FLOOD DISASTER AND SCHOOL CHILDREN SAFETY: AN URGENT MATTER OF NATIONAL CONCERN IN LAGOS STATE

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Abstract
Disaster being an unplanned and unpalatable natural or manmade occurrence includes flooding which appears as one of the most occurring disasters globally has accounted for innumerable number of death and loss of properties nationwide especially in urban and populated cities like Lagos. School children particularly face disruption in academic activities, time wastage and destruction of school properties due to recurrent flood leading to loss of interest in school, panic and lower educational standard. Root causes of flooding such as human-induced greenhouse gas emissions, inequality and global demand pressure need to be tackled urgently with scientific approaches and health education such as flood risk reduction, flood awareness and education, flood insurance, proper sanitation, health awareness and sensitization programmes in school, effective collaboration among agencies, enforcement of environmental standard and more scientific research system in order to mitigate its occurrence and effects.

Keywords: *Disaster, Flood, School children, Flood risk reduction, Safety.*

Introduction
Disaster has for a long time been a major cause of great damage and loss of life in communities including both natural and man-made disasters resulting to serious impacts on children, youth, adults and overall education systems. Flood disaster occurs as a result of excess water flowing on land that used to be dry which do not only affect man but also all inhabitants of the earth as well as the ecosystem as a whole. Floods can be environmentally important to local ecosystems like it bringing nutrients to soil such as in Egypt where the annual flooding of the Nile River carries nutrients to otherwise dry land. However, when the adverse effects of an occurrence are far greater than its benefits as it is with flooding, it is definitely a matter of concern requiring serious and urgent attention especially when it concerns school children who are more vulnerable due to their physical and psychosocial vulnerabilities compared to adults.

This phenomenon called flood occurs when the excess waters of the river spills beyond its capacity and boundaries (Ijigah and Akinyemi, 2015) i.e., when large amounts of water flow from a source such as a river or a broken pipe onto a previously dry area, or when water overflows banks or barriers. Flood disasters are considered as the most leading and significant natural disaster world-wide and cause human impacts and economic losses (Jonkman, 2005). Flood is among the most devastating natural disasters in the world, claiming more lives and causing more property damage than any other natural phenomena. In Nigeria, at least 20% of the population and 8% of its industries are at risk of flooding (Aderogba,

2012). In Lagos state however, the environmental impact of floods on individuals, schools, children and communities cannot be overemphasized because of its social, economic, and psychological implications.

Among natural disasters, floods have been reported to be responsible for almost half of casualties, floods are also the most frequent Environmental or natural disasters, affecting over 2.8 billion people in the world and causing over 200,000 deaths over the past three decades (Agbonkhese, et.al., 2014). Between 1995 and 2015, the lives of 2.3 billion people were affected, making floods accountable for 47% of all weather-related disasters globally (Aja and Olaore, 2014). Nigeria, the most populous country in Africa experienced one of its largest flood disasters in 2012 causing the destruction of assets worth over US$9.5 billion, most of which were in the urban centres (Federal Government of Nigeria, 2013). Risk of catastrophic losses due to flooding is significant given deforestation and the increasing proximity of large populations to coastal areas, river basins and lakeshores. Considering the global picture of flood disaster, the various rolling Vulnerability Assessments conducted in different countries indicated that the last two decades have seen an increase in the frequency and occurrence of climate-induced flood (Rieckmann, Tamason, Gurley, and Jensen, 2018).

Lagos is a low-lying city with a flat topography and many areas at or below sea level, with an average elevation of only 1.5 m above sea level (Ajibade, 2017). Lagos is sinking at a rate of up to ~87 mm per year (Ikuemonisan, Emmanuel and Vitalis, 2020) meaning that the sea is increasingly encroaching at the city's edges. Low elevation and sinking land combined with massive drainage problems due to waste-clogged drainage systems mean that water is trapped and builds up quickly following heavy rainfall or storms (Adeloye, Adebayo and Rustum, 2011). Although images from news coverage of such a big city underwater were shocking, Lagos has in fact been facing increasingly severe flooding during both of its two annual rainy seasons with the April to July rains being the most intense (Ikuemonisan, Emmanuel and Vitalis, 2020) and in fact, in July 2021, major floods hit the centre of Lagos, submerging cars and houses and bringing many parts of the metropolis to a standstill. The cost to Lagos in terms of damages, economic productivity and mortality is estimated to be as high as $4 billion per year (Croitoru and Lelia, 2020).

To make matters worse, Lagos' low coastline is eroding as sea levels continue to rise and storm surges exacerbate the flooding (Ajibade and Idowu, 2016). Up to 84 per cent of the Lagos shoreline has washed away in the past 50 years, retreating at an average rate of 2.64 m per year (Osanyintuyi, Abiola, Yonghong and Mokhtar, 2022). This erosion is in part due to booming levels of urbanization and the sand mining trade that feeds it, both of which push both coastal ecosystems and communities that depend on them into increasingly vulnerable positions. If this trend of rising seas, flooding and coastal degradation

continues, the habitability of the city itself could be under threat by the end of this century. As well as being a present-day example of the vulnerability of climate change to coastal cities around the world, the floods in Lagos also highlight the threat of unregulated urbanization in exposed areas, and the often-overlooked cost of extracting resources to support it (Adeloye, Adebayo and Rustum, 2011).

School children and flood

Among other infrastructures, school buildings as well as student's residents are very important assets of the society. They play an active role in enhancing the capacity of children to develop skills for their future life leading to the development of the nation. There are many types of disasters which have direct or indirect impacts on schools. When disasters like flood, wind and earthquake occur, they damage school infrastructures including class building, library building, water supply and toilet system. This event is directly related to the closing of school or may be the reduction of the school hours or continuation of education elsewhere in elevated ground or in open space. The school children are vulnerable and "at risk" against natural disasters during the time of school (Tuladhar, Yatabe, Dahal and Bhandary, 2013).

Educational rights of the students are disrupted when the natural disasters occur. The school infrastructures collapse that leads to the discontinuation of the education system and increasing rate of drop out of the children. The education system will be disrupted and consequently the quality of education is decreased. If the schools are closed for long duration due to collapse of school infrastructures, the students will go to another school. Teachers will be engaged in rescuing and helping the community flood victims. The children will be attracted towards the socially unwanted activities or they get stressed. Sometimes the indirect effects also play a vital role to keep the students out of the school after the event of disaster. The students are forced to leave the school by their parents and engage them in livelihood activities to cope the flood disaster (Tuladhar, Yatabe, Dahal, and Bhandary, 2013).

Another reason for leaving the school is the unsafe condition of school building and other infrastructures. The parents, after knowing the vulnerability of school against flood hesitate to send their children in the school. The children are always in fear during their study in school during flood disaster (Petal, 2008). The direct and indirect impacts of the flood disaster in school infrastructures create psycho-social problem among the school children and without mincing word, quality of education in school will be better if the provision of facility, safe and secure situation, children friendly environment and effective health education are ensured.

Negative impacts of flooding on quality education

The role and importance of education in achieving sustainable development cannot be overstated. In the developing world, there is even more need to promote education as the literacy levels fall well below that of the developed world (Shrestha, Subedi, Yatabe and Bhandary 2011). To that effect, there are numerous campaigns to promote universal basic education for all, especially for young children, but flooding disasters undermine this right to education of children in many communities. Displacements due to flooding cause children in disaster areas to become educationally disadvantaged at the crucial school age, which sets them up for continued economic disadvantage and opportunities later in life (Shrestha, Yatabe, Bhandary and Subedi 2012).

Flooding disrupts the schooling of children and the delivery of education generally, no matter the severity of the flooding. Even in non-major floods, parents are reluctant to send their children to school as they fear them treading dangerous flood waters on their way to schools. They cannot ascertain if storms or rainfall will increase the severity of floods when the children are away at school and so prefer to have them at home where they have greater control over their safety, should the severity of flooding increase or there be need of evacuation. The teachers are also not in the best psychological state to teach because they also have to handle terrible conditions either in the school, home, or emergency shelter to get their lesson notes ready. They also have to deal with their own flooded homes and damaged properties. Parents on their part cannot do much for their children's education at this period or help with teaching on the home front (Kousky 2016).

Educational materials are destroyed and even after the floods recede or the waters dry up, longer term effects in the education system are experienced because it is not easy to replace damaged educational materials especially in developing countries. In places prone to annual flooding, there might also be reluctance on the part of the authorities to replace these learning materials, knowing that it may be damaged again during the next flooding cycle (Popoola, 2012).

The effects of flooding disasters in the education sector become more damaging in places where access to education is already inadequate. There are usually delayed reconstruction efforts for damaged schools in the worst hit developing nations. The effect of flooding on the education of young school children is much more profound in the areas that experience annual flooding of such a scale that is not classified as a major disaster, meaning that these children lose many months of school year every year. Also, disasters like flood bring severe hardship to poor families who might be forced to withdraw their children totally from school and push them into the labor market to work to help provide for their families basic needs which brings a halt to their formal education (Kousky 2016).

Root causes of flood in Lagos State

Ihinegbu and Sebesvari (2022) in a technical report published lately identified major root causes of flood especially in Lagos state. These include:

Human-induced greenhouse gas emissions

Human-induced greenhouse gas emissions and subsequent rises in ocean and atmospheric temperatures were the main drivers for the increasing global mean sea level since at least 1971 (Intergovernmental Panel on Climate Change, 2021). Global mean sea level had risen 20 cm by 2018 when compared to that in 1901 (Intergovernmental Panel on Climate Change, 2021). Furthermore, climate change is responsible for increased monsoon precipitation, more frequent and intense rainfall patterns, and more recurrent pluvial floods in West Africa (Intergovernmental Panel on Climate Change, 2021).

Global demand pressures

Around the world, the trend of growing cities and urban populations is fuelling a rampant demand for sand, making sand mining a lucrative option, particularly as sufficient regulation and environmental protection in mined areas is lacking. As such, sand is currently the world's second most used natural resource after water and is crucial for multiple economic sectors, particularly construction, which globally consumes between 15 and 29 billion tons of sand resources per year (United Nations Environment Programme, 2014). The coastal location of Lagos and the ecological dynamics occurring on its waterfront make it a preferred destination for sand miners. Lagos has the two sand sources relevant to the construction sector: on the one hand, sand from the seabed, which is mainly used for land reclamation; and on the other hand, sand from shorelines, rivers and lakes, which is ideal for construction material due to its shape and cut. Sand mining has been highly responsible for habitat destruction, water pollution and increased water turbidity, which has severely impacted biodiversity and has put the state at great risk of Flood (Adekunbi and Falilu, 2018).

Inequality of development and livelihood opportunities

The disparity between relative poverty and disadvantage in rural areas compared to urban areas and the perceived neglect by the government in assisting with land reforms and agricultural productivity have been cited as major catalysts for rapid migration into Lagos which often bring the rural and poor dwellers into vulnerable positions in the city (Emordi, Omon and Osiki, 2008). Due to unemployment, power imbalance, unaffordable housing, gender Inequality and social disparity, 70 per cent of the population of the Lagos metropolitan area have formed over 100 slum communities (Dano, Umar and Lawal, 2020) and these informal urban neighbourhood, often built in hazard-prone areas, lack adequate

drainage and waste disposal systems, making them the most susceptible to frequent flooding (Dano, Umar and Lawal, 2020).

Insufficient risk governance

The first aspect of insufficient risk governance is the ineffective implementation of the national flood risk management plan, which is reflected in the gap in investments for climate change adaptation, the absence of risk-informed spatial and a lack of inter-institutional coordination for flood emergency preparedness, management and response (Dano, Umar and Lawal, 2020). Despite the various emergency response centres established by the National and State Emergency Management Agency, there are numerous gaps in the institutional response to flood victims in Lagos state, given the low capacity of response staff, lack of equipment, corruption and poor management (Ouikotan, 2017).

Another aspect of governance that does not sufficiently factor in risk is the neo-liberal approach to land-use planning that facilitates the uncontrolled urbanization that drives vulnerability to flooding. Despite having land-use plans and zoning regulations in place, real estate developers ignore planning restrictions and rules, erecting buildings on flood plains, the coastline and drainage ways (Adeloye, Adebayo and Rustum, 2011). This is coupled with scarce storm water systems and inadequate drainage structures (Adeloye, Adebayo and Rustum, 2011).

Etuonovbe (2011) further categorized the causes of flooding in Nigeria as follows:

1. Natural causes which includes: heavy rainfall, climate change, oceans storms and tidal waves usually along the coast, lack of Lakes, and silting.
2. Human causes which can include: burst water from main pipes, poor refuse and sewage disposal, dam failures, population pressure (especially in the city of Lagos) and deforestation (such as North part of Nigeria).

Effects of flood on school children

Damage to school's infrastructure

Due to uncertainty in data collection, it may be difficult to ascertain exactly the exact numbers of infrastructure damage in schools. However, frequent flooding in Lagos schools result in damage and destruction of school properties, official documents, textbooks and notebooks, facilities, laboratory equipment as well as school building collapse. Lucas (2021) also noted that flood destroys critical infrastructure, homes, small businesses, schools, markets, roads, water facilities, communication networks, health centres, electric power poles and other public infrastructure.

Damage to the ecosystem and the school environment

Flooding impacts local aquatic ecosystems by washing waste, polluted sediments and fertilizers from farmland into water bodies threatening the health of aquatic organisms (Chukwu, Okeah, Wekpe and Ikebude, 2018). This include school farmland, school fish ponds, agricultural produce, subject practicals, school field, fence, school bus, road to school and the school environment as a whole.

Increase in water borne diseases

Flooding in schools negatively affect children's health through the contamination of water bodies and increasing incidences of waterborne diseases like malaria, cholera, typhoid, yellow fever, diarrhoea, leptospirosis and hepatitis A. Due to the continuing overflow of raw sewage and waste dumps, wells and boreholes used for domestic purposes get contaminated, exacerbating the lack of access to clean and fresh water in Lagos (Olanrewaju and Caroline, 2019) which makes it a threat to achieving Sustainable Development Goal 6 (SDG6) of the UN's 2030 Agenda (clean water and sanitation) as resulting pollution of water bodies and damage to sanitation facilities have serious impacts on health and wellbeing of both school children and other dwellers especially those in informal settlement and riverine areas of the State.

Increase in number of internally displaced children in schools (IDCS)

Due to flood and destruction in school's facilities, large number of children who come to school to learn end up flocked and choked together in the only remaining safe place in the school which may be just one or two classrooms containing overcrowded students. This makes learning difficult and almost impossible, school feeding service becomes very difficult to effect for the period, there will be increase infectious and air borne diseases due to overcrowding, school children become emotionally and psychological depressed and further see school as unsafe. This effect of this is loss of interest in school.

Suggested solutions to flood in Lagos State

The review of flood management made by Nkwunonwo, Whitworth and Baily (2016) prompted several suggestions for reducing flood risk in Lagos which are based on three key considerations:

1. The understanding and demonstration of the roles more scientific approaches (such as flood modelling) can play in flood risk reduction within the context of Lagos.
2. The need to align the focus of flood risk reduction in the Lagos area to the objectives of similar measures in more developed countries such as the US, the UK, and the Netherlands. This should be linked to improving collaboration between Lagos and indeed Nigeria and the developed

countries in terms of promoting a more effective flood risk management philosophy.

3. Promote of awareness of flooding among local communities, urban residents and the general public and to delineate more suitable locations for relocation of human populations during flooding events.

School children flood safety

School children are learners found in the school premises ready to take instructions from teachers in a teaching and learning environment. Floods can occur when it is least expected so school children should be protected against the effects of flood. This may take the form of the following:

Proper planning: It is important to develop a plan well in advance of an actual flooding emergency. This will help minimize the chaos that may occur in case of a flood. As the plan evolves, it's important to keep everyone at the school updated at all times so that the administration and students must know what to do and where to go in case of an emergency.

Teachers training on flood response: Making sure that teachers know how to respond in the case of a flash flood emergency is extremely important. This is even more critical for schools with significant number of students. With Health and Safety Education, there will be regular reviews of flood safety protocols to ensure teachers are up-to-date on what to do in case of an emergency.

***Solid communication system*:** Setting up a solid communication plan to disseminate information out to the school population with message delivered promptly is very essential. This communication system may include use of automated texts and calls or special applications to alert students and staff in case of flood emergency.

***Proper protection of students and schools' properties*:** Expensive properties such as computer system, Schools typically have expensive equipment and property that is not easy to repair. Consider purchasing an inflatable flood barrier that can easily be placed around campus during flood seasons. Additionally, it is important to consider getting students and expensive equipment such as computers and lab equipment to higher levels of the school building and stand stay away from the floodwaters until help arrives. Floods will rarely rise beyond the first floor of the building except it is a great disaster.

***Safe school transportation arrangement*:** During flood season, schools need to arrange safe transportation for both the staff and students so that they can get home quickly and safely. Extra sturdy buses can also be implemented.

Health education before, during and after flood in schools

People's knowledge and awareness to the health risk determines the possibility of disaster occurrence, a lack of awareness of health risks is a crucial point that must be addressed and a possible workaround is to integrate effective health education and promotion in schools and communities since it raises the awareness of people about infections, disasters like flood as well as minimize health risks after events.

Sanitation and hygiene: Schools need to be educated about the importance of maintaining hygiene and sanitation during flood and even in every emergency situation because. Due to overcrowding of Internally Displaced Children in Schools (IDCS) within the limited spaces, it is very possible for infectious diseases such as diarrhea, Acute Respiratory Infections and measles to occur. Information about how people should use water efficiently for their needs (drinking, washing, excreta disposal) as well as management of solid waste is useful to prevent those infectious diseases (Kouadio, Aljunid, Kamigaki, Hammad, Oshitani, 2012).

Importance of personal protection: During and after flood, excessive water often bring about disease carrying dirt leading to diseases such as cholera, diarrhea, typhoid and other water borne diseases. Students often go about school environment bare footed and handling various materials without caution. Health education is important to inform students about the dangers of these unhealthy actions and the need to wear protective equipment such as disposable gloves, masks, and boots to prevent contact with these pathogens.

First aid and wound care management: Wounds and injuries commonly occur at the time of a disaster including flood particularly with school children who can be unsuspecting and naïve. Untreated wounds, especially those involving exposure to contaminated soil and water can increase the risk of tetanus infection (Lim, 2005). As in some previous disasters, tetanus became a severe threat caused by contamination of injury wounds. Pascapurnama et. al., (2016) found that patients more severely affected by tetanus were found after disasters because many survivors left wounds untreated, and received no immediate treatment or booster vaccination. Health education is needed to provide information that if students become injured or sustain wounds, they should receive proper and prompt medical treatment and vaccination. First aid should also be administered as an early action that can be done by both students and teachers before paramedics undertake wound treatment.

Education about vaccination:Vaccination issues have become one concern after disasters. The school is likely to have limited knowledge about how vaccination such as measles and tetanus works and why vaccination is important to prevent

infectious disease outbreak following a disaster (Pascapurnama et. al., 2016). The school should become educated about general vaccination so as to encourage parents to get immunized to prevent infectious diseases not only after flood but also as general policy.

Conclusion

Flood disaster is a serious occurrence that has claimed many lives and properties which need urgent and serious approach locally, nationally and even with global assistance especially for urbanising cities like Lagos. Flood risk management is urgently needed since weather forecast has stated increased rise in flood occurrence at major places in the State due to climate change. Individuals, researchers, government agencies and everyone concerned have specific roles to play in administrative data gathering, public dialogue, public education and structural planning towards mitigating the occurrence and effects of flood in the nation. The root causes need to be strategically addressed so that the state can continue to be a safe and better place to stay. The following recommendations were made:

1. There should be a systematic flood risk management programme to mitigate and tackle flood occurrences in the State by the State government.
2. There should be sufficient regulation, monitoring and environmental protection of lakes, dams, seas, oceans and other mining areas to guard against excessive sand mining by National Environmental Standards and Regulations Enforcement Agency (NESREA).
3. There should be Integration of health promotion and education as well as Disaster Risk Reduction program into the curriculum by the Ministry of Education
4. School owners should ensure school buildings are designed, adequately anchored and constructed by methods and practices that minimize flood damage
5. There should be enough public enlightenment and education on causes, risks and consequences of flood including effective actions to be taken towards mitigation.
6. There should be accurate, sufficient and robust research by institutions of learning towards flood modeling, improvement in flood alert and flood early signals in the State.
7. There should be improved collaboration among hydrologists, remote sensing and GIS experts, environmental scientists, engineers, surveyors, Health Educators towards consistent monitoring of the annual hydrological cycle and weather patterns with adequate sensitization to the public and prompt advice given to the government.

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