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EDITED BY
Amrita G. Daniere,
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University of Nottingham, United Kingdom
Furqan Asif,
Wageningen University and
Research, Netherlands

*CORRESPONDENCE
Susan S. Ekoh
✉ susan.ekoh@idos-research.de

†PRESENT ADDRESS
Susan S. Ekoh,
German Institute of Development and
Sustainability (IDOS), Bonn, Germany

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Vulnerable spaces, unequal responses: lessons for transformative climate resilience in Lagos

Susan S. Ekoh[1,2*†] and Lemir Teron[3]

[1]Deutsches Institut für Entwicklungspolitik (DIE), Bonn, Germany, [2]Graduate Program in Environmental Science, SUNY College of Environmental Science and Forestry, Syracuse, NY, United States, [3]Department of Environmental Studies, SUNY College of Environmental Science and Forestry, Syracuse, NY, United States

Urban coastal megacities like Lagos face flooding challenges that may be exacerbated by climate change in the future. Through an urban political ecology lens, this study engages with the dynamics of politics and power that produce differentiated flood impacts and adaptation strategies. Data from telephone interviews of 21 Lagos residents across the mainland and island areas reveal people's understanding of their flood vulnerabilities within the wider socio-political context of Lagos. In particular, state failure in the provisioning of services, amenities, and overall flood protection, shapes flood risk in Lagos. In addition, income and access to material resources inform people's experiences and ability to cope with flooding. Furthermore, citizens apply localized strategies to prepare for and cope with flooding events, particularly through Community Development Associations (CDAs). These localized strategies have implications for transformative resilience. However, these forms of endogenous resilience cannot replace attention to wider urban governance challenges in cities like Lagos.

KEYWORDS

urban political ecology, coastal cities, coastal flooding, community-based adaptation, climate change vulnerability

Introduction

Lagos, Nigeria, along with coastal cities globally, will be presented with flooding and sea level rise imposed threats as a result of climate change (Schraven et al., 2019; Rigaud et al., 2021). Lagos is a megacity with a population of 21 million people, off the Atlantic Ocean in West Africa. Its low lying elevation (~15 m above sea level) influences the city's biophysical vulnerability to sea level rise and coastal flooding [Lagos State Government (LASG), 2013; Heinrich Boell Stiftung, 2018]. Past flooding events (i.e., 2012, 2020 floods) have led to displacement and loss of lives and property (Ajibade et al., 2013; Soneye, 2014; Hansen, 2021). Cost of damages associated with flooding in 2011 reveal an estimate of up to US $200 million (FSD Africa, 2021). Estimates show that the flooding of 2012 led to upwards of 2 million residents being displaced (Atufu and Holt, 2018). While Ologunorisa et al. (2022) estimate that around 50 people have lost their lives from 1985 to 2017 in Lagos due to flooding events.

Along with its coastal geography, Lagos is also surrounded by lagoons, wetlands and creeks which contribute to river flooding, which is exacerbated by urban sprawl and unregulated development (Heinrich Boell Stiftung, 2018). Urban planning issues and state inefficiencies at flood management also contribute to flooding in Lagos (Adeloye and Rustum, 2011; Kasim et al., 2021). Historically and into the present, urban development in

Lagos has involved the transformation of biophysically vulnerable spaces to accommodate rapid urbanization (Bigon, 2016; Kasim et al., 2021). For example, housing structures are built on sand-filled swampy terrains, predisposing residents in those locations to the effects of flooding (Aluko, 2010). Vulnerability for inhabitants of informal settlements in amplified as residents must engage in adaptation with limited resources (Adegun, 2022). Generally, trust in government among Lagos residents to support flood risk reduction is low (Ekoh et al., 2022). Therefore, transformative resilience is necessary to ensure that the most vulnerable are sheltered from the impacts of climate change. Transformative resilience goes beyond simply climate-proofing existing infrastructures or development patterns and instead calls for scholars, activists, policy-makers, and practitioners to "identify root causes of vulnerability and barriers to resilience, and actively challenge the institutions, vested interests and power relations that create these conditions" (Bahadur and Tanner, 2014, p. 211). To understand these root causes and the possibilities for transformative resilience, it is imperative to engage with the production and distribution of flood risk in Lagos, and flood responses.

In acknowledgment of the above, this paper adopts an urban political ecology approach to understand people's experiences of flooding within the wider socio-political context of Lagos flooding and the possibilities for transformative resilience in the city. An urban political ecology approach considers the influence of politics and power that shape environmental outcomes in urban areas (Swyngedouw and Heynen, 2003; Lawhon et al., 2014; Coates and Nygren, 2020). In particular, this paper considers the importance of state urban development policies and discourses in shaping flood risks and responses. It asks: (1) how are flood vulnerabilities and responses differentiated among Lagos residents?, (2) What role does the state play in these outcomes? and finally, (3) What are the implications for adaptation responses? This study sheds new insights on the perceived role of the state and state policy in the Lagos context in shaping flood vulnerabilities. The paper also documents promising "endogenous" sources of transformative resilience in the work of Community Development Associations. Whereby endogenous resilience is one that is developed and driven from local contexts and by local people vs. top-down efforts (Ziervogel et al., 2017).

Literature review

Vulnerability

Adger (2006, p. 269) defines vulnerability as "a state of susceptibility to harm." Interpreted as the conditions that make people able or unable to cope with harm. This definition is often further disaggregated into exposure, sensitivity, and adaptive capacity. *Social vulnerability* on the other hand, helps with understanding the social dynamics of people's susceptibility to harm and their ability to cope with effects of events such as disasters (Singh et al., 2014). Risks from disasters caused by climate change events affect a wide variety of people regardless of socio-economic factors (Allen, 2003; Wisner et al., 2004). However, the level of impact or ability of people to respond and recover from these events—or their adaptive capacity— is influenced by socio-economic factors (Wisner et al., 2004) and wider societal structures inequality (Bullard and Wright, 2009). For example, Ajibade et al. (2013), in a study of coastal Lagos residents, find that low-income women experienced the most impacts of any group.

Income is a social vulnerability factor, whereby less economically powerful groups are more likely to reside in the most hazardous areas where land costs are lowest (Marks, 2015). Lagos is unique because high-income neighborhoods like Lekki and Victoria Island encounter flooding similar to lower income neighborhoods such as Ikorodu.[1] Mehrotra et al.'s (2009) case study of Lagos echoes this point by revealing that that even though slum settlements in Lagos are biophysically vulnerable, affluent neighborhoods equally experience biophysical vulnerability, especially places like Ikoyi which are 60% wetlands.

Urban political ecology and flood risk in Lagos

Vulnerabilities do not exist in isolation; they emerge from demographic, political, and economic processes; hence, the distribution of power and material resources in a society matters (Blaikie et al., 2005). Examining practices of the state government in Lagos offers insights to the production of vulnerable landscapes that expose Lagos residents to differing levels of flood risk and shape their capacities to respond. Of critical importance is the state government's approach to urban development. In September 2013, the Lagos State Government (LASG) enacted a development plan with targets set for 2025, by the administration of the then state governor, Babatunde Raji Fashola. The plan comprises of four pillars of development, namely economic, infrastructure, social development and security, and sustainable environment [(Lagos State Government (LASG), 2013)]. Its vision for the future of Lagos is articulated as making Lagos "Africa's model megacity and global economic and financial hub that is safe, functional and productive" [(Lagos State Government (LASG), 2013)]. Within the plan, the LASG recognizes flooding as a major issue that requires attention. It also presents strategies for addressing challenges that include effective flood warning systems, structural interventions, and wetlands management [Lagos State Government (LASG), 2013; Heinrich Boell Stiftung, 2018]. However, in practice, efforts to achieve Lagos's development plans are questionable given the limited access to basic amenities, the dearth of affordable housing, and poor sanitation conditions that people in the city are faced with (Abubakar et al., 2020; Dano et al., 2020; Shiru et al., 2020). In

1 The areas of Lagos are majorly categorized into two—the island and mainland, which this study adopts in the analysis. Physically, the island areas refer to locations beyond the 3rd mainland bridge, which is a bridge measuring 7.3 miles, that separates the mainland suburbs like Ikeja, Ikorodu and others, from areas around the coast, such as the ancient *Isale Eko* (Lagos Island), Lekki, Victoria Garden City, and Ajah. Areas on the island are largely associated with middle-and high-income earners. Although, informal housing structures occupied by lower income groups can be found in these areas especially around the creek.

2020, widespread youth protests known as ENDSARS[2] drew public attention to these issues.

There is some progress toward Lagos's economic development plans, though the pace and focus of projects are subject to debate. Some of these economic development activities have been carried out without proper attention to social and environmental impacts or considerations (Lawanson and Agunbiade, 2018). Urban redevelopment projects are concentrated in parts where colonial administrators, economic and political elites lived during colonial times (Bigon, 2008; Elias and Omojola, 2015). An example of the LASG's debated approach to development can be seen in Lawanson and Agunbiade's (2018) analysis of Lekki Free Trade Zone project. Although aimed at economic development and to attract foreign direct investment, outcomes showed that Indigenous communities were displaced and not duly compensated according to the terms of agreement on land use (Lawanson and Agunbiade, 2018). Other elite-focused economic development plans like the Eko Atlantic City project have displaced low-income groups and appropriated and enclosed the beach front areas, leaving the poor more physically and socio-economically vulnerable (Ajibade, 2017). These are important examples when flood vulnerabilities are concerned because the displacement of the urban poor, without benefitting from the proposed developments, can push people into vulnerable housing conditions and decrease their ability to cope with floods (Ajibade and McBean, 2014). Furthermore, even though the State has agencies responsible for flood preparedness and management in Lagos, literature suggests that these have been unsuccessful for various reasons, including bureaucratic processes and lack of cross-agency coordination (Heinrich Boell Stiftung, 2018). In some instances, structural interventions to curb flooding by the government have displaced low-income communities, for example, the LASG's "Great Wall of Lagos" project (Adelekan, 2016).

Lawanson and Agunbiade (2018) and Olajide and Lawanson (2021) echo the sentiment, asserting that the LASG has adopted a neoliberal approach to development whereby the economy is prioritized over social and environmental factors. The LASG has embarked on urban (re)development projects connected to the global market through international funding from financial institutions, aimed at attracting foreign investments (Olajide and Lawanson, 2021). Chinese contractors are among private sector developers brought in to implement the (re)development projects (Olajide and Lawanson, 2021). However, studies suggest that low-income residents of Lagos are often the most affected by these projects, through displacements (Lawanson and Agunbiade, 2018). Weak housing rights form the backbone of marginalization for these vulnerable groups (Ajibade and McBean, 2014). Past literature suggests that biophysical vulnerable spaces and poor environmental management practices (see: Blaikie and Brookfield, 1987) predispose people in these areas to the adverse effects of flooding (Ajibade and McBean, 2014).

Yet, there is a need for understanding how recent efforts, such as the 2013 plan, have served to alter risk exposure and responses. Moreover, there is room to recognize how people exercise agency within these constraints, given calls for transformative resilience scholars to understand endogenous forms of resilience (Ziervogel et al., 2017).

Materials and methods

Data collection and analysis

To answer the above questions, this study employed semi-structured interviews with residents of Lagos. Interviewees were sampled purposively from a wider PhD dissertation study (Ekoh, 2021) that involved online surveys (352 completed), where respondents indicated interest in a follow up interview. Respondents who indicated interest in participating in a follow up interview from the surveyed sample were redirected to a separate form to gather necessary information for further contact. A total number of 21 interviews were scheduled. We completed Internal Review Board (IRB) approval processes required for this study. IRB number is 20-061. Electronic consent forms were presented to participants prior to the interviews, where participants were provided with information on the study and had the liberty to make a choice to proceed with the interview or to decline.

Recruited participants reside in the island and mainland areas of Lagos. About 76% of interviewees are mainland residents while the rest live on the island areas. Participants comprised of 7 people who identify as female and 14 who identify as male. Although attempts were made to have greater gender-balanced representation within the survey, lack of response from potential participants posed constraints. The age range of interview participants was between 25 and 45 years old. About 80% of participants had directly experienced flooding in the past 10 years. For those that lacked direct flood experience, some of them shared indirect experiences or observations of flood events. Pseudonyms are used in this paper to protect the anonymity of participants. The first author conducted the interviews with participants from August 2020 to September 2020.

In this study, we take a reflexive thematic approach to analyzing the qualitative data (Braun and Clarke, 2021). According to Braun and Clarke (2021), reflexive thematic analysis may involve a six-step process, although these steps are prescriptions and can be flexible (see Braun and Clarke, 2021). Braun and Clarke (2021) emphasize the need to recognize and highlight underlying theoretical assumptions. We adopt this approach to the data analysis for this study.

In this regard, the coding development was iterative, involving two cycles coding. Codes were refined accordingly throughout this process. Themes were generated from the data across central elements that unified aspects of the data. Likewise, visual tools on NVIVO software also offered an avenue to see patterns across experiences shared by participants, aiding the establishment of themes.

Furthermore, reflexivity included reflecting over emerging themes from the data, and especially patterns that challenged prior knowledge of the context of flood vulnerabilities in Lagos.

2 ENDSARS protests occurred nationally but Lagos was a key location for protests. The primary reason for the protests were youth resistance to police brutality. However, the protests evolved to cover issues of poor governance.

This stemmed from the first authors positionality as a former resident of Lagos, including prior awareness of flood issues in Lagos. In presenting results, we take a constructivist theoretical approach (Crotty, 2020) where we are interested not only in what people are saying but how they describe experiences and events; we reflect this in the interview excerpts that are highlighted.

We embed the entire study in an urban political ecology approach, as we attempt to understand flood vulnerabilities among Lagos residents. This means that in our data analysis we paid close attention to dimensions of power and politics at play in flood experiences and responses shared by respondents in this study. We build on other studies in the literature that have applied urban political ecology to flooding using qualitative analytical approaches (e.g., Marks, 2015; Ajibade, 2017; Abass, 2022).

One (perceived) limitation of the study is the ultimate number of interview participants. Initially, the project called for the lead author to conduct on the ground interviews and community focus groups in Lagos in the spring of 2020. This period ultimately coincided with the early stages of the COVID-19 pandemic and that approach was no longer feasible for public health purposes nor allowable due to travel restrictions. Online surveys and remote follow-up interviews offered an alternative strategy, which may have limited the number of possible respondents for the study. Notwithstanding the adjustment in approaches to conducting interviews, the intricate nature of what was captured is substantial; several interviews lasted nearly an hour and revealed participants' deep understanding of, and experiences with, threats associated with flooding. The interviews progressed to the point of data saturation, which in qualitative methods implies that no new themes were unfolding (Doolittle, 2015).

In addition, in some cases interviewees would share their observation or analysis of events and not always their own direct experiences. However, it still offers beneficial insights to how vulnerabilities to flooding might manifest in the area and similar contexts, and the in-depth and semi-structured format of the interviews allowed for a valuable window into residents' perceptions of risk and the factors motivating their responses.

Results

This section presents results from interviews for this study and offers two key insights. Firstly, respondents understand their flood vulnerabilities across the lines of income, housing conditions, land tenure and the unregulated activities of landowners. Reflecting the wider socio-political context, e.g., influences of state policies and (in) actions on flood vulnerabilities as well as individual capabilities with respect to material resources that affect the ability to cope with flooding events. Secondly, in response to flooding, residents apply localized efforts to cope with current or anticipated flood events. Specifically, an interesting aspect of flood response by Lagos residents and a key source of "endogenous resilience" (Ziervogel et al., 2017) is the role of community development associations (CDAs).

Understandings of flood vulnerabilities: the urban poor and "elite"

> *"We have swampy areas for [the] common man and we have swampy areas for the rich too… Like Ajah, the Lekki environment… They are vulnerable to floods!... So, they also will be involved in it. And we have the swampy area that belongs to the poor people that will also be vulnerable."*
> *(Ife, Phone interview, August 29, 2020).*

The above is an excerpt from an interview with Ife, a Lagos resident. It shows the widespread understanding that all residents of Lagos face some flood risk, regardless of income levels. Although, further insights show that income is a significant factor in the ways that people experience flooding in Lagos. The presence and quality of amenities and infrastructure in Lagos neighborhoods determine how impactful flooding will be. Underdeveloped areas lack amenities and infrastructure that leads to worse flood experiences. *Ima*, an interview respondent spoke on how certain neighborhoods such as "Lagos Island, Lekki, or Ikoyi… are generally cleaner and have better houses." Interviews also suggest that the government tends to establish urban development projects in areas where the wealthy live first, attending to poor people last and usually after much persuasion. Interestingly, urban projects concentrated in high-income areas of Lagos are problematic because these areas are biophysically vulnerable to flooding.

For example, *Kunle*, an interview participant said:

> *"The need for housing, the need for road, the need for bridges, has pushed [the] government and people to go into areas that they are not supposed to go into areas that should serve as… so to say… sinks… wetlands."*
> *(Kunle, Phone interview, September 12, 2020).*

The statement above reveals how the natural environment in Lagos, especially physically vulnerable locations such as wetlands, littoral zones, and other low-lying areas have been transformed. The concentration of urban development projects on the island areas—made up of Lagos Island and other neighborhoods, including places like Lekki and Ikoyi—contribute to a class-based attraction to these places for people looking for where to live, even though parts of these areas are prone to floods. The new government and private development project—Eko Atlantic City in this area of Lagos is driving encroachment into low lying flood prone areas. *Ini*, a resident of Lekki articulates this point by saying:

> *"Lagosians, we try to… you know… anyone that makes some good money, if he doesn't live in Lekki, then he's not rich! Why? Because, over the years, Lekki has been made to be a small Dubai or a small London—reserved region, because the government has invested in security, invested in the topography of the land, invested in beautification of the place, and so it's believed that a certain elite group are to be found there! So, anybody that has some good change believes; "if I'm not in Lekki, then I'm nowhere." So, on the part of the citizens, they've bought into the lie, and created their own lie in a way that made it look so real. So, two lies suddenly became one truth! From the part*

> *of the government and the part of the individual. So, everybody now moved there because it was a small Eldorado. But, they forgot that in the midst of the Eldorado that there was something that was not permanent, the sand filling was a temporary thing, that the government did just to sell off… in a bid to in quote "profit making."*
> *(Ini, Phone interview, August 26, 2020).*

The interview excerpt suggests that the classist attraction to the island areas of Lagos are artificially created by the government through the concentration of urban development projects. These areas are expensive to live in and although wetlands and swamps surround the island, continuous development is taking place while increasing vulnerability to flooding for its inhabitants (see: Obiefuna et al., 2021). Based on data from Lagos State Government (LASG) (2013), Lagos Island's population is an estimated 2.4 million people while the mainland areas have an estimated population of 19 million people (see: Soyinka, 2018).

In addition, several participants highlighted how lack of capital forces people to live in certain physically vulnerable environments, lacking access to amenities. Lack of infrastructural development especially in informal communities increase flood vulnerabilities (Amoako, 2016; Lawanson et al., 2023). Many interviewees highlighted Ikorodu, a neighborhood in Lagos as physically vulnerable and cheap. *Obi,* a study participant specifically stated that:

> *"... I stay[ed] at Ikorodu before and it's the kind of place whereby people are just rushing in there because it's a new site and land is cheap… and everything about the places are cheap. Because of that, the government has not been able to develop the area….I'm talking about developing in the aspect of … if you're living in Ikorodu, most of the houses and streets… they don't have drainage systems and … in fact, the street that I stayed in…actually doesn't have a gutter."*
> *(Obi, Phone interview, September 10, 2020).*

Speaking on cost and flooding more broadly, *Katie* stated:

> *"But that depends on your capital… It depends on the kind of money you have. Because the areas… that experience flooding a lot, [are] cheaper. While the areas that don't experience flooding are costlier due to mansions and good roads in that area."*
> *(Katie, Phone interview, August 25, 2020).*

*Obi*i in the interview excerpt above, highlights that lack of infrastructural development contributes to the low cost of land in Ikorodu. The absence of drainage systems makes the community more vulnerable to flooding. Thus, elites tend to inhabit more structurally protected neighborhoods while others are relegated to vulnerable locations (Marks, 2015 study in Bangkok). Another participant stated that the cost of renting homes in waterlogged areas is cheaper than less vulnerable locations. Homeowners in these areas are also more likely to move out in the event of repeated flooding events and rent them out at low costs (*Peter, phone interview, August 28, 2020*). The cheap costs of rent is attractive to low income renters, exposing them to flooding. Furthermore, buildings are erected without consideration for possible drainage channels, creating the perfect environment for flooding events to take place. Ola an interview participant, claims that enforcement of building policies by the responsible agency in Lagos is fraught with allegations of bribery, where "anything can go if you [grease] the right palms" (Ola, phone interview, August 28, 2020).

Housing conditions and flood experiences

Rapid urban growth has led to limited housing availability in Lagos. A number of participants who also mention that the influx of people to the city has created congestion echoed this. To keep up with this demand, a participant, *Ife* said that there has been "encroachment into the waterways." Implying that urban growth drives housing development into vulnerable spaces to accommodate rising demand for homes. Slum settlements are a manifestation of housing problems in cities (Okwuashi and Ofem, 2014).

The vulnerability of informal settlements was highlighted in interviews. In particular, the experiences of people who live in structures called *bashers or shanties* from an outsider perspective. According to *Aisha*, an interview participant, bashers are low-cost wooden houses with no public utilities, that accommodate small-scale traders, food vendors, mechanics, and others, involved in the provision of basic goods and services to the surrounding neighborhood (Aisha, Phone interview, August 2020). Residents in these settlements offer informal but convenient shopping experiences, and other service opportunities, to people like Aisha who live in the surrounding formal neighborhoods. Hence, these shanty communities contribute essentially to the vitality of the city's economy albeit in less formal ways (UN-Habitat, 2003).

Aisha further describes her observation of the flooding experience of people who live in *bashers*[3], stating that they cope with flooding by temporarily moving after a flooding event, removing valuable household goods and in other cases, erecting platforms within their informal housing structures. Beyond that, bashers are often targeted for demolition to support beautification projects that cater to elites. Aisha specifically stated:

> *"And the next thing I know, they built a gate, and they started beautifying the place. That's what they call beautifying! … and you know… I was like… Ah! Remarking to my sister, I said 'Lagos doesn't have any space for poor people.' Or this Island doesn't have space for poor people."*
> *(Aisha, Phone interview, August 2020).*

Demolitions affect low-income groups the most, displacing them and exacerbating vulnerabilities to flooding (Ajibade and McBean, 2014). These demolitions highlight the interplay of politics and power in shaping flood vulnerabilities within the city. The government plays a significant role in contributing to vulnerabilities of the urban poor through its neoliberal projects within the city. For example, the LASG has received funding from the World Bank to implement slum upgrade projects within the

3 Aisha in the past had acquired a basher for her staff.

city (Olajide and Lawanson, 2021). Ironically, these projects have displaced people within these communities that were targeted to be served and instead luxury housing has been developed to cater to the needs of higher income groups (Olajide and Lawanson, 2021).

Land tenure, government acquisitions, and their contribution to flood experiences

State practices and policies of eminent domain contribute to increasing flood vulnerabilities among Lagos residents. Results from this study shows that, through eminent domain, the state has acquired land to accommodate road expansions and other infrastructural projects. In Lagos, government acquisition of land is predicated on Nigeria's land use decree of 1978. This act gave "management and control" of all land in each state to the military government within the state (Nigerian Military Government, 1978). When land is acquired by the state, an established land allocation committee oversees the resettlement of people whose land has been acquired (Nigerian Military Government, 1978). The local government on the other hand is in charge of compensating people whose land has been acquired (Nigerian Military Government, 1978). However in practice, resettlement and compensation has not always been successful (Aluko, 2012).

Results in this study show that people who live in places acquired by the government have had to move at short notice, disrupting their lives and livelihoods. This has also led people to move to locations that are more vulnerable to seek housing. This increases vulnerability to flooding and diminishes resilience. Many of these residents are renters, which means that government acquisitions go to the landlords with little to no compensation made to residents. Also, the compensation schemes have been found to be ineffective or incomplete (Lawanson and Agunbiade, 2018; Olajide and Lawanson, 2021). *Obi*, an interviewee stated that sometimes the government forcefully acquires these properties, when property owners "refuse to sell." *Obi*, in particular, received short notice (a few months) to move out of his current residence without prior notice about the sale of the property that occurred 2 years ago. Hence, it is necessary to consider the justice dimensions of how development in Lagos creates further burdens on the most vulnerable.

Furthermore, the state has discursively promoted urban development projects as ecologically sound, even though they cause disproportionate impacts on the urban poor (Ajibade, 2017). *Ini* highlights a key part of the issue, which is the government's interest in attracting private investment. According to *Kunle,* an informant, most of "the development in Lagos is economic and not ecological." The Eko Atlantic City project is a good example. *Ade,* an interviewee, claims that the Lagos State Government, in response to criticisms of the Eko Atlantic City project as being a contributor to a recent flooding event, stated that the project "was well planned," a "reclamation of land washed away by the ocean" and so, not the "cause" of flooding. *Ade* stated that the government attributed flooding to be a "natural phenomenon." This further establishes how through discourse, transformations of the urban environment are promoted and enacted to benefit certain groups of people while disproportionately harming others (Peet et al., 2010; Ajibade, 2017). In the case of Eko Atlantic City, poor vulnerable groups have been harmed by displacement while elites are the target beneficiaries of these urban development projects.

Unregulated landowners

An important consideration for land regulation, sales, and ownership in Lagos are the traditional landowners, called *omo onile.* Lack of oversight by the authorities in Lagos on the activities of land owners contributes to flood vulnerabilities. Several interviewees highlighted their role in land and building practices and how that affects flooding. The omo onile are indigenes of Lagos with land rights, who have used this position to assert legitimacy to the city of Lagos (Akinyele, 2009). They are major players in the Lagos housing market, engaging in the land sales (Ayodele, 2017; Odunfa et al., 2021). General public perception of the *Omo onile* are not entirely positive, they are filled with unpleasant experiences of land contestations, violence, and extortions (Akinyele, 2009; Ayodele, 2017; Odunfa et al., 2021). In this study, informants spoke about how the *omo onile* are unregulated and engage in selling land without clear guidance on land use purposes. Many times, landowners sell land in flood prone areas driven by financial gain, often without the knowledge of an unsuspecting buyer. *Ade*, an interviewee stated:

> *"Sometimes, those [landowners], they do sell lands in waterlogged areas or canals to prospective buyers, just because they want money" (Ade, Phone interview, August 30, 2020).*

Differentiated flood responses

Results presented so far reveal that that flood risk is distributed differently across income groups and neighborhoods. Results have also shown the role of government-led projects and lack of infrastructural development in contributing to flood vulnerabilities, especially for the urban poor. This section presents results on how residents of Lagos have applied responses to flooding. Firstly, although physical vulnerabilities are distributed across various income groups, wealthy people can invest in more resilient structures, protection measures, and other response strategies that minimize vulnerabilities to flooding. Some interview participants noted that certain neighborhoods have better drainages than others, which is a function of income. Whereby, elites can facilitate their privilege to get the government's attention. This is demonstrated by *Ima*'s statement:

> *"Some get more attention than the others. Obviously, those who are higher income earners… those who are… we call them rich anyway… They get quick attention from the government. They know how to pull the strings, they make more noise, they get quick access to government attention. So, it's easier to maintain those areas where the richer ones are living. It is easier for them to get, you know… the attention of the government when things are not working well, than those who are the low-income earners." (Ima, Phone interview, August 2020).*

A second point when considering income as a factor that engenders flood vulnerability is access to resources (Lawanson et al., 2023). For example, interviewee *Ini*'s ownership of two houses—one on the island and another on the mainland, enables him to cope by moving temporarily during flooding events. Another interviewee equally spoke about seasonal migration options that wealthy people can harness, and also how some have trucks as a form of mobility which helps them cope during flooding vs. less costly, smaller car options. Staying in hotels after a flooding event was raised as a way that wealthier people cope with flooding. In multiple studies on disaster response and recovery during Hurricane Katrina (Elliott and Pais, 2006; Pastor et al., 2006) similar findings were observed, where wealthier residents were more likely to evacuate to apartment rentals and hotels along with disaster response unevenness across economic lines.

In cases where there is a general lack of responsiveness of the government, people with higher incomes mobilize their resources toward implementing flood coping strategies, individually and collectively. Resources that build adaptive capacity include information. *Kola*, an informant, mentioned that access to information helps people build secure housing structures. Whereby some people can afford experts like engineers and land surveyors, prior to building homes, while lower income people do not have the same luxury. This translates to poorer housing conditions that predispose people to more adverse flood impacts.

In addition, rapid development in Lagos has not resulted in concomitant investments in flood protection structures on the part of the government. Results show that many neighborhoods suffer from the absence of drainages, others experience blockage of drainages due to indiscriminate waste disposal, while others need drainage upgrades. Many times, the presence of drainages or lack of, is determined by the income capacity of residents. Study findings reveal that where the government fails to provide drainage systems, neighborhoods with capital organize, pull together resources and invest in drainage systems collectively for flood preparedness and/or response. According to Fourchard (2011) residents, not government authorities have mainly taken responsibility for development in Lagos.

Community-based responses: community development associations

In the absence of adequate amenity provisions and flood management, findings from this research study suggest that community-based responses have played a significant role in flood management and have the potential to be an effective approach to climate adaptation. Waste management practices in the city is an example. Municipal waste contributes significantly to flooding in Lagos (Gandy, 2006; Douglas et al., 2008; Okwuashi and Ofem, 2014). Some interviewees attribute this to lack of waste bins and systems of waste collection that enable proper waste management. However, the failure of government in providing this essential urban municipal service places the burden on individuals and households to come up with their own waste management practices. This is demonstrated in this statement:

> *… I go to the market and buy a refuse [bag]. At the end of every 3 or 4 weeks, I have to move from my house… I have to trek to the expressway because that's where people normally dump refuse.… There are some who will dump it on the main road while some dump by the roadside. Now… I dump by the roadside. I will tell you why! Because, when you dump by the roadside, the government is forced to come and pack them... I know it is not ideal for me to dump by the roadside, but that is the best I can do! I cannot dump in those gutters around my street because I know I'll be helping the flood. So, the best I can do is to go dump by the roadside.*
> *(Femi, Phone interview, September 11, 2020).*

The above statement demonstrates the burdens on residents to device strategies to manage their municipal waste. However, not every resident is able to do this, so this creates ripple effects, increasing flood vulnerabilities in the city. Even though the government has enabled private sector providers (PSPs) to support municipal solid waste management in Lagos (Akiyode and Sojinu, 2006), interviews emerging from this study show pros and cons of this arrangement. A major problem of PSPs in Lagos, echoed by a few participants, is that they are not enough of them to cater effectively to all neighborhoods. Secondly, some interviewees expressed criticism of PSPs in terms of their inefficiency and inability to meet up with scheduled pick-ups. Informants expressed that low-income neighborhoods are more affected. This is because PSPs claim that the reason for their inefficiency is due to inaccessibility of neighborhoods with bad road conditions. In the absence of waste collection, people have engaged in indiscriminate dumping of waste, further exacerbating flood issues in these neighborhoods. However, in response to these challenges, communities have organized to augment the failure of the government in providing waste management. Interviewees mentioned that organized neighborhoods implement community-policing strategies to monitor improper waste dumping in order to mitigate against future flooding events. Community Development Associations often perform these monitoring efforts. These community-based strategies can allow for monitoring and compliance among community members (Ostrom, 1990).

On CDA's according to an interviewee, *"… people just forget about government and then people started their own government by themselves" (Olaolu, Phone Interview Participant, September 14, 2020).* Interestingly, CDAs were originally set up by the government to promote public participation in urban governance (Muse and Narsiah, 2015), and for open communication with the local government on community needs for planning (Oyalowo, 2021). The LASG itself has engrained CDAs into law, itemizing rules of conduct/organization (Oyalowo, 2021). Although, as in the case with Olaolu's statement, some community members have come to see CDA's as separate from the government. For others, CDA's have offered an opportunity to gain direct access to the local government on issues that affect the community, for example around transformers for electricity and on flood issues.

For neighborhoods across all income groups, the data suggests that the ability to organize was key to successful implementation of flood management strategies. In the words of Ade an informant,

"…we have our chairman, we have our patron, we have our treasurer… so we all contribute to ideas on how to solve the flooding issue." (Ade, Phone Interview Participant, August 30, 2020). Although, findings also suggest that high income and low-income neighborhoods organize around different priorities, that is, some across waste management to curb floods and others around drainages. In certain high-income neighborhoods, waste seemed to be less of a factor in flooding, and more on the physical topography and building policies. However, it is important to note that overlaps exist in priority areas of flood management irrespective of the income levels of neighborhoods (Fateye et al., 2021). *Aisha,* an interview participant *(Phone Interview, August 25, 2020*), who lives in a high-income neighborhood confirmed this. She said waste management in her prior and current neighborhoods (both high-income) were "efficient"; the main challenges in her current abode is the high density of housing developments. She claims that neighborhoods on the mainland have more waste issues because they are unable to organize effectively, compared to high-income neighborhoods, and because the government fails to play their role in waste management. Although, interviews also showed that in some cases there is more support from government on flood management strategies when communities organize and may have already implemented coping strategies.

Overall, the grassroots nature of CDAs and the belief, by at least some residents, that they are a means of advancing a responsible approach to flood mitigation is encouraging. However, there is further need to interrogate the efficacy of such entities in future studies. For more on CDAs and related projects in Lagos, see Akinsorotan and Olujide (2006) and Akinyemi (2020).

Discussion and recommendations

Lessons for a transformative approach to resilience

Thus far, this paper has revealed resident attitudes about flooding from individuals across a spectrum of vulnerability levels. Vulnerability to flooding in Lagos, as described by interview participants falls along the lines of income, housing conditions, unregulated land use and policies of acquisition. Income, on one hand plays a role in the scale of impact, the ability to cope with, and recover from flooding events (Marks, 2015). On the other hand, failure to provide basic infrastructure and municipal services especially in areas where the poor reside increase the vulnerabilities of the urban poor to flooding. Hence, results emphasize the need for attention on socio-political dimensions in producing flood risk to adequately address flood vulnerabilities.

Furthermore, organizing and collective action emerged in this research as a significant way through which neighborhoods respond to flooding. In particular, community development associations have been useful toward implementing flood management strategies. Interviewees describe specific interventions such as drainage systems and waste management to prepare for and to control flooding. Furthermore, CDAs have been used as vehicles to collectively present community interest to the government and toward localized action on issues. Therefore, we argue that these localized efforts contribute to transformative resilience and that these "endogenous" sources of resilience (Ziervogel et al., 2017) should be enabled in the implementation of climate adaptation strategies in Lagos, and places with similar structures. We find that localized efforts fill gaps created by urban governance failures where people are left without a choice but to seek ways of adjusting to the realities of climate change. Although reliance on bottom up resilience strategies places burdens on citizens to take action. It is also necessary to acknowledge and support such efforts. Donors, multilateral institutions and NGO's can target these existing efforts toward building urban resilience in places like Lagos.

Noteworthy, it important to anticipate and curb potential issues that may arise with community-based institutions like the CDAs. Gender representation is a key aspect. Studies have highlighted the uneven representation of men in CDAs (Akinsorotan and Olujide, 2007; Oyalowo, 2021). Others have shown undue external influences by government or traditional rulership within CDAs to push certain agendas (Muse and Narsiah, 2015). There have been tensions with local government authorities (Oyalowo, 2021) and co-option of power by CDA leadership (Muse and Narsiah, 2015). These are legitimate concerns that should be anticipated and curbed. Hence, there is need for further research on CDAs and urban resilience in Lagos. In particular, insights on community-based strategies to curb flooding in informal settlements will be beneficial.

Most importantly, addressing the underlying governance issues that produce flood risk in Lagos is critical. Despite local efforts, the role of effective urban governance in response to climate threats cannot be diminished (Leal Filho et al., 2018). Institutional dimensions are necessary for climate resilience (McClymont et al., 2020; Sono et al., 2021). Sono et al. (2021) outline "transparency, access to information, control of corruption and fraud, accountability, participation and engagement" as indicators of resilience. We find in our study that these challenges exist in urban governance in Lagos. For example, the vulnerability of renters displaced through eminent domain practices illuminate issues with engagement and should be addressed. Engagement with community groups should be prioritized (see: Harris, 2015), involving not just property owners but also renters. When land is acquired for development projects, leading to the displacement of people, it should be ensured that the purpose of the projects should benefit those who will be affected (Harris, 2015). Systems of accountability must be put in place to check incidences of bribery that encourage the construction of buildings in vulnerable locations. Overall, efforts must be made to address the socio-economic and political factors that produce flood risk and vulnerabilities in Lagos.

Conclusion

This study has attempted to examine flood vulnerabilities in Lagos within the wider socio-political context. Results reveal that flood risk is produced through state actions and inactions related to the provision of necessary urban amenities, infrastructure, and enactment of policies that curb flooding. Furthermore, results for this study demonstrate that low-income groups experience unique

vulnerabilities because they lack the necessary economic resources to avert or cope with flooding. The urban poor are also forced to live in flood prone areas due to government practices of demolitions and evictions. Unregulated land sale activities of landowners put unsuspecting buyers at risk of purchasing land in flood prone areas. Whereas others are driven to these flood prone areas due to cheap prices of land or rental homes. Where the state fails to take on infrastructural and management functions aimed at curbing floods, residents often the elite can appropriate resources to help them address flooding.

Through community-based strategies, residents may be able to manage flood issues. Community Development Associations in particular were highlighted by informants as a solution to some of Lagos's urban challenges at the neighborhood level, confirming similar findings by Akinsorotan and Olujide (2007). These organizations, with proper organizing, pull together resources and share information to implement flood management strategies. Communities with functioning CDAs have successfully implemented structural and non-structural measures for flood management. Considering Lagos' urban and governance challenges, this study proposes that these localized actions be targeted and supported to build urban resilience toward climate impacts in Lagos.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by Syracuse University IRB. The participants provided their written informed consent to participate in this study.

Author contributions

SE worked on the conceptualization, data collection, methodology, analysis, and writing of this manuscript. LT contributed to the development, supervision, review of the current manuscript and will additionally be in part responsible for data analysis, interpretation associated with and further drafting associated with any requisite revisions, and joint approval of the final version. Both authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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