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## Climate change and livelihood vulnerabilities of low-income coastal communities in Lagos, Nigeria

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This article examines environmental and livelihood vulnerabilities of low-income coastal settlements in Lagos, Nigeria. The Sustainable Livelihoods Approach is used as the analytical framework of how household's assets are affected by flood incidence. Using mixed methods combining qualitative and quantitative analysis, factors that intensify the impacts of flood events on livelihoods assets of the urban poor are examined. Results indicate that the effects of floods on urban poor livelihoods are multifaceted. Vulnerability of Lagos to flood hazards is a function of various biophysical, topographical, climatic and socio-economic factors. It was also noted that uncoordinated urban expansion into flood prone areas, and increase in the intensity and volume of rain are also contributory factors to incidence of flood hazards in Lagos. The article concludes by recommending strategies for coping with the challenges faced by these communities and these include infrastructure upgrading, effective development control and civic reorientation.

**Keywords:** coastal settlement; flood; Lagos; urban poverty; climate change; vulnerability

### 1. Introduction

Many of the world's major cities began as coastal settlements. Coastal settlements are repositories of extensive natural resources and have served as trade and military posts from time immemorial. However, they are particularly vulnerable to environmental change and have been adversely affected by climate change and climate related disasters such as freak rains, torrential storms and flooding from storm surges. Extant literature had predicted that climate change is likely to cause shifts in the global pattern and intensity of rain fall, and thereby, in some regions, increasing the exposure of many people to severe flooding (Few 2003; Parnell *et al.* 2007; Spurgeon *et al.* 2009). Current global happenings regarding flood have, in fact, come to validate the prediction of these studies (IPCC 2009).

Cities in developing countries are especially vulnerable to climate change impact, especially flooding (Parnell *et al.* 2007). The continuous increase in urban population, coupled with flood disasters occurring more frequently in urban areas, results in negative impacts on livelihoods (Kundzewicz *et al.* 2008). Furthermore, lack of urban planning, compounded by rapid rural to urban migration and the associated expansion of slums, exacerbate the impacts of climate change on city dwellers (Huq *et al.* 2007). The urban poor are particularly vulnerable because they are mostly confined to ecologically fragile areas (Bartone 1991) and are less resilient to the consequences of climate change (Feiden 2011; Institute of Development Studies 2012). Furthermore, the urban poor of coastal cities, especially those

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resident in slums located in low-lying areas, will experience more damage due to flood events and other climate-induced activities. Flooding has been identified as one of the major natural hazards which disrupt the prosperity, safety, infrastructure, livelihoods and well-being of human settlements, particularly in developing countries, and by implication prevents poor households from moving out of poverty (ActionAid 2006, p. 134). Flood has multiple effects on the livelihoods of the urban poor. It affects people's health through waterborne diseases, damage to food, etc.; it destroys income and causes further deterioration of sanitation, increased exposure to disease and temporary reduction of access to health care facilities. Many schools are closed during flood periods and children have their education interrupted. Some people may not be able to get to work for long periods and suffer loss of income and possible loss of jobs. Flooding thus greatly aggravates poverty (ActionAid 2006, p. 7).

The Intergovernmental Panel on Climate Change (IPCC, 2007) estimated that 40% of the population of West Africa live in coastal cities and are vulnerable to the consequence of climate change. Furthermore, the Nigerian coast is one of the low-lying ones in Western Africa, which is likely to experience severe effects from flooding as a result of rising sea levels and climate change. The International Disaster Database (2013) estimated that between 1988 and 2012 more than 10 million people have been adversely affected by floods in Nigeria. In 2012, more than 7 million people lost assets of over \$636 million to floods alone.

With Lagos accounting for more than 50% of the population of the 600 km long Greater Ibadan–Lagos–Accra Corridor, it is especially vulnerable to environmental change and flood events. There is also a high concentration of poor populations and urban slums in Lagos. Nubi and Omirin (2006) identified over 100 blighted areas in the Lagos Metropolis while Lagos State Government (2004) estimates that 70% of Lagos' residents live below the poverty line. The effect of climate change related risks, particularly flood, are already manifesting in Lagos. In the past few years almost

every part of Lagos has experienced, and been affected by flood incidence. According to Gandy (2006), when it rains heavily in Lagos, more than half of the city's dwellings suffer from routine flooding and a third of households must contend with knee-deep water within their homes. However, low-income settlements are disproportionately affected by the incidence of flooding due to their multiple forms of vulnerability and multiple sources of deprivation. This article therefore, through the lens of the sustainable livelihood framework, examines how livelihoods of the urban poor in Lagos, Nigeria are affected by flood events and what compound their vulnerability to these events.

## 2. Literature review: vulnerability, floods and urban livelihoods

Vulnerability may be defined as the state of individuals, groups or communities in terms of their ability to cope with and adapt to any external stress on their livelihoods and well-being (Adger and Kelly (1999). The concept of vulnerability has evolved over the years and it has been applied in various disciplines. In the context of climate change, IPCC (2001) defines vulnerability as the extent to which a natural or social system is susceptible to sustaining damage from climate change. The degree of anticipated or experienced damage is, however, a function of the character, magnitude and rate of climate variation to which a system is exposed, its sensitivity and its adaptive capacity.

UN-HABITAT (2008) and World Bank (2008) estimate that more than half of the current global population is located in urban areas and will have to cope with challenges of climate change and its associated effects, including floods. According to Satterthwaite (2011), urban expansion alters the natural landscape, land uses, land cover, and water flows. Wheeler and Evans (2009) corroborate this point of view by stating that the changes in land use associated with urbanisation and the increased development of impermeable surfaces lead to enhanced overland flow and reduced infiltration, thereby affecting the natural storage of

water and causing modification of run-off streams and consequently increased flooding.

Interaction between high demand and limited supply of land to accommodate the rapid population increase has resulted in uncoordinated and uncontrolled urban expansion especially towards the peripheral areas of cities in developing countries, including Nigeria. The outcome of this process is that, cities are now expanding from core areas into marginal areas, ecologically fragile sites and hazardous locations such as flood plain, swampy areas and canal setbacks, where they are exposed to flood risks (Satterthwaite 2006). Consequences of this haphazard urban process include increasing incidence of environmental hazards which threaten health, well-being and overall livelihoods, especially in informal settlements (International Institute for Environment and Development 2001; Jha *et al.* 2012). In addition to urbanisation and uncoordinated urban expansion to flood-prone areas, vulnerability to flood hazards is particularly intensified where combinations of inadequate and poorly maintained infrastructure, low-quality housing and low capability of the urban poor intertwine (World Bank 2008). The fact that the urban poor are typically accommodated and work in informal settlements, often densely populated, with poor construction materials and poorly constructed housing, and lack of access to adequate urban infrastructure facilities make them and their livelihoods more vulnerable to flood risks and associated hazards.

Flood is a natural phenomenon caused mainly by natural events; however, the incidence of floods and its associated risks have been exacerbated by human-induced activities. Human activities such as deforestation, wetland reclamation, greenhouse gas emission, poor planning, improper development and poorly designed infrastructure, particularly drainage systems, are capable of increasing flood events and vulnerability to the associated risks. What is important to note is that vulnerability to flood events is caused by both natural and human-induced activities. While flood originates from natural factors, human-induced activities increase its potential to causing damage to physical, natural and socio-economic environments. Bartone (1991) asserts

that poverty puts pressure on people to engage in unsustainable and ecologically damaging practices. In Lagos, for example, informal entrepreneurs tend to construct their make-shift kiosks along drainage channels and also dump domestic wastes indiscriminately into existing drains, thereby causing blockage and consequently floods. A host of other factors have also been attributed to the continuous vulnerability of cities in developing countries to flood hazards. The factors as noted by various researchers like Bull-Kamanga *et al.* (2003), Lavell *et al.* (2003) and Adelekan (2010) include unprecedented urbanisation resulting into uncoordinated urban expansion, particularly into flood-prone areas, overcrowding, informal land occupation, poor waste management, disruption of natural drainage channels, inadequate infrastructure, particularly drainage system, poor maintenance of the existing infrastructure, poor housing quality, poverty and weak institutional capacity. In actual fact, the urban poor are caught within the webs of these multiple factors because they are the most likely group to experience multiple of these factors simultaneously. At this point, it is important to emphasise that all the above mentioned factors combined to exacerbate vulnerability of Lagos' urban poor to flood hazards. Furthermore, with increasing intensity of rain and rising water levels in both the Atlantic Ocean and Lagos Lagoons, available channels meant to discharge water from the roads and drainages are unable to do so effectively.

From which ever perspective vulnerability is defined or understood, the common thing is that it poses a major threat to physical, social and economic development of individuals and the community at large. In the light of this, poor people are especially vulnerable to the incidence of climate change hazards, including flooding, because they have few resources, and thus, have limited capability to cope with such hazards whenever they occur.

### 3. The study area

Lagos is a group of several large islands separated by creeks on a vast lagoon on the Bight of Benin, bordered by the Atlantic Ocean. The entire region

lies within the coastal lowland of South Western Nigeria, generally less than 100 m above sea level. Water bodies and wetlands cover over 40% of the total land area of Lagos and an additional 12% is subject to seasonal flooding. Lagos state has a land area of approximately 3345 sq km and a coastline of approximately 180 sq km.

Lagos has a population density of 4906.78 persons per square kilometre. However, the figure is higher within Lagos metropolis, which accommodates most of the low-income settlements and urban slum. Lagos metropolis is the continuous urbanised area of Lagos state, which consists of 16 local government areas out of the 20 local government areas of Lagos. It covers about 37% of Lagos state landmass and accommodates about 80% of the population. In the heavily built-up area of the metropolis, average population density is as high as 20,000 per sq km. The occupancy ratio ranges between 8 and 10 persons per room, with 72.5% of households occupying one-room apartment.

The topography of Lagos State slopes from north to south, flattening out at its lowest points in Victoria Island, Lagos Island, Ikoyi and Apapa. The elevation of the built-up area of the city ranges between 1 m in the coastal areas and about 75 m above sea level at its Northern fringes. The climate is tropical continental with rainfall throughout the year. Floods usually occur during the rainy season (April–October), aggravated by the poor surface drainage systems of the coastal lowlands. The natural vegetation is salt water mangrove swamp forest, though this has been replaced by concrete and other impermeable surfaces in response to the rapid urbanisation process. What remains of the natural vegetation is insignificant (Rudrappan 2011; Aderogba 2012).

Based on the Nigerian Meteorological Agency projections and the IPCC, recent research findings relating to climate change induced hazards, particularly sea level rise and flooding, predict that Lagos is likely to be one of the most negatively impacted conurbations in Nigeria as a result of its low-lying and costal location with a high concentration of population and economic activities

(Spurgeon *et al.* 2009). Evidences have clearly shown that the frequency and severity of flood disasters in Nigeria generally and particularly in Lagos over the years have increased considerably. The genesis of the present dysfunctions has been historically traced to the failure of successive colonial administrations to tackle the problems of overcrowding, disease and inadequate urban infrastructure (Aderibigbe 1975; Echeruo 1977); rather, urban planning and administration in both the colonial and postcolonial era was based on a cultural dualism model which reflected in a disproportionate concentration of urban infrastructure in the Government Reserved Areas housing the upper-income cadres at the expense of the majority who are concentrated in the informal settlements scattered around the city (Adalemo 1981; Olukoju 2003; Gandy 2005; Godwin & Hopwood 2011).

The current increase in flood incidence and its associated risks, experienced across Lagos, have been attributed to the global sea level rise and increase in the intensity and volume of local rainfall. For instance, in early 2011, the Nigeria Institute for Oceanography and Marine predicted a significant increase in the volume of rain especially in the Southern part of the country (Nigeria) where Lagos is located. The volume of rainfall was predicted to be between of 1200 and 2700 mm as against 300 and 1100 mm in the North. French *et al.* (1995) estimate that about 3 million people live in the low-lying areas of the Lagos Metropolis, the vast majority of which are additionally vulnerable because of their status as residents of informal communities characterised by extreme lack of infrastructure. Many of these settlements are located on the edge of the Lagos Lagoon. According to Adelekan (2010), between 50% and 79% of the inhabitants live within 500 m of the coastline, often on unstable in-fill land created by sand filling. Flooding has become a common feature in Lagos, resulting in loss of lives and properties. Flooding has been identified as a major obstacle to sustainable development in Lagos, especially among the urban poor (Lagos State Government 2004). Adelekan (2010) noted that the severity of the Lagos storms has increased

over the years and has had devastating effects on the residents' livelihoods, particularly the low income.

McGranahan *et al.* (2007) noted that while economic activity and urban development often increase the environmental pressures that lead to flooding, it is the low-income settlements and poor groups that tend to be the most vulnerable. Most government responses to flooding in Lagos are reactionary and isolated to the wealthier parts of the city, such as the sand replenishment repeatedly undertaken on Victoria Island and more recently the construction of the sea wall. The poor are left to fend for themselves; hence, this study seeks to investigate the environment and livelihood vulnerabilities of low-income coastal settlements in Lagos.

#### 4. Methodology and analytical framework

The Sustainable Livelihoods Approach (SLA) presents an analytical framework for understanding livelihood vulnerability of selected low-income settlements in Lagos to the incidence of flooding. More specifically, impacts of flood events and factors that intensify the impacts on livelihoods assets of the urban poor are examined. This methodology further aids the understanding of community perceptions and responses to urban hazards as it will assist in the development of specific strategies for urban resilience in the study area as had been demonstrated in the work of Moser and Stein (2011).

The need to focus on assets arises because assets, on the one hand, are the bedrocks upon which livelihoods are based and, on the other hand, assets define people's capabilities to cope with vulnerabilities (Sen 1997; Bebbington 1999). There is a close relationship between vulnerability and assets. The more assets people have, the less vulnerable they generally are; the greater the erosion of people's assets, the greater their vulnerability (Moser & Satterthwaite 2008). Within the livelihoods context, assets are generally defined as stock of natural, physical, human, financial and social capital, which are used directly or

indirectly by individuals and households to making livelihoods. As noted by Moser and Satterthwaite (2008), these assets can be acquired, developed, improved and transferred across generations. They can also generate flows of consumption, as well as additional stock (Ford Foundation 2004).

The SLA provides a framework for research which summarises many of the concepts related to the livelihood assets and livelihood vulnerability (Chamber 1989, 1995; Carney *et al.* 1999; Lyons & Snoxell 2005; Kantor & Nair 2005). This framework enables a broad range of quantitative and qualitative research design and data-collection methods. Consequently, for the purpose of this research, both quantitative and qualitative data collection methods, which included household survey, households' in-depth interview, key informants' interviews, direct observation and published documents, were used. The study was undertaken in five selected low-income settlements in Lagos.

These communities were selected because of their designation as communities with high-flooding risk by the Lagos state Ministry of Environment. Household surveys were carried out in Ajegunle-Ikorodu, Ilaje-Bariga, Makoko and Okun-Ajah. The household surveys were done by the administration with structured questionnaires on adult household members of the communities. Sampling technique used was simple random sampling. There were 161, 137, 188 and 109 respondents in Ajegunle-Ikorodu, Ilaje-Bariga, Makoko and Okun Ajah, respectively. Furthermore, key informant interviews and household in-depth interviews were conducted in Ajegunle-Ikorodu and Aboru-Ipaja, respectively. The use of multiple methods provided valuable information on vulnerability and effects of floods on livelihoods of the urban poor in Lagos.

#### 5. Research results and discussion

Vulnerability of Lagos to flood hazards is a function of various biophysical, topographical, climatic and socio-economic factors. These are manifested

in its location (coastal), population density (densely populated and mostly overcrowded), infrastructure provision (often inadequate and poorly maintained), socio-economic characteristics (predominantly poor) and settlements morphology (predominantly unplanned and haphazard).

Average household size is 6 persons with about 5% of respondents in each community belonging to households of more than 10 persons. All the communities are informal settlements and hence they are haphazardly laid out. Houses in the communities are mostly built with locally available materials. The houses in Makoko are on stilts while those in Okun Ajah are predominantly built with bamboo and palm fronds. There is poor infrastructure in the study area and most roads are not motorable. Drainage systems are generally blocked. About 71.4% of the respondents are informal enterprise operators, largely carrying out survivalist enterprises. Average monthly income per household is ₦22,500 (US \$150). The absolute poor, that is, those surviving on less than ₦15,000 (US\$100) monthly, make up 12.1%, 16.5%, 24.02% and 65.2% of respondents in Ajegunle, Ilaje, Makoko and Okun Ajah, respectively.

### 5.1. Physical vulnerability – impact on physical assets

The most visibly devastating impact of flood is the damage to physical structures. At the community level, physical vulnerability is manifested in the destruction of basic infrastructure. As noted by Jha *et al.* (2012, p. 161), large-scale flooding can cause damage to community infrastructure, particularly roads, which are often the major way of accessing flood affected communities. The study

revealed that the effects of flood on physical assets of low-income settlements in Lagos is manifested in physical damage to buildings and community infrastructure (both socio-economic and physical infrastructure), total collapse of buildings, damage and loss of households' productive and non-productive assets. The study revealed that in Ajegunle Ikorodu and Makoko, over 80% of the respondents had experienced their homes being flooded in the preceding years (see Table 1). This had been accompanied by attendant destruction of household assets as was recorded by about 60% of respondents in Okun Ajah and Ilaje Bariga and 88% in Ajegunle. Major households' assets damaged by floods include clothing, mattresses, wooden furniture and electrical appliances such as televisions, radio sets and refrigerators.

Community infrastructure, including roads, electricity poles and drainage as well as public buildings were also reportedly damaged by floods. The flood of October 2010 destroyed the only public secondary school in Ajegunle, Ikorodu. Residents reported that the flood took over the school completely and displaced both the staff and students. The impact led to disruption of academic activities for more than 3 weeks before the students were eventually relocated to another school in the local government area. The relocation of the school has effects on both human and financial assets of the residents. There was an increase in travel time and transportation costs. Additionally, it equally raises safety issue as the school is located across the eight lanes Ikorodu Expressway.

According to one respondent:

...whenever I or my wife cannot afford to give them transport money; we make them sit at home.

Table 1. Household physical asset vulnerability to flooding incidents.

|                              | Ajegunle Ikorodu<br><i>n</i> = 161 | Ilaje Bariga<br><i>n</i> = 137 | Makoko<br><i>n</i> = 188 | Okun Ajah<br><i>n</i> = 109 |
|------------------------------|------------------------------------|--------------------------------|--------------------------|-----------------------------|
| Home flooding (%)            | 85.1                               | 68.6                           | 82.9                     | 66.5                        |
| Loss of household assets (%) | 88.2                               | 61.7                           | 55.3                     | 59.8                        |

Though we are all not happy about it but what can we do?

Another respondent noted that

...the community has lost about seven children, which I know off, in the process of crossing the expressway.

Damaged infrastructure and community facilities are not repaired or replaced with immediacy by the municipal authorities. This may be due to the fact that the communities are low-income squatter settlements.

A respondent in Aboru explained that:

It has been more than 3 weeks since some electricity poles got damaged by flood, we have not had electricity in my area and up till now nobody is say or doing anything about replacing them.

This situation has implications on the income of the residents, particularly those who operate home-based enterprise and artisans who rely solely on electricity for means of production. Alternative sources of power, usually the petrol generator, are expensive to acquire and maintain.

## 5.2. *Human vulnerability – impacts on human assets*

The study revealed that sanitation issues are prevalent in the study area, especially during the rainy season, when floods are frequent. The direct consequence of this is an increase in diseases, especially those caused by waterborne agents.

Common diseases experienced during these periods, as indicated by many respondents, include diarrhoea, malaria, pneumonia, typhoid, cough and cold. About 82% of the respondents across all the communities indicated that at least one member of their household has experienced sickness during the floods, while 26.7% in Ajegunle, 13.8% in Ilaje, 15.8% in Makoko and 10.1% in Okun Ajah had lost a family member due to flood or flood-related issues since 2007. Table 2 shows health records of prevalent diseases in Lagos Mainland (including Ilaje Bariga and Makoko) Local Government areas over a 5-year period (2006–2011). The increase in malaria cases are due in part to the increased cases of flooding as well as the weakness of existing drainage systems in the study area during the period in question.

As stated by one respondent who sells local herbs in Ajegunle:

Any time we experience flood here, there is usually high demand for herbs and treatments associated with water-borne diseases.

High incidence of disease outbreak during flood hazards has been attributed to environmental pollution and increased underground water contamination that usually occur during flooding, as significant proportion of the residents either rely on well, boreholes or water vendors for their main source of water for drinking and domestic use. The putrefaction of debris also results in the release of gaseous substances into the atmosphere as well as the prevalence of putrid stench in the study area. Land pollution is in the form of poor environmental

Table 2. Reported cases of sanitation diseases at Public Health Centres in Lagos Mainland (2006–2011).

|                   | 2006 | 2007 | 2008   | 2009 | 2010 | 2011 |
|-------------------|------|------|--------|------|------|------|
| Malaria           | 2957 | 3131 | 2602   | 2849 | 7640 | 7464 |
| Diarrhoea         | 550  | 678  | 1988   | 354  | 1299 | 1799 |
| Pneumonia         | —    | —    | 918    | —    | 652  | 368  |
| Cough and Catarrh | 923  | 1622 | 17,354 | 688  | 625  | —    |
| Dysentery         | —    | —    | —      | 13   | 22   | 47   |

Source: These records were extracted from the Medical Records and Statistics(2006–2011) archived at the Lagos State Hospitals Management Board.

Table 3. The most serious types of environmental pollution in the study area.

| Type of pollution |           | Ajegunle Ikorodu<br><i>n</i> = 161 | Ilaje Bariga<br><i>n</i> = 137 | Makoko<br><i>n</i> = 188 | Okun Ajah<br><i>n</i> = 109 |
|-------------------|-----------|------------------------------------|--------------------------------|--------------------------|-----------------------------|
| Pollution         | Water (%) | 39.7                               | 43.6                           | 68.6                     | 42.3                        |
|                   | Air (%)   | 35.4                               | 29.5                           | 25.5                     | 19.4                        |
|                   | Land (%)  | 24.9                               | 26.9                           | 11.2                     | 41.9                        |

sanitation and the depositing of drainage effluence along the streets was also prevalent. The situation is further exacerbated by overcrowding, which aids easy spread of communicable diseases. Table 3 shows what the respondents consider to be the most serious form of pollution experienced by them as a result of flooding.

Across the four communities, water pollution was the most serious type experienced. The location of the communities along water banks may be responsible for this as the immediate devastation experienced was due to water. Air pollution experienced is usually due to the emissions from the use of kerosene stoves and petrol-powered generating sets. The use of firewood for cooking is also widespread in the communities, especially among the commercial fish smokers and canteen operators. While land pollution affects only 11% of respondents in Makoko, coastal erosion occasioned by incessant storm surges in Okun Ajah is most likely responsible for the high consideration placed on both water and land pollution.

### 5.3. Financial vulnerability – impacts on financial assets

With a majority of the respondents already experiencing financial difficulties, incidence of floods tend to exacerbate their vulnerabilities. It is important to note that, as observed by Jha *et al.* (2012), it is particularly difficult to get accurate data to quantifying, in monetary term, the ripple effects of flood events on the economy and impacts on infrastructure. This statement is true for the current study. Though it was difficult for the residents to value the actual financial loss to flood, as revealed by the respondents, economic cost of their loss is

manifested in damage and loss of household properties, and disruption of economic activities. Many of the respondents (67.4%) claim to have lost properties to floods in the past 5 years which they currently cannot afford to replace, while 53.1% of the respondents claim that at least one member of their families have lost entire livelihoods when their business premises were overrun by flooding incidents. The kin system of multiple-income earner nature of poor families was the cushioning factor when these events occurred.

One male respondent in Aboru expressed:

I cannot say this is the total amount of what I lost to flood between last year (2011) and this year but, the point is that many of my properties, I mean my household items, were damaged. I am yet to replace most of them because I have no money to do so.

Statement of another respondent in Ajegunle corroborated the above quote:

I do not know what to do neither do I know where to move to, everything I have laboured for over the years, including my certificate have been lost to flood that ravaged last two weeks. Now I am empty, left with nothing...I am practically back to square one, where do I even start from.

## 6. Conclusion

The study has examined livelihood vulnerability of the residents of low-income coastal communities in Lagos to the incidence of flood events through the lens of Sustainable Livelihood Framework. Building on various literature and empirical study, the article reveals that vulnerability and impacts of flood on urban poor in Lagos are mostly related to physical, human and financial/economic assets.

The study revealed that though flooding in Lagos is a city-wide experience as a result of its coastal location, however, poor communities are especially vulnerable because of their location often along flood plains, their lack of tenural status and the general deprivations associated with poverty. They are disproportionately vulnerable and affected by the impacts of flood hazards because they already experience multiple deprivations and exclusions in their livelihoods. These are manifested in their low and, often, inadequate income, poor environmental conditions, overcrowding, inadequate access to infrastructure, hazardous and precarious locations among others. The risks associated with flood hazards therefore hit them hard, and do not only exacerbate their already poor conditions but also hinder their capabilities to move out of poverty.

It is therefore recommended that the municipal government be more responsive to the plight of the communities in these instances and that urban planning strategies must be put in place to ensure that hazardous areas are left free of human habitation and that urban regeneration efforts must include the consideration of flood-mitigation measures.

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