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Re-Thinking the Legal Framework for Flood Management in Nigeria in Light of Climate Change and Sustainable Development Goals (SDGs)

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Abstract

In recent times science and politics appear to have accepted not only the reality of climate change but of its debilitating impact like rise in sea level, rise in temperature and extreme weather patterns which have brought in its wake increased and intense cases of flooding. Between 1980 and 2016, total direct damages exceeded $1.6 trillion, and at least 225,000 people lost their lives with attendant economic losses globally including Nigeria. The paper finds that the overall impact of flooding include outbreak of diseases, death, loss of economic assets, hunger, pollution, migration, all of which threaten the attainment of the Sustainable Development Goals of eliminating poverty and ensuring good health and gender equality. The paper also finds that regulation could be employed to achieve effective low-cost solutions for the management of flooding in Nigeria. The challenge however is that Nigeria being a country with one of the highest degrees of vulnerability in flood risks and rapid population growth has weak legal framework. Drawing from the international best practices, the paper makes some salient recommendations towards effective legal framework for flood management.

Keywords: Flood management, Flood risks, Climate change, SDGs, Nigeria.

Introduction

On account of natural variations in the hydrological cycle, population growth, urbanization and economic growth in flood-prone areas exacerbated by climate change, global mean sea levels are increasing thus making more critical the concern of increased and inevitability of flooding globally. The global population exposed to river and coastal flooding has doubled, increasing from around 520 million people in 1970 to almost 1 billion in 2010 (Jongman, Ward, & Aerts, 2012). Between 1980 and 2016, total direct damages exceeded $1.6 trillion and at least 225,000 people lost their lives with attendant economic losses (Munich, 2016). For example, the 2011 river flooding in Thailand resulted in losses of about $40 billion. The CNN reported that the flood disaster across South East Asia in 2011 led to the death of more than 139,580 people (Adebayo, 2014).

The Mississippi in 2011 swelled and caused flood in Missouri, Illinois, Tennessee, Arkansas, Mississippi and Louisiana states in America. Heavy rainfall, severe thunderstorms and flash flooding affected several Midwest states of America in 2013. In fact, in the 2013 coastal floods in the United States by Hurricane Sandy, over $50 billion was lost. The 2015 Malawi floods were the worst in the country's history and were followed by food shortage across large parts of the country. Similarly in Nigeria, the paper finds that the impact of flooding include social, environmental and economic effects. For example, in Nigeria over 26 out of 36 states were submerged by flood in 2012. These floods are considered the most severe since 2012. (Nigeria: Floods 2017).

Specifically, in Jigawa State of Nigeria, more than two million people were displaced while about 90,000 hectares of farmland were destroyed (Nation Newspaper 2010). In Rini town in Bakura Local Government Area of Zamfara State of Nigeria, flood washed away more than 2,000 hectares of farmland. The flood rendered 50 families homeless and created pools of water on the road in nearby villages. Devastating floods ravaged communities in Ogun and Osun States in Nigeria in the year 2010. The flood was caused by the release of water from Oyan Dam by the Ogun/Osun River Basin Development Authority. Thousands of residents were rendered homeless, lives endangered, properties destroyed and socio-economic life disrupted by the resultant flood that sacked several communities in Ikosi-Ketu, Mile 12, Agiliti, Owode, Elede,

Owode Onirin, Agboyi, Odogun, Isheri, Ojodu Berger, Majashin, Maidan and Thomas Laniyan, among other estates, in the two states (Newspaper 2010). On July 8, 2017 there was a huge loss of social services when entertainment house like National Television Authority (NTA) Lagos, Nigeria could not function because the streets of Victoria Island Lagos was completely flooded (Kazeem 2017), loss of agricultural produce resulting in hunger, poverty; loss of means of livelihood. Flood washed away N25m worth of fruits in Kebbi state and there is the impact of pollution of streams, rivers, degradation of the environment, outbreak of diseases, death, migration, etc. all of which constitute a challenge to the attainment of the Sustainable Development Goals (SDGs) Gerland P, Raftery, A. E., Sevèíková, H., Li, N., Gu, D, Spoorenberg T- . . .-Wilmoth, J. (2014).

Without proper management of adaptation/ flooding, it is estimated that an additional 100 million people will fall into poverty due to floods and droughts Hallegatte, S., Bangalore, M., Bonzanigo, L., Vogt-Schilb, A. (2015). *Shock waves: Managing the impacts of climate change on poverty*. Washington, DC: World Bank. Regrettably, the monograph finds that Nigeria lacks the requisite strong legal framework and political will to achieve effective solutions for the management of flooding in Nigeria. The paper therefore makes some salient recommendations towards effective legal framework for flood management. The paper conceptualises the key terms, provides the nexus between flooding CC and SDGs. It also reviews the global attempt at managing flooding and lessons for Nigeria before discussing the policy and legal framework for flood management in Nigeria. Thereafter the vignette examined the legal issues and challenges that imped the efficient management of flood in Nigeria and offered salient recommendations following global best practices and local considerations.

Conceptual Clarifications

Flood

This means large volume run-off water in places that are hitherto dry or usually contains much less flowing water; it is an abnormally large quantity of water, which cannot be contained within the existing channels. In the context of the paper flooding is "the overflowing of the normal confines of a stream or other body of

water caused by natural phenomena (e.g., weather) that threatens the safety, welfare of people, and/or damage to public and/or private property" (Ministry of Natural Resources (MNR), 2008). Thus flood management therefore has to do with how to address or tackle the challenge of flooding.

The causes of flooding are mostly anthropogenic; for example due to continuous removal of surface material from earth's crust by natural forces like water, wind, gravity and glacier ice, poor institutional framework- control of unregulated earth moving disturbing activities like sand mining, sand grading , sand dredging, soil erosion , flood control regulation, poor drainage system and reclamation, building on floodplains, absence of or ineffective town planning mechanism, silted, shallow, ineffective canals, deforestation and desertification, etc,

Climate Change

The United Nations Convention on Climate Change (UNCCC) defines climate change (CC) as a change of climate which is attributed 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 comparable time periods. The term 'climate change' generally refers to the variability in our climate that has been identified since the early part of the 20th century. The impact that floods have on the exposed elements is determined by their vulnerability and not necessarily by the volume of their economic losses. *Vulnerability* refers to the susceptibility of the exposed assets and people to the impact of the hazard, and it has multiple facets (Hallegatte, S., et. al, 2015).

Sustainable Development Goals

The concept of sustainable development (SD) was put on the table by the Brundtland Commission by formulating the classic definition of sustainable development, namely, development that seeks to meet the needs and aspirations of the present without compromising the ability to meet the needs of the future (Brundtland, 1987). Sustainable development is about equity, environmental consciousness, food security, poverty alleviation, healthy living, good social services, among others. It has been argued that the needs of the future generation have been

compromised with the increased flooding exacerbated by climate change. In the absence of universally accepted definition of SD the International Panel on Climate Change (IPCC) consistent with the Bruntland Commission 1987, and the Third Assessment Report (TAR). (IPCC, 2001b) defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". The essence of sustainable development throughout is meeting fundamental human needs in ways that preserve the life support systems of the planet (Katesetal, 2000). Its strength lies in reconciling real and perceived conflicts between the economy and the environment and between the present and the future (Archive, 2007).

Relationship between Flooding, CC and SD

Although there has been some disagreement between researchers who run climate models and those who look at the historical record of flood stages; both teams agree that a global analysis conducted, found initial evidence that the number of severe floods (those exceeding 100- year levels) in large river basins have increased over the twentieth century and is expected to continue to increase (Milly, 2002). As global temperature continues to increase due to the impact of Climate change, there is increased potential of the warmer atmosphere to bear more water vapour which comes back to the earth in the form of heavy rainfall. The heavier the rainfall the more the tendency for heavy flooding with damaging consequences like with attendant water related diseases, loss of agricultural products leading to hunger, poverty, loss of livelihood amongst others, all of which impinge the overall attainment of the SDGs. However, it is remarkable that flood has got its positive side. The smaller and more frequent floods assist in improving the fertility and nutrient levels of soils, recharging groundwater levels, and maintaining unique floodplain biodiversity (Reice, 2003).

As at 2018 69 million Nigerians do not have access to water (Nigeria water). On the other hand, recycled flood water, like most available water resources globally has the potential to be used as an alternative source of irrigation water, domestic/non-potable uses and part of sustainable water management strategy (UNICE,F 2018). Doing so will reduce pressure on limited volume of portable

water and promote attainment of SDGs (Orie & Akujobi, 2018). Floods cause rivers to overflow their banks. They carry along sands, debris and silt and when the flood water recedes, most often they leave behind deposits of layers of nutrient-rich sediment, thus making the soil more fertile. For example the ancient Egyptians planned their farming and in deed their lives around the regular flooding of the Nile.

Water conservation measures through re-use of waste water and storm water harvesting are veritable means of ensuring that future generations have access to the water they need, able to fight drought and desertification thereby reducing the impact of climate change. Thus the potential benefits of extracting such resources from wastewater go well beyond human and environmental health, with implications on food and energy security as well as climate change mitigation and adaptation (Orie, 2016). The re-use of waste water help create water during drought, and help reduce cost on water bills for water used in the house. These benefits are not confined to a particular jurisdiction. The next section therefore examines the global efforts at flood management.

Overview of Global Efforts at Flood Management

This segment examines the policies and legal framework applicable in different jurisdiction for the management of flood. It also provides lessons for developing country like Nigeria.

i. Policy: The paper examines some global best practices in flood management using adaptation. These are Attack, Protection, Accommodation and Retreat. Regarding the management of coastal flooding due to sea level rise there are generally four key climate change adaptation policies namely protection (defence), accommodation, retreat and attack, which are some of the outcomes of implemented policies, legislations and programmes during the integration phrase of natural hazard and climate change adaptation into land use planning process (Agdahl, 2017).

(a) Protection (defence)

(i) Hard Protection

High flood walls have been used in places like central Gothenburg -Southwestern Sweden, (a city with very low elevation, which exposes it to flood risk and vulnerability) to adapt the city to flooding occasioned by rise in sea level. In Gothenburg, construction of movable flood barriers and other embankments in the form of" mitre gates" are used to reduce flood risk by controlling the water discharge from Lake Vänern into the Göta River. Potential adaptation measures such as land-use change or new flood defenses' can be included in the model in order to understand how effective they may be in reducing flood risk. This way, risk assessments can demonstrate the possible approaches available to policymakers to build a less risky future. Structural flood protection (that is, the construction of levees, Floodwalls, dams, and dikes) remains the primary means of adaptation to floods. The construction and maintenance of levees and dikes require intensive engineering and significant investments. Therefore, it is often seen that the level of protection from floods is higher in high-income countries than low-income countries. Scussolini, P., Aerts, J. C. J. H., Jongman, B., Bouwer, L. M., Winsemius, H. C., de Moel, H., & Ward, P. J. (2016). When properly constructed and maintained, structural measures can protect against floods. However, when not maintained, levees are prone to failure and may give a false sense of security. This was demonstrated, for example, by the widespread levee breaches in New Orleans caused by Hurricane Katrina in 2005.

(ii) Soft Protection

Nature-based green infrastructure solutions /measures, such as mangroves, wetlands, and forests, Green roofs, Green city parks are increasingly used as alternatives or complements to structural protection in places like Canada (Waves, 2016). For example, floodplain vegetation along rivers or coasts can be effective in reducing wave height and inundation, which then requires lower and less costly dikes to protect the hinterland. Nature-based solutions for flood risk management can be used not only in coastal or riverine settings, but also in urban areas. Green roofs, parks, and wetlands can help store storm waters and reduce urban

flooding (Soz, Kryspin-Watson, & Stanton-Geddes, 2016). However, there are controversies with regards to their role in adaptation for flood management.

(b) Accommodation: The aim is to allow economic and connectivity potentials of an area to propel development in such a way that buildings are adjusted to become resilient while development is encouraged to continue in floodplain areas. Furthermore, accommodation strategies are outcomes of "organisational policies and strategies" (Agdahl, 2017). Examples of accommodation methods include: installing water-permeable pavement as practiced in Australia, building codes, elevating buildings and land uplifting (Grannis, 2011). Such arrangement allows for the first floor to be used as empty space will reduce flood damage. This means that, during flood events, the occupants of the house would move to the upper floor which processes all of the valuable assets, while the first floor is deliberately allowed to flood. This method reduces property damage. The issue is that countries like Nigeria with obsolete parochial policies do not have such modern organizational policies for flood management. As part of her strategy therefore, Nigeria should as a matter of necessity review her policies to incorporate this method.

(c) Attack: To prevent the buildings and infrastructures from flood damage, innovative technologies as well as traditional urban design and construction approaches are used to adapt the features to flood risk and vulnerability impacted by water level rise (Agdahl, 2017). By way of example, floating or amphibious homes are constructed on concrete floating platform or concrete pontoons and wood frames at low water level, which helps to maintain them suspended on the waters (Hendriks 1999). In practice such amphibious homes are adjusted according to the different heights depending on the projected variations in the sea level. In some cases, EP-foam and concrete are used to prevent the homes from sinking into the waters. In New Orleans for example structural" protection measures — levees, floodwalls, pumps, and floodgates — are unable to protect the city from all possible storm surge events. Non structural measures now used include elevating existing or new structures on stilt above the revised base flood elevation (BFE) standard or relocation to lower-risk areas, revised

building codes, and land use restrictions designed to curtail future growth in the flood plain. Another example is Netherlands, where the Floating City IJmeer has been developed on the Rhine delta and even the highways are constructed to withstand flood damage. Such feats have been replicated in Maasbommel in Netherlands, in Japan and in Louvre in Abu Dhabi construction of amphibious homes are underway (Agdahl, 2017).

(d) Retreat: This necessitates moving inland to safer ground, or relocation of vulnerable persons and economic assets in high flood risk zones to safer grounds (Lee, 2014). Bray, M., Hooke, J., & Carter, D. (1997, 22), prefer to interpret this approach instead as "planned abandonment of land and structures in vulnerable areas and the resettlement of inhabitants" on safe ground. However, Grannis (2011) considers retreat as the most controversial climate change adaptation strategy but nonetheless, holds that, when flood risk and vulnerability are highest, retreat becomes the most effective measure the local government can apply (Nicholls, 2011). The implementation of retreat strategies is achievable through strict government legislation and through integration and advanced planning programmes (Bray et al.,1997).

The international community established the Water Framework Directive (WFD) to reduce the impact of floods, though precautionary flood protection measures are not specifically prescribed. Apart from the WFD, the European strategy on flood protection is also to make use of and integrate other policy fields such as Common Agriculture Policy (CAP), transportation, shipping, urban development, emergency management, and especially nature conservation. In addition, there has been several initiatives/actions at global and European level, namely, the Helsinki Convention on the Protection and Use of Transboundary Water-courses and International Lakes (Helsinki, 1992) which became a legal instrument in 2013 (Water Convention , 2013), the legal instruments or co-operative programmes on such water-courses and their river basins as the Rhine, Danube, Elbe, Odra, the UN/ECE Guidelines on Sustainable Flood Protection, Global Water Partnership, 2nd and 3rd World Water Forum, the World Summit on Sustainable Development (Johannesburg, 2002), the Declaration of Intent concerning co-operation in the field of Integrated Flood Management in Deltas and Lowland River

Regions (Kyoto, March 2003), etc. The European Union Solidarity fund (EUSF) and The LIFE Financial Instrument for the Environment were also created as specific financial instruments to give immediate financial assistance in the event of a major disaster to help people, regions and countries that are victims of flood disaster (Regulation (EC)2002).

On its part, the Intergovernmental Panel on Climate Change (IPCC) assumes that there will be an average of temperature rise in the 21st century (1.4 to 5.8 degrees Celsius) and that based on this assumption, the sea is expected to rise making it more difficult for the rivers in the delta to drain into the sea. The resultant effect of this is flooding. Furthermore, the SDGs 6, as formulated by the United Nations is to ensure availability and sustainable management of water and sanitation for all. Target 6.3 of the SDGs explicitly focuses on reducing pollution and improving the disposal, management and treatment of wastewater and its impact on ambient water quality. This target is highly relevant to achieving several other SDGs. Such treated waste water like flood water help to reduce the demands of clean water, improve the availability of clean water towards attainment of SDG 6 target. In assessing the global practices it is important to note that:

i. The Netherland experience shows that she has in place well laid out laws, regulations and the requisite political will for enforcement of flood management regulation for example regulation on zoning and restriction of settlement in risk areas.
ii. Structural measures like Dykes, floodwalls and embankments and relief channels when properly constructed, maintained and combined with non structural measures like elevating stilt, can protect against flood as seen from the case of New Orleans.
iii. Local-scale solutions such as elevating new buildings and protecting critical infrastructures proved to be the most cost effective. Such an analysis allows the prioritization of limited investment funds in protecting the city against rising sea levels (Longman, 2018). Different kinds of flood protection measures can be best suited to different given areas.

iv. Early Preparation of a flood forecasting and flood warning system is not negotiable while insurance and emergency financing schemes is common place in most jurisdictions.
v. There is need to change our behaviour (software), and not just build defences (hardware).

Armed with the global perspective and the lessons it holds for Nigeria the paper proceeds to examine the framework for flood management in Nigeria.

Framework for Flood Management in Nigeria

i. Policy

The principal national policy on the environment is the National policy on Environment of 1989. This policy was a product of a reactionary knee-jerked approach occasioned by the Koko waste dump in 1988. The policy was revised in 1999 but was never adopted. In 2005 came the National Policy on Erosion, Flood control and Coastal Zone Management, which was established to manage erosion, control flooding and coastal zone management, dams and reservoirs. In line with this policy the government approved the National Forest policy 2006 to target Sustainable Forestry Management (SFM), leading to sustainable increases in the economic, social and environmental benefits from forests and trees. This policy is expected to work in synergy with the National Disaster Framework of 2010. The National Water Policy and initiatives 2016 is a more recent creation as it provides strategy that will improve the management and delivery of water resources in the country- harmonise all relevant laws including Water Resources Act, The River Basin Development Authority Act (RBDA), the National Water Resources Institute amongst others. However, it is important to state here that although this policy is relatively new for purposes of assessment of its effectiveness, the fact that it does not provide for management of flood water in the era of globally climate enhanced flooding is a major shortfall.

ii. Laws

With respect to the Laws, the Constitution of the Federal Republic of Nigeria; s.20 on Environment- provides for the protection and

improvement of the environment and safeguard of the water, air and land, forest and wild life of Nigeria citizen. However, the Nigerian Constitution makes S.20 non justiciable while the fundamental human rights remain justiciable. (Orie, 2014; Attorney-General of Ondo State v. Attorney-General of the Federation and Ors (2002); Chief Adebiyi Olafisoye v Federal Republic of Nigeria 2004). The Constitution gave birth to the National Resources Conservation Act 1989 meant to address soil, water, forestry, wildlife conservation and formulate and implement policy in this regard and the Federal Environmental Protection Act 1988 which was later scrapped in 1999 and replaced in 2007 by a more comprehensive law, the National Environmental Standards & Regulation Enforcement Agency (NESREA) Act. Sections 8(k) and 26 of the Act gave the agency power to control flood and erosion, and enhance the quality of land resources, natural watershed, coastal zones, dam and reservoirs.

In line with its mandate to enforce environmental guidelines and policies NERSREA produced 24 regulations some of which also provide for the regulation of flooding. These regulations include; (a) National Environmental (Soil Erosion and flood control) Regulation 2011 to manage flood water to prevent flooding - regulation 2 (2c,2e)and (2(4), reg 6 (3), reg 7 and 11; (b) National Environmental (Protection of watershed, Mountainous, Hilly and catchment Areas) Regulation 2009; (c) National Environmental (Control of Bush, Forest Fire and Open Burning) Regulations, S.1. No.15, 2011 gives permit for bush and forest burning; and (d) National Environmental (Coastal and Marine Area Protection) Regulation 2011 for protection of the marine and coastal environment.

Furthermore, the National Emergency Management Agency (Establishment etc) Act (NEMA) by its s. 6 (1) generally deals with natural disaster but without any special provision to tackle the menace of flooding. In a similar vein, mandate of the RBDA as indicated in s.4(1) includes the controls of floods, erosion and for watershed management while that of the Nigerian Hydrological Services Agencies (NIHSA) is to provide services required for assessment of the nation's surface and groundwater resources. In addition to the above there are also similar Edicts in various States and other interventions. It is clear from the review of the Nigerian laws and policies here that Nigeria has some policies and laws

that could be deployed to checkmate the menace of flooding in Nigeria. Implementation of those regulations is where the problem is. However, it equally observed that some of the policies and laws like the National policy on Environment and the National Forest policy are obsolete and in need of reviews. While the RBDAA and NEMA do not have specific provisions on how to manage floods, NESREA and its regulations have been criticized for failing to provide adequate consideration to the management of floods . The next section therefore will examine the issues, challenges and strategies that generally impede the management of flooding in Nigeria

Issues, Challenges and Strategies in Flood Management in Nigeria

As populations grow, cities expand, and climate changes, the challenge is to reduce current flood risk while also ensuring that new development happens in a resilient way.

i. Policy integration

There is no doubt that Nigeria has several policies that have limited relevance to flood management since they are either obsolete or do not have specific provisions for flood management. These policies have proven ineffective in addressing climate change related impacts (flooding) by helping communities achieve their goals with regards to reduction of flood risk and vulnerability in the built –up area and the environment. Furthermore, it is imperative that future policies related to wet weather flows and their management have a link to climate change and building resilience. Policy that can speak to adapting to change and possible changes in the way water flows across the city's landscape will be important going forwards because no matter how extensively one plans, the future is still uncertain necessitating the need for an insurance policy on climate induced flooding.

ii. Legal framework

The issue here is that although s.20 provides for the protection of the environment that provision is under chapter 2 of the Constitution-that is - Directive Principles of State Policy. The challenge is that the s.20 is generally seen as not justiciable. The

Absence of specific law on flood water management and water re-use is an added challenge as flood water help to reduce the demands of clean water, improve the availability of clean water towards attainment of SDG 6 target. The NEMA and the River Basin Authority Development Acts and even the NESREA Act have not brought any significant improvement to the challenge of managing flooding, The strategy is for Nigerian government to review her obsolete water regulation and incorporate /establish efficient flood water regulation in her water management law and related laws like NEMA, NESREA, and River Basin Development Authority Act if she must achieve water sustainability in line with the SDGs target and contribute to the fight against the impact of Climate Change.

iii. Weak enforcement

It has been submitted in some quarters that there are overlapping and conflicting roles among Federal Government organs like RBDA, NIHSA, Federal Environmental Protection Agency, Ministry of Environment, Standard Organization of Nigeria and National Agency for Food and Drug Administration and Control (NAFDAC). These arrangements functioned with frictions but have largely failed in proffering; working national water policy for Nigerians (Enyidi, 2017). Part of government strategy therefore should be to create distinct roles for each organ and in a manner that will enable them function in synergy with one another.

iv. Political will of government: Countries with best practices in fighting flooding must consistently match their policies with action. A high degree of commitment is expected – commitment to; demolish houses on flood plains, relocate people, provide incentives for relocation and pay compensation where appropriate, stop reclamation in low land areas like Lagos, protect wetlands, fit- for- purpose and well- maintained drainage systems; (de-silting, repair, etc.) dredging of the rivers and canals, build dams , and embankments. This is not so in the case of Nigeria where policies are obsolete coupled with the fact that government lack the requisite will to implement her flood policies for reasons not limited to absence of relevant laws, corruption and funding. For example in 2016, several states in Nigeria were submerged and some state governments like that of Nasarawa state evacuated

several people out of the floodplain areas, yet shortly after the incident, in Suleja area of Nasarawa state, like in many other parts of Nigeria, flood victims went back to live on the same flood plains that they had vacated when the flood came. There is neither government policy or legislation to prevent them from doing so nor any plan for alternative residential accommodation- so the circle of flooding continues. Nasarawa state is one of the few states that demolished and relocated limited number of people on the floodplains. In most other states the victims are usually asked to relocate-with no alternative plan, no compensation, no incentives and no regulation to compel people to vacate. Especially for the low income earners and the people engaged in agriculture, the flood plains are attractive to live in; cheaper land to build, lushly vegetation for live stocks, fertile land for farming, fishing business, etc.

v. Mapping of Flash and River Flooding Hazard

Floods are the leading cause of natural-disaster losses globally. Although the amount of fatalities has declined due to improved early warning systems, economic losses continue to rise with increased urbanization in flood-hazard areas. The ideal situation is to have this mapping done based on long series of inundation observation from past flood occurrences using remote-sensing imagery either at low resolution for large-scale flooding or at high resolution for local flooding. The Flood Inundation Mapping (FIM) Program helps communities protect lives and property by providing tools and information to help them understand their local flood risks and makes cost-effective mitigation decisions. The main problem with this approach is that satellite images are not essentially accessible during the flood, and even if enough images can be collected, the time series available may be too short to assess very rare but destructive events. Furthermore, additional information often needed to define the severity of a flood, such as water levels and flow velocities, cannot be derived from satellite data (Jongman, et. al., 2018). The strategy is for government to recognise flooding as a major natural disaster and to dedicate funds towards its research and management.

vi. Enlightenment

What is most striking is that, projects underway with regards to making the city greener, are concerned with creating more green spaces in high flood prone areas but no connections are made with adaptation for flood management in these locations. For example, in Sweden there are ongoing plans for the creation of green corridors linking "Mölndal to Hisingen, through the Botanical Garden" which also include growing of plants in the parks. Besides, projects to create a Centenary Park in the high flood prone area of Frihamnen are underway. Yet no connection has been established with regards to how the flood situation in the area will be improved thanks to these green spaces. Focus is still on the connecting capacity, recreational and good health of vegetation to the area, and what is most important- adaptation for flood management has been left out completely (Agdahl , 2017).

In Nigeria the situation is similar; not many rural people can link flooding in Lagos and all over Nigeria, landslide and erosion in Anambra and Enugu with impacts of climate change. (Nigeria: Floods 2017). Secondly, is the fact that most countries can completely eliminate flooding. This will mean that there is the need to "make space for the flood." To achieve this, flood management in Nigeria must become intertwined with other domains such as urban planning, ecological restoration, or recreation.

vii. Technology

The use of technology in the management of flood water is a sine qua non to the effective management of flood in the 21st century. There are increasingly different forms of technology available for effective management of flood water. These include, Stormwater harvesting, channelization (create channels and ensure they are not blocked, build food banks and encourage citizens to do so and see flood water harvesting as business venture (FAO Report; Orie and Akujobi, 2018). Such stored flood water could be used later for agriculture and pasture. From the discussion in this segment one can distill that flood protection and flood management strategies can modify either flood waters, or susceptibility to flood damage and the impact of flooding.

Recommendation

A sustainable holistic and resilient approach to flood-risk management as recommended here will deploy diverse approaches through-out the river basin, with methods varying by local conditions while still reflecting the overall basin conditions. These approaches should include a mix of structural (e.g. secure floodwalls protecting the downtown of a city, levees protecting farmland) and non-structural tools (e.g. early-warning systems, insurance) and relying as much as possible on green infrastructure, such as forests and wetlands to retain runoff and using some floodplains as "relief valves" to convey water during large floods.

In establishing a holistic approach towards water management as recommended above, Nigeria must change the way in which she thinks about its river basins, waterfronts and systems. The evolution of flood management globally reveals a move from flood control to management, and to the thought of welcoming water– reacquainting ourselves with water and changing the way people think about it, especially in the coastal zones, realizing that it has and will always shape our land and the way people live.

Risk acceptance with flood hazard brings forward the possibility of making room for water. This new way of understanding water will allow for a resilient rather than resistance approach to flooding. It seeks to reduce flood hazard risk through the use of technology (including modern climate insurance policies), but accepts that there will be a residual. It will allow for innovations in flood management and flood-receptive design as the population of Nigeria grows. Such national flood management Act should equally encourage the integration of stakeholder effort, drive best practice and set standards for flood mitigation, adaptation and resilience in line with the SDGs. These dynamics must be captured in the new Nigerian policy and legal framework for flood management bearing in mind distinct roles for various arms of government. In addition, the government must demonstrate the political will to fight climate change, achieve the SDGs 6 target through policy review and harmonization, demonstrated ability to implement and enforce the regulations.

Conclusion

The impact of CC like rise in sea level, rise in temperature and extreme weather patterns mostly on account of anthropogenic factors has brought in its wake the issue of increased and

inevitability of flooding globally. Through a review of some best practices in many jurisdictions, the paper found that a range of options are available to policymakers in Nigeria to address flood risk and build a safer future in line with the fight against CC and for the attainment of the objectives of the SDGs and in the same vein improve on the strategies that impede the effective management of flooding in Nigeria. This therefore necessitated the recommendation for a review of existing policies and laws and possibly enactment of novel ones in line with best practices and local considerations.

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