

A Resilient Coastal Mega City, A Resilient People: Flooding as a Climate Change Threat in Lagos, Nigeria

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ABSTRACT

With an estimated population of about 11.2 million Lagos popularly referred to as 'Èkó' or 'Lasgidi', is a coastal city vulnerable to recurrent flooding which has progressively modified the shoreline but the residents and city's resilience to recurrent flooding is incomprehensible. With increasing urbanisation, population growth, urbanisation of poverty and daily influx of people from other States of the Federation, various settlements have evolved along the wetlands without supportive infrastructures thus, making neighbourhoods highly vulnerable to flooding. The paper examines residents' vulnerability and resilience to flooding, the coping and mitigating strategies and policies that have been adopted by residents and the State. For a resilient city and a resilient people the paper proposes resilience thinking and adaptive governance through flood mitigation education and awareness programs that eradicates or minimizes refuse or debris dumping in storm-water channels.

INTRODUCTION

Nigerian cities, in low lying terrains like Lagos, are prone to coastal, river or urban flooding. Urban flooding occurs where little or no provision has been made for surface drainage, or where existing drainage has been blocked with municipal waste, refuses and eroded soil sediments (Folorunsho and Awosika, 2001). Urban flooding is a serious disaster in the world, which not only causes serious damage, disturbs normal life and working conditions, but also pollutes the city and causes sanitary problems (Chen, 2004).

Lagos, a vibrant commercial capital is a megacity occupying two main islands in the Atlantic Ocean, separated by creeks and mangrove swamps. Lagos experiences coastal and urban area flooding, high tidal levels, ocean waves, and storm surges. Inadequate infrastructures to

contain the run-off, peoples' attitudes and non-compliance to physical planning measures all constitute barriers to proper flood control. The major causes of flooding in these areas include excessive and recurrent rainfall, overflow of water bodies, encroachment of building on flood-plain, poor/faulty/non-functional drainage network and indiscriminate dumping of waste into water channels leading to drainage blockage. Lagosians continue to be vulnerable to flooding and their resilience in addressing the flooding challenges remains unparalleled.

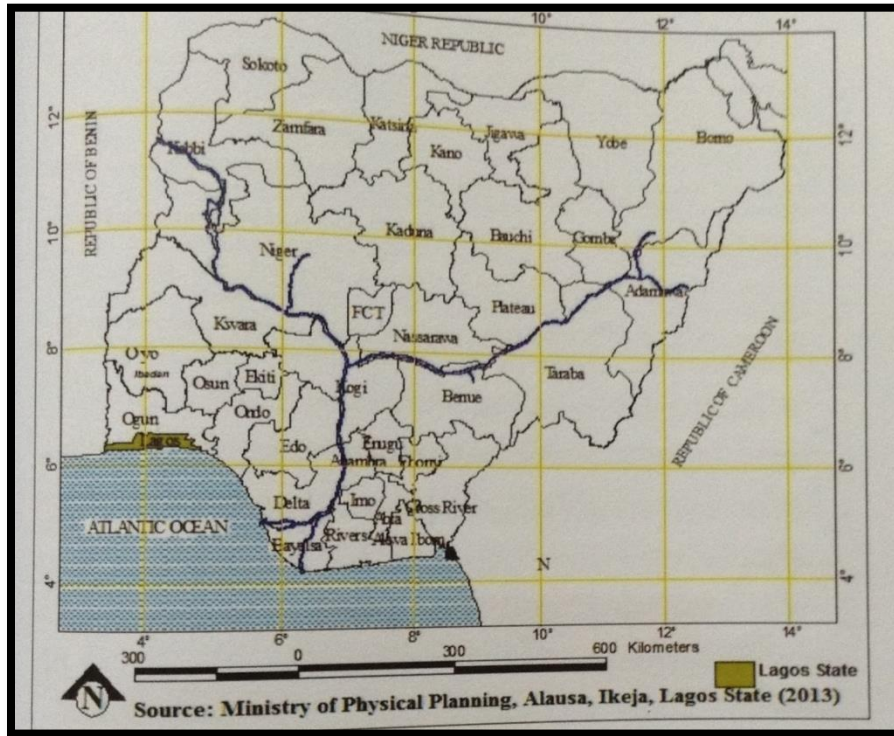
Resilience means "ability to adapt to and through a difficult situation. Resilience is a term that is often used to mean 'bouncing back from a terrible event' or 'having strength to cope', or 'being determined to see things through to the end'" (Mowbray, 2011:2). Resilience refers to the process of overcoming the negative effects of risk exposure, coping successfully with traumatic experiences, and avoiding the negative trajectories associated with risks (Fergus and Zimmerman, 2005). Resilience and Resilience thinking enables the system, individual, people, community, city or economy to adapt and embrace shocks arising from a catastrophe through innovative resolutions.

The paper examines residents' vulnerability and resilience to flooding, the policies that have been adopted by residents and the State to cope with flooding. For a resilient city and a resilient people, paper adopts the resilience framework and proposes resilience thinking and adaptive governance (through flood mitigation education and awareness programs well as integration of geo-spatial and remote sensing techniques towards appropriate flood modeling, simulation and forecasting) as an approach to minimize the devastating impact of flooding.

STUDY AREA

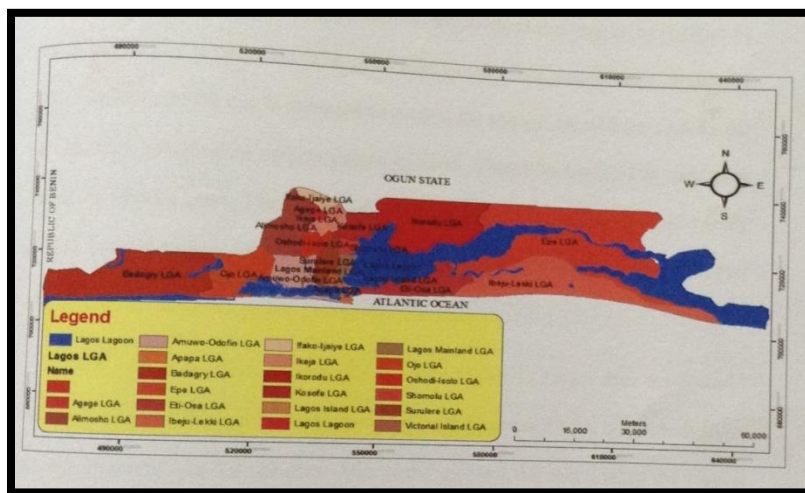
Lagos megacity occupies two main islands in the Atlantic Ocean, separated by creeks. Its land area is 153,340 hectares, with 209 km² (some 19.6 per cent of its landmass) covered by water and mangrove swamps (Filani, 2012). The seat of Nigeria's government until 1986, Lagos (Figure 1) remains the nation's commercial capital, contributing more to its economic growth than any other city. With an estimated population of 16 million, Lagos is the most populous conurbation in Nigeria with a population density of about 5,000 persons/km², making it one of the most densely populated cities in Africa (Filani, 2012).

Figure 1: Lagos State in Nigeria context



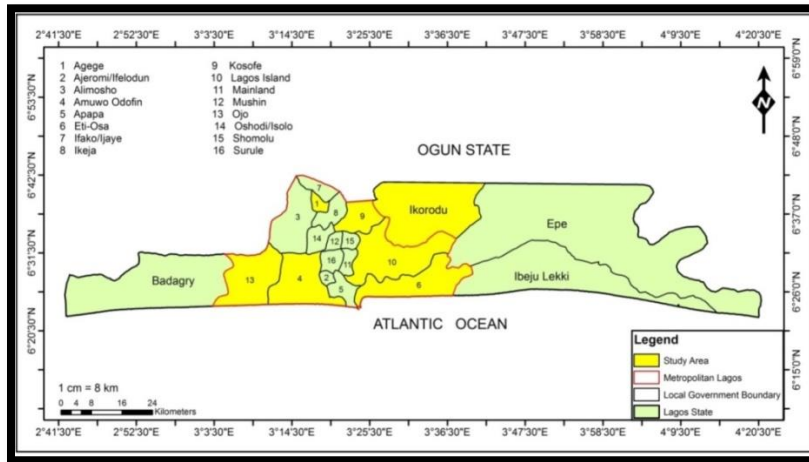
Source: Ministry of Physical Planning, Alusa, Ikeja, Lagos State, 2013.

Lagos State has 20 Local Government Areas (LGA) (Figure 2), out of which 16 make-up the metropolis. The Local Governments considered in this study include Ojo, Kosofe, Eti-Osa, Lagos Island, Amuwo-Odofin, Ikorodu, Ajeromi-Ifelodun and Agege (Figure 3).



Source: Information Unit, Lagos State, 2014

Figure 3: Local Government Areas under study within Lagos State Context



Source: Authors, 2015

METHODOLOGY

The study utilized both secondary and primary data. The secondary data regarding coping and mitigating policies and its implementation were obtained from the Lagos State Ministry of Environment- Lagos State Waste Management Authority (LAWMA), Office of Drainage Services; and Lagos State Emergency Management Agency (LASEMA). Primary data was collected using informal interviews and structured questionnaires administered in 2014/2015 on 150 residents through purposive sampling to elicit information regarding frequency of flood occurrence and residents coping mechanisms.

RESILIENCE FRAMEWORK

Resilience is the “the ability of a system to absorb disturbances and still retain its basic function and structure” (Walker and Salt, 2006:1) and “the capacity to change in order to maintain the same identity” (Folke et al., 2010). Resilience is about survival and adaptability. Resilience is “the ability of a system to maintain its structure and patterns of behavior in the face of disturbance” (Holling, 1986:296). Resilience “is the ability to persist and the ability to adapt” (Adger, 2003:1).

Resilience originated in the 1970s in the field of ecology from the research of C.S. Holling (Pisano, 2012). Resilience is defined as “a measure of the persistence of systems and of their ability to absorb change and disturbance and still maintain the same relationships between populations or state variables” (Holling, 1973:14). The concept of resilience in relation to social–

ecological systems incorporates the idea of adaptation, learning and self-organization in addition to the general ability to persist disturbance (Folke, 2006). “Resilience is the capacity of a system be it an individual, a forest, a city or an economy, to deal with change and continue to develop. It is about the capacity to use shocks and disturbances like a financial crisis or climate change to spur renewal and innovative thinking. Resilience thinking embraces learning, diversity... and humans and nature are strongly coupled to the point that they should be conceived as one social-ecological system” (Moberg and Simonsen, 2014:3).

The resilience perspective shifts policies from those that aspire to control change in systems assumed to be stable, to managing the capacity of social–ecological systems to cope with, adapt to, and shape change (Berkes et al., 2003, Smit and Wandel, 2006).

Resilience in the ecological literature reflects different aspects of stability that focuses on efficiency, constancy or persistence, change and unpredictability (Gunderson et al, 2002). He notes “the differences between these two aspects of stability – essentially between a focus on maintaining efficiency of function (engineering resilience) versus a focus on maintaining existence of function (ecological resilience) – are so fundamental that they can become alternative paradigms whose devotees reflect traditions of a discipline or of an attitude more than a reality of nature ...”(Gunderson et al, 2002:1).

Resilience Thinking

Resilience thinking on the other hand “is about generating increased knowledge of how we can strengthen the capacity to deal with the stresses caused by climate change and other aspects of global change. It is about finding ways to deal with unexpected events and crises and identifying sustainable ways for humans to live within the Earth’s boundaries” (Moberg and Simonsen, 2014:3). “Resilience thinking provides a framework for viewing a social-ecological system as one system operating over many linked scales of time and space [notwithstanding that] its focus is on how the system changes and copes with disturbance” (Walker and Salt, 2006:38). Resilience thinking addresses the dynamics and development of complex social–ecological systems (SES) (Folke et al., 2005)). Three aspects are central: “resilience, adaptability, and transformability” (Pisano, 2012:12). For resilient world the values of diversity, ecological variability, modularity, acknowledging slow variables, tight feedbacks, social capital, innovation, overlap in governance, ecosystem services (Walker and Salt, 2006). Table 1 shows the facets of resilience.

Table 1: Three Facets of Resilience

Resilience concepts	Characteristics	Focus on	Context
Engineering resilience	Return time, efficiency	Recovery, constancy	Vicinity of a stable equilibrium
Ecological resilience	Buffer capacity, withstand shock, maintain function	Persistence, robustness	Multiple equilibria, stability landscapes
Social–ecological resilience	Interplay disturbance and reorganization, sustaining and developing	Adaptive capacity transformability, learning, innovation	Integrated system feedback, cross-scale dynamic interactions

Source: Folke (2006)

Pisano (2012:9) focuses on social-ecological resilience as the best suited for considering governance issues and conceptualises resilience characteristics through the definition of social-ecological resilience that, draws from Carpenter et al (2001) as the:

- Amount of disturbance a system can absorb and still remain within the same state or domain of attraction;
- Degree to which the system is capable of self-organization;
- Ability to build and increase the capacity for learning and adaptation.

Social–ecological resilience is about people and nature as interdependent systems. This is true for local communities and their surrounding ecosystems, but the great acceleration of human activities on earth now also makes it an issue at global scales (Steffen et al, 2007), making it difficult and even irrational to continue to separate the ecological and social and to try to explain them independently, even for analytical purposes (Folke et al, 2010).

Adaptive Governance

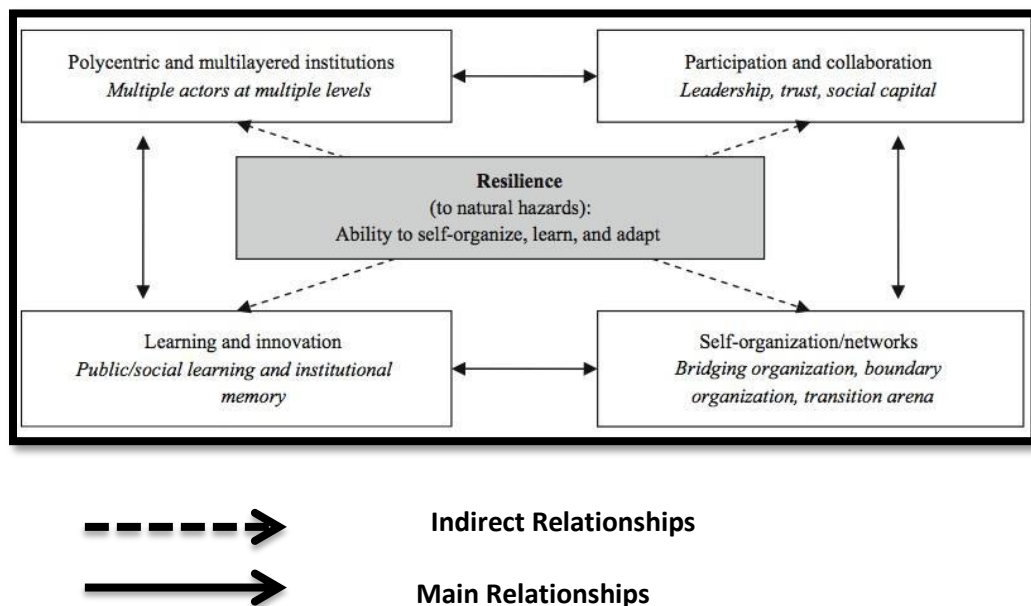
The Stockholm Resilience Centre considers adaptive governance as “an evolving research framework for analysing the social, institutional, economical and ecological foundations of multilevel governance modes that are successful in building resilience for the vast challenges posed by global change, and coupled complex adaptive Socio-Ecological Systems” (Pisano, 2012: 25). Adaptive governance deals with the complex issues that socio-ecological systems are confronted with (Pisano, 2012). Adaptive governance is best understood as an approach that unites those environmental and natural resource management approaches that share some

or all of the following principles: polycentric and multi-layered institutions, participation and collaboration, self-organization and networks, and learning and innovation (Djalante, Holley and Thomalla, 2011). Four interactive crucial aspects for adaptive governance are suggested by Folke et al (2005) namely: (1) to build knowledge and understanding of resource and ecosystem dynamics; (2) to feed ecological knowledge into adaptive management practices; (3) to support flexible institutions and multilevel governance systems; and,(4) to deal with external perturbations, uncertainty, and surprise. Figure 4 shows an illustrative representation of the links between the crucial characteristics of adaptive governance that will help in building and governing resilience (Pisano, 2012).

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- Deal with external perturbations, uncertainty, and surprise

Figure 4: Interlinkages between key characteristics of adaptive governance in relation to building resilience



Source: Djalante, Holley and Thomalla (2011).

RESIDENTS PROFILE

The residents profile is shown in Table 2. About 52.7% and 47.3% of respondents were men and women respectively. 62.6% of respondents were above 40 years old while about 37.4% of respondents were above 40 years old. In regards to marital status 37.3% were single, while 50%, 6% and 6.7% of the respondents were married, divorced and separated respectively. 12.7% of respondents had no education while 34.7%, 28.6% and 24% of respondents had primary, secondary and tertiary education respectively. About 60% of respondents earned less than ₦40000 (US\$111) per month while 30% earned between ₦ 41000 and N80000 per month (US\$114-US\$222) and 10% earned above ₦ 80000 (US\$222) per month. 21.3% of respondents have stayed in the study area since birth, 27.3% between 1-5 years, 22.7% between 6-10 years, 11.3% between 11-15 years and 17.3% have stayed in the study area for above 15 years. Some of the factors which attracted respondents to the flood prone areas include low rent (28.7%), low rent and proximity to work (13.3%), low rent and market availability (9.3%), availability of cheap land (14.7%), nearness to work place (11.3%), and family ties (12.7%). All the respondents in the areas visited attested to have experienced flooding before.

Table 2: Respondents socio-economic profile

Sex	Number	%
Male	79	52.7
Female	71	47.3
Total	150	100
Age	Number	%
less than 20 years	26	17.3
21-40 years	68	45.3
41-60 years	40	26.7
Above 60 years	16	10.7
Total	150	100
Marital status	Number	%
Single	56	37.3
Married	75	50
Divorced	9	6
Separated	10	6.7
Total	150	100

Level of Education	Number	%
No formal education	19	12.7
Primary	52	34.7
Secondary	43	28.6
Tertiary	36	24
Total	150	100
Monthly Income in Naira (₦0	Number	%
Less than ₦ 20,000	45	30
₦ 20,000 - ₦ 40,000	45	30
₦ 41,000 - ₦ 60,000	26	17.3
₦ 61,000 - ₦ 80,000	19	12.7
Above ₦ 80,000	15	10
Total	150	100
Duration of Residency	Number	%
Since Birth	32	21.3
1- 5years	41	27.3
6-10years	34	22.7
11- 15years	17	11.3
above 15years	26	17.3
Total	150	100

In 2018 the exchange rate is \$1=360

RESIDENTS VULNERABILITY TO FLOODING

Lagos State is susceptible to recurrent yearly flooding due to its spatial location, topography, urbanization of poverty and crowding. The incidence of flooding is indicated in Table 3.

Table 3: Flood incidence in Lagos State from 2000 to 2014

Year	Affected locations	Rainfall began	Duration in days	No of deaths	Number of displaced persons	Main cause	Comments
2000	Most parts of the metropolis	22/5/2000	1		None	Rainfall	Socio-economic activities paralyzed, road blocked
2000	Lagos City	20/5/2000	2	10	None	Rainfall	The flooding was up to a metre (yard) deep

Table 3: Flood incidence in Lagos State from 2000 to 2014

Year	Affected locations	Rainfall began	Duration in days	No of deaths	Number of displaced persons	Main cause	Comments
							in several low-lying areas of the city, tens of thousands of homes all over the city were inundated with water.
2002	Lagos	7/24/2002	3	2	None	Rainfall	A mother and baby drowned
2004	Lagos City	6/17/2004	2	0	None	Rainfall	Ten hours rain floods large areas of Lagos City hyped by locked drains caused by dumping refuse
2007	Lagos area-Ikorodu, Kosofe	8/1/2007	15	6	5000	Rainfall	Ogun river flooding; 4,000 homeless in Lagos. 200 buildings destroyed 6 people dead
2009	Lagos Mainland – Apapa axis	30/6/2009	2		None	Rainfall	
2010	Lagos business districts, Island	7/7/2010	1		1760	Rainfall	Most streets in the city’s key business district were swallowed up in flood. Motorists forced out of business.
2010	Lagos mainland and Island	14/6/2010	1		None	Rainfall	Roads were flooded. Canoes constructed to ferry people across ‘the river’.
2011	Lagos	10/7/2011	2	Over 25	5393 households	Rainfall	5,393 households were affected in 31 districts/streets. Estimated output loss of ₦100 billion
2012	Lagos mainland and Island	27/06/2012	3	7	None	Rainfall	Houses submerged, one collapsed in Bariga. Community linking bridges washed off; pupils trapped; roads and bridges were submerged by the flood, and many properties were swept away
2013	Lagos Island and Mainland	10/4/2013	1		None	Rainfall	Commuters were stranded as downpour causes flooding, gridlock in Lagos
2013	Lagos Island	9/08/2013	1		None	Tidal waves	Homes were flooded
2014	Lagos Island and Mainland	20/4/2014			None	Rainfall	Roads and Drainages were submerged
2014	Lagos Island and Mainland	10/07/2014	1		None	Rainfall	Roads and Drainages were submerged; movement was impeded.

Source: Informal Research culled from various Newspaper sources in Nigeria (Vanguard, The Punch, Business Day, Daily Champion, Daily Times, Global Flood Register).

The major causes of flooding in the study locations include:

- Flat topography
- Excessive and recurrent rainfall
- Overflow of water bodies
- Encroachment of building on flood-plain
- Absence of building setbacks and construction of houses on drainage or water ways (Photo 1)
- Opening of a dam (Oyan dam) in neighbouring Ogun State
- Poor/faulty/non-functional drainage network (Photo 2) and,
- Indiscriminate dumping of waste into water channels leading to drainage blockage

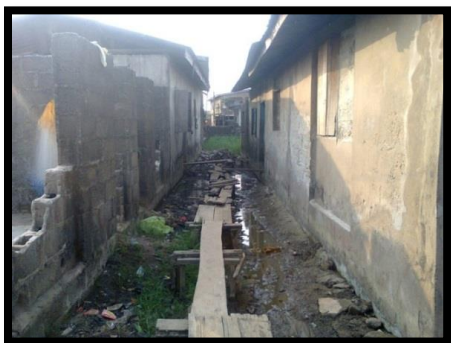
Most of these factors seemingly are human triggered apart from the topography. In low lying areas like Amuwo- Odofin, Ajegunle, Owode and Ojo, residents said flooding occurs anytime there is a heavy rainfall for several hours.

Photo 1: Inadequate setback of houses



Source: Authors 2015

Photo 2: Clogged drainage between houses



Source: Authors 2015

Incomplete canal dredging and inadequate infrastructures to contain the run-off constitute barriers to proper flood control measures. For example, in Ajegunle, a canal was dredged in 2010 after the flood with the expectation that it would be concretized but up till not completed. Residents complained that flooding effect have heightened after the dredging than it was before the dredging (Photo 3). The unfinished dredged canal accumulates stagnant water and remains a breeding ground for mosquitoes and flies. Residents notes the Lagos State Waste Management Authority (LAWMA) comes around once in a while to spray the water to avoid/minimize flies infestation.

Photo 3: Abandoned dredged canal



Source: Authors 2015

Peoples' attitudes, non-compliance to physical planning measures and high rate of influx of people into the city of Lagos has led to indiscriminate development and construction of different forms of unsustainable and unstable shelter/housing that fail to comply with planning regulations and standards of housing development. These developments impede free flow of water and run-off during and after rainfall thus leading to flooding. Floods have devastated many parts of Lagos leading to loss of several lives and property and the displacement of many people.

RESIDENTS RESILIENCE

The immediate response to flooding by the residents varies. About 23.3% of respondents want to leave the area (flee from area), 22.7% of respondents fill the roads with sand using sandbags, putting wood shavings on roads; 22.7% of respondents use buckets to dispose flood

water from their houses; 16.7% of respondents want to relocate temporarily; and 37.3% of the respondents have done nothing during the flooding incidences.

However, over the years, residents of these areas have adopted various coping strategies. These include:

- Clearing and de-silting of drainage,
- Building of embankments and raising of building frontages,
- Use of boats for movement during flooding,
- Building high walls to prevent floodwater from entering the houses, construction of trenches around houses,
- Arrangement of planks and tyres on sandbags to aid movement to their shops/buildings

However, in the low cost housing in Amuwo-Odofin residents who do not live on the ground floor worry less about flooding. With dysfunctional governance structure residents' adaptability is notable in the various methods used to contain flooding (Photos 4-7). The residents self organize to make their community flood resistance by using no or low cost materials like planks or used tyres to construct embankments and keep the community moving.

Photo 4: Sandbags and planks



Source: Authors 2015

Photo 5: Temporary bridges



Source: Authors 2015

Photo 6: Bridge made with planks



Source: Authors 2015

Photo 7: Planks placed on tyres for movement



Source: Authors 2015

Majority of these coping strategies are rudimentary, unsustainable, temporary and inefficient. Government Agencies like Office of Drainage Services, LASEMA and LAWMA have attempted some intervention according to the respondents.

POLICY RESPONSE

Office of Drainage Services

To combat the occurrence and re-occurrence of flooding in Lagos State, the Government through the Office of Drainage service embarked on the dredging of the silted streams and drainage channels in Lagos. In the year 2008, a total of 676,603.55 metric tons of silt were evacuated from existing collector drains and canals and carted away to maintain the hydraulic efficiency of the drains as designed. This is to improve their carrying capacities and enhance the efficiency of the channels to effectively drain storm-water run-offs. The first drainage master plan (Lagos Mainland drainage master plan) was designed and concluded in 1974 in a bid to control urban flooding and inundations (Drainage Department, Lagos State Ministry of Environment, 2014).

Subsequently, drainage master plans for other areas were concluded in 1992 and 1998 respectively. The 1992 master plans were the Apapa Storm water drainage master plan and Lagos Island Storm water drainage master plan. The identified works were divided into two namely Priority 1 works and Priority 2 but only priority 1 works have been implemented to date. The last master plan was Greater Lagos Drainage master plan and it was concluded in 1998.

In Lagos State, between 2007 and 2011 a total of 169 drainages were dredged, while 124 of the waterways were lined with concrete and about 45 channels were also dredged between 2007 and 2011, and proposed to be lined before 2015.

Lagos State Environmental Management Agency (LASEMA)

LASEMA strategies cover 5 main aspects:

- Flood Prevention: The LEMC (Local Emergency Management Committee) was established in 2014 under the Lagos State Environmental Management Agency. The committee consists of 774 local members from all the wards in the State. The members are from all agencies related to the environment, Community Based Organizations, and representatives of communities. The committee was established in accordance with

priority 3 of the Disaster Risk Reduction Convention in Kobe, Japan. The goal of the committee is to ensure reduction of risk at local level through knowledge, innovation and education. These three elements would then build the culture of safety and resilience in Lagos Community.

- **Flood Preparedness:** Identification of flood vulnerable communities through risk mapping and hazard vulnerability mapping. Other agencies working on the environment are also identified for collaborative efforts for example the Nigerian Metrological Agency (NIMET), Lagos State Environmental Management Agency (LAWMA), Lagos State Environmental Protection Agency (LASEPA), Department of Metrological Services, Emergency Flood Abatement Department, an Office of Drainage Services in the Ministry of Environment, and Ministry of Physical Planning and Urban Development (MPPUD).
- **Flood Mitigation:** This involves the use of early warning systems to sensitize and educate vulnerable communities on how to prepare, respond to and recover from the impact of the disaster; monitoring and enforcement of environmental laws like the Lagos State building code and Lagos State emergency plans.
- **Flood Response:** Stock piling of necessary equipment to combat flood and ensure easy response, and building of relief camps for rehabilitation for affected persons. Presently, Lagos state has two existing relief camps in Lagos East- Agbowa, Lagos West- Igbodo and an on-going construction in Lagos central-Lekki. For example, the 1760 Internally Displaced Persons during the 2010 flooding were resettled temporarily at these relief camps.
- **Flood Recovery:** Obtaining the demography and characteristics of the people to ascertain and predict flood victims (so as to prepare relief materials and number of people that would be displaced).

Lagos State Waste Management Authority (LAWMA)

Spatial growth is not the only product of population expansion, but also, waste generation, particularly, municipal solid waste that is impossible to avoid. About 10,000 tons of solid waste is generated each day in Lagos, with GPC of 0.65kg/person/day. The rate at which municipal solid waste is being generated hinders the capabilities, financial and technical, of LAWMA to sanitarily manage waste. Solid waste is left uncollected and dumped indiscriminately in water bodies, air-spaces of buildings, open lands, road verges and public drains. Littered waste becomes permanent feature of urban landscape.

DISCUSSION

Flooding challenges due to the encroachment of buildings on flood-plains, poor/faulty/non-functional and inadequate drainage network; and indiscriminate dumping of waste into water channels have resulted into displacement of people, loss of livelihoods, loss of productive hours, pollution of drinking water, destruction of farm lands, housing and infrastructures, water borne diseases, and death as seen in this study.

Urban sprawl and urbanization of poverty continue to cause overcrowding, and poor quality of housing in Lagos as evidenced in the study locations. Inadequate urban planning, poor infrastructures or lack thereof, poor enforcement existing planning regulation and non-compliance by people continue to cause havoc especially during flooding incidence. With the ever increasing urban population in Lagos, encroachments of wetlands and building of illegal structures, flooding will continue to reoccur unless people and governance structures transform.

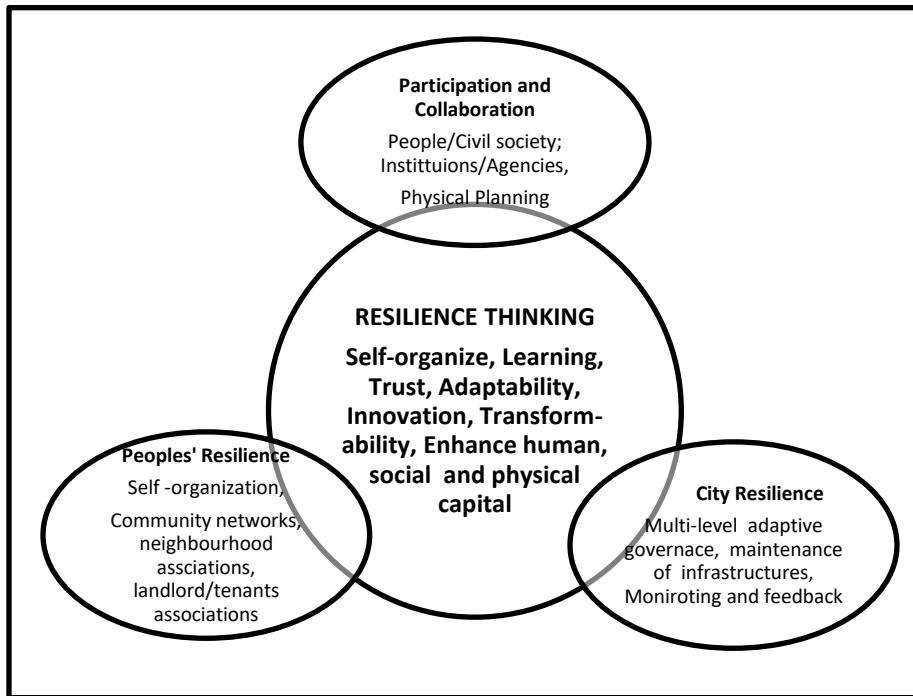
The people and city's resilience will continue to be tested in periods of flooding. Therefore adaptability measures that build resilience and transformability or transform-ability of residents and the governance regimes to self-organize and develop the capacity to learn and adapt is very critical.

Policy, programs, plans and projects by government agencies such as LASEMA, Lagos State Ministry of the Environment-Office of Drainage Services and LAWMA are laudable but have fallen short of people's expectations. Projects are not completed due to bureaucracy, funding inertia or lack of funds. Canal dredging and de-silting of drainages in areas like Ajegunle, Owode, Ojo, Agege, Amuwo Odofin, Lagos Island, Eti-osa were not completed, thus increasing the vulnerability of the people to more flooding disasters. Respondents noted the 'silent' inactivity of The Ministry of Physical Planning and Urban Development.

WAY FORWARD

Resilience thinking is about the capacity to learn, adapt, self-organize, and transform-ability. WEF (2018) notes the failure of urban planning, failure of regional or global governance and increasing urbanization are among the interconnected risks of climate change. Thus, planners have a major role in facilitating resilience thinking and developing tools together with the community (civil society) and policy makers to build resilience especially to avert flooding or any other environmental disaster (Figure 5).

Figure 5: Building Socio-Ecological Resilience in Flood Incidence



Source: Authors Conceptualisation, 2015

Appropriate feedback and monitoring is also very critical to building resilience and achieving adaptive governance.

Planners

Physical (Community) Planners must ensure the:

- Facilitating participation and collaboration among civil society and policy makers
- Revision and enforcement of planning regulations, building codes, development control measures, zoning by-laws and change of use laws
- Revision and enforcement of Lagos building codes and non-compliance will lead to demolition of structures blocking the flow of drains and canals
- Improved sanitation and proper waste disposal measures
- Flood mitigation education and awareness
- Advice on building materials to be used in flood prone areas and
- Inform citizens about flood prone areas in the city
- Integration of geo-spatial and remote sensing techniques towards appropriate flood modeling, simulation and forecasting

Residents

People would always be at the centre of socio-ecological resilience. Residents should be properly informed and educated in the areas of:

- Utilizing good quality building materials,
- Proper waste disposal methods,
- Refrain from dumping waste indiscriminately or along water channels or in drains/gutter,
- Flood control and the devastating consequences
- Education is key to resilience thinking

Government

Multilevel governance is fundamental to resilience thinking and building resilience. Thus, the State Government through appropriate agencies (private, public, CBOs or NGOs) should:

- Develop awareness mechanisms as to the risk of flooding in communities
- Develop monitoring structures
- Set up effective information and warning systems
- Ensure enforcement and compliance of all environmental laws
- Ensure a budget reform for efficient performance
- Provision and maintenance of infrastructures
- Dredging and de-silting of blocked canals and drainages
- Review periodically flood adaptation and mitigation policies and programs

CONCLUSION

The communities in the study Local Government areas show resilience by the different measures adopted and adapted deal with flooding. These communities have persisted to reoccurring flooding. The utilization of planks/wood and used tyres (wheels) as pathways; and the construction of bridges to facilitate movement of people and goods indicate the extent of adaptability and transform-ability of the residents. For a resilient city and a resilient people, physical/community planners should begin to build resilience (socio-ecological resilience) and incorporate resilience thinking and adaptive governance into plan making, planning policy and practice especially in flood or any emergency and disaster situations.

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