and 18 in 2010. It only decreased to 6 in 1990. It is projected that the number may increase to 17 by 2020.

Average cost of lost properties by individual families, households, government and corporate organizations was #5 million in 1980, and #21 million in 2010. See figure (3b). It is projected that it may increase to as much as #32 million by 2020 if the state should continue undated. Over the years relief package was only #2 million in 1980 but it was as much as #18 million. Average estimated drainage required was just 40.00% of the existing drains; the requirement increased to 78.00% in 2000 and 101.60% in 2010; and it may be as much as 150% by 2020. See figure 2(d).

DISCUSSION AND CONCLUSION

The region has come to a long way with multiplicity of functions of the cities and towns as centers of administration, commerce, education, tourism, trade, culture, industry, finance, economy and others, but not with commensurate infrastructural development. The region contains about 19.65% of the Nigerians living in Nigeria and a host of other national's resident and or working for their livings in Nigeria. Urban functions kept on increasing and so also rural-urban migration of skilled, semi-skilled and becoming common phenomena whereas it is not a welcome scene because of its destructive and devastating effects. Hitherto, the cities and towns experienced floods that come and last for weeks on roads, streets, lanes and crescents; and communities. The pattern 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. There is a third phase: following torrential rains, floods now come leading to threats to urban lives, loss of lives and property and rendering thousands of residents homeless; changing the face of the earth and disrupting the unsustainable traffic and others. The intensity, height, spread, frequency and havoc are increasing by the years. It has become permanent features of some communities as long as the rainy season lasts. The rain of weeks of July 10th and 11th 2011, and June 17th 2012, for example took the residents by surprise. The flood took over, shut down and grounded the economy and incurred agony on residents and governments. Houses got submerged, collapsed and washed away, people, including school children, motorists, and bridges washed away. Farmlands, bridges and culverts, roads, railways, schools and colleges, hospitals and maternity homes, residence and others were submerged and washed away, families were forced to relocate, businesses were paralyzed; and lives of animals and human being were lost.

The entire ecosystem of animals, plants and man were altered: habitats of animals and plants were affected, insects, reptiles, rodents and vermin were driven out of their natural habitats, sought alternatives and became dangerous to man and other animals. Urban dwellers had to rethink about their places of abode relative to positions of drains and natural landscape. The incidences call for attention of authority such as the state governments, Lagos state has to declare holidays for the public schools. It may be said to be next to Tsunami. For some days, it became major news item in the national and international dailies and magazines. Airtime of Radio and Television stations were generously devoted to the news on flood, for two weeks after the incidence. The living habits of the residents, poor planning of the physical environment, non-conformance to the natural physiographic characteristics of the landscape and general poor living habits of the inhabitants at home, manufacturing industries, offices, markets and stores, workshops, recreation centers and so on leave the drains blocked leading the floods canals and drainage channels have been silted and filled up with sand, plastics, cans, and bottles, sachets of pure water, carrier bags and others that will never degrade. Drainage channels, erosion passages and so on were often blocked or, at best, narrowed by physical buildings, construction and reconstruction rubbles; and or by various activities of the urban dwellers.

Individuals and groups, organizations, businesses and even governments are not abiding by the environment laws. It may certainly not have been as enormous as it were if the drainage channels were adequate and there were no blockages of the existing drains. It has not been recognized by all that each house or drainage in any street or along any road is part of that community.

The last 30 years have experienced considerable physical development. Construction and reconstruction of roads, offices, markets and stores, manufacturing industries and others without any appreciable infrastructures such as drainage, roads and canals to support them. These are environmental challenges that need to be addressed towards sustainable development. It must be remembered that annual floods have been promoting settlements based on thriving agricultural communities in river valleys. Egypt that gave rise to the whole civilizations that depended absolutely on the fertile silt settling on flood plains of river Nile is a case in point. Though, it is risk dwelling along flood plains. However, it is imperative that concerted efforts are made to put a check on the incessant flood insurgencies and put into better use the better parts of floods and flood plains. If the cities and towns will stand the test of times, meet the millennium development goals and perform the urban functions to the admiration of the urbanities the challenges of floods must be

faced head on. It should be remembered too that global warming and climate change is a worldwide challenge the global phenomenon.

Towards averting the annual tragedy of floods often occasioned by torrential rains and living habits of the residents the three tiers of governments should step up rehabilitation activities that would ensure major roads and drainage channels across the cities and towns are free of encumbrances and serviceable. The ministries of works and infrastructure of each state should be tasked by their respective state governments to ensure adequate free drainage channels and erosion passages in all nooks and crannies of the states. The ministry may have to enforce the drainage clearing through "persuasive approach" while the city government beef up supervision of any identified problem areas. Residents, manufacturing industries and assembly plants, offices, market and stores, hospitals and maternity homes, schools and colleges and others should be compelled to ensure that their surroundings, the drainage channels and erosion passages are clean, clear and free of refuse before, during and after rainy seasons. That is everyone must cultivate the habit of weekly clearing of drains in his surroundings.

Specifically, it is imperative that the national month's environmental sanitation exercise is enforced and sustained. The exercise may be observed at more regular intervals. To rid homes, works environments and others of filth made up of waste foods, abandoned/condemned home utensils and appliances, unserviceable tools and equipments and others, and properly disposed of them without necessarily hindering free flow of water along erosion passages, gutters, drainage channels and canals. There must be urgent government interventions to remedy the situations in the cities and towns to save them 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 structure and dismantle them it is better late than never; and the time is now to clear the drainage channels, canals and erosion passages of illegal structures and sites.

Green areas, besides urban rivers, streams, canals and other drainage channels should be encouraged and enforced. The management of river basin developments authorities should be magnanimous enough to provide the engineering and technical solutions that can take care of floods in their respective areas of jurisdiction. Following from above, urban physical planning departments should not be oblivious of global warming and consequences on climate change more torrential rains, increased run offs more floods; and the inadequate drainage channels. Weather forecasts and forecasters should be more pro active to weather events that could lead to torrential rainstorms that may subsequently result in floods, and havocs. There must be legislations that must deal with the use of plastic bottle and cans, sachets such as pure water sachets, carrier bags and other non degradable material not only in the urban centers throughout the region and in the whole country. Residents, as groups and as individuals, and corporate bodies should be implored and encouraged to embark on some palliative measures such as dredging and re-dredging of drains, erosion passages and so on: and construction of embankments and channelization of some routes that are prone to flood. While channels may be further opened and widened, side drains and gutters could have removable precast concrete or steel cover for ease of maintenance. Government should deploy reasonable human and material resources to free all floodable areas across the built up area from incessant floods before during and after rains, and should be conscious of floatability of new suburbs.

Physical planners and policy makers should know that natural disasters such floods have destructive power, could be very sudden, occasional and so on. These therefore are pointers to appropriate planning and forecast. For the region to achieve improvement in environmental management and accelerated development for sustainable growth and development, there must be redoubled effort to scale up flood control and management, climate change irrigation and adaptation initiatives. Environmental education is imperative and it is now a must. At every level of education; on radio, television, newspaper and magazines, and in every public forum, these must be stressed; and research and development efforts should not be relented either.

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