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# Examining Opportunities and Challenges for Implementing Land-based Financing Instruments for Funding Climate Action: Aligning Land, Real Estate Markets, and Climate Resilience Strategies in Lagos

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## **Abstract**

Lagos, a coastal megacity, is facing a daunting challenge: how to adapt to the rapidly escalating impacts of climate change while grappling with the complexities of rapid urbanization and land management. As the city's population continues to surge and its built-up area expands at an alarming rate, the risks posed by flooding, sea level rise, and other climate-induced hazards are becoming increasingly dire. The study explains how, at the heart of this crisis, lie the dysfunctionalities in Lagos's land markets. Inadequate risk assessments, information asymmetries, speculative behavior, and weak enforcement of land use regulations are leading to the underpricing of climate risks and the overvaluation of properties in high-risk areas. The result is a deeply unequal landscape of resilience, where marginalized communities bear the brunt of environmental hazards. This study delves into the intricacies of these challenges, offering a comprehensive analysis of the factors that contribute to the underpricing of climate risks in Lagos's land markets. But it doesn't stop there. The challenges faced by Lagos are immense, but so too are the opportunities for transformation. The study also presents a bold vision for a more resilient, sustainable, and equitable future, outlining a set of recommendations that span land management, and developing a comprehensive land use plan that integrates climate risk assessment, to taxation reforms, and also explores the potential of land-based financing instruments, such as development charges, betterment levies, and transfer of development rights, to generate funds for adaptation projects. By promoting resilience as a marketable amenity, Lagos can attract private sector investment in resilience infrastructure and create a more robust and competitive market for climate-resilient properties.

## **About the Author**

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**Examining opportunities and challenges for implementing land-based financing instruments for funding climate action:  
Aligning land, real estate markets, and climate resilience strategies in Lagos**

**Introduction: Objective and relevance of this case**

The escalating impacts of climatic events on coastal metropolises are exemplified by Lagos,<sup>1</sup> which epitomizes the susceptibility of such urban centers to the multifaceted threats imposed by climatic variability and rising sea levels (Rigaud et al. 2021). Lagos, the most populous and urbanized metropolitan area in Nigeria, is projected to surpass 32 million people by 2053 and is expected to become the world's largest metropolis with a population of 80 million by 2100 (Hoorweg & Pope 2016). Its unique geographical positioning along the Atlantic seaboard of West Africa, with an average elevation marginally exceeding 2 meters above mean sea level, renders it acutely vulnerable to the vicissitudes of coastal inundation, fluvial flooding, intense precipitation, and the progressive encroachment of the ocean (Böll Stiftung 2018).

Moreover, according to the 2022 IPCC Sixth Assessment Report, Lagos is one of 12 major African cities that would be the most severely affected by sea level rise. Global sea levels are projected to rise between 1.3 to 1.6 meters by the end of this century, putting Lagos in a precarious position given its low-lying coastline. The projected sea level rise of approximately 0.5 meters by the end of the century, coupled with land subsidence rates of up to ~87 mm per year (Ikuemonisan and Ozebo 2020), forecasts a grim future. The most recent IPCC report shows that by 2100, Lagos will experience a 54-cm sea level rise under the RCP4.5 scenario and a 75-cm rise under the RCP8.5 scenario (worst case). It estimates that they would collectively sustain cumulative damage of US\$65 billion under RCP 4.5 and US\$86.5 billion in the high-emission scenario RCP 8.5 by the year 2050.<sup>2</sup>

The rapid and uncontrolled growth of Lagos has led to significant losses in the city's natural environment, particularly its wetlands, lagoons, and beaches. Within the expansive 600-kilometer Greater Ibadan–Lagos–Accra Corridor, Lagos serves as a nucleus, accommodating more than half of the corridor's population. This demographic concentration, alongside a notable prevalence of impoverished communities and informal settlements, exacerbates the city's exposure to adverse events (Lagos State Government 2004).

Intense rainfall engenders widespread inundation, with a significant proportion of dwellings experiencing routine flooding, exacerbated by the region's topography, intense precipitation, and subpar drainage systems (Lawanson et al. 2023). Moreover, the intensity of rainfall events has

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<sup>1</sup> The economic repercussions of such events are staggering. For instance, flooding in 2011 resulted in estimated damages reaching US \$200 million (FSD Africa 2021). Further, it is approximated that the 2012 flooding event led to the displacement of more than 2 million residents (Atufu and Holt 2018).

<sup>2</sup> Additionally, RCP 8.5 combined with the hypothetical impact from marine ice sheet instability at high levels of warming would involve up to US\$137.5 billion in damage, while the additional accounting for the "low-probability, high-damage events" may increase aggregate risks to US\$187 billion for the "moderate" RCP4.5, US\$206 billion for RCP8.5 and US\$397 billion under the high-end ice sheet instability scenario.

been escalating, further straining these inadequate drainage infrastructures.<sup>3</sup> The frequency of extreme precipitation events is on the rise due to climate change, and the lack of climate-resilient urban development—marked by unregulated construction in flood-prone areas—aggravates the city's susceptibility to these meteorological phenomena. Empirical evidence indicates that in the last decades, virtually all regions of Lagos have been afflicted by flooding (Gandy 2006; World Bank 2020). Historical accounts chronicle significant flooding episodes, notably those of 2012 and 2020, which have precipitated extensive human displacement, loss of life, and infrastructural devastation (Hansen 2021).<sup>4</sup> Fiscally, the annual economic toll of recurrent flooding in Lagos is staggering, with estimates reaching \$4 billion. Infrastructure alone incurs losses upward of \$22 million annually, as floods ravage roads, bridges, educational and health facilities, and residential structures (ADB 2022). The city may face the dire necessity of adaptation investments and planning for resilience. The journey ahead may be complex and fraught with obstacles, but the destination – a more resilient, sustainable, and equitable future for all – is well worth the effort.

Rapid urbanization, where built-up land has doubled since 2000 (Kasim et al. 2021), drives development in hazard-prone areas, with 70 percent of Lagos's population in informal settlements lacking drainage and waste disposal infrastructure. This is coupled with insufficient affordable housing, displacing the poor into high-risk zones. Residents of economically marginalized communities in Lagos disproportionately face the adverse impacts of climate change. Notable among these are informal settlements like Ajegunle, Badia, Bariga, and Ilaje, where hundreds of thousands live under the constant threat of flooding. Urban sprawl has doubled built-up land since 2000, increasing flood vulnerability.

Today, for example, the environmental resilience of Lagos is further compromised by the degradation of vital coastal ecosystems, such as mangrove forests, which historically mitigated storm surge impacts and a rapid increase in urban expansion and densification in vulnerable areas (Merem et al. 2019). The impacts of rapid and not planned urbanization and the loss of critical blue and green infrastructure have been further compounded by rising sea levels due to climate change. This combination of factors has made it increasingly difficult for Lagos to meet the needs of its rapidly growing population while simultaneously responding to the consequences of climate change. Lagos ranked as the second least livable city out of 172 global cities (EIU Global Livability Ranking 2022).

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<sup>3</sup> Lagos has a high concentration of impervious sandy surfaces and limited blue-green infrastructure. Combined with the predicted increased precipitation intensity, these factors can overwhelm the current drainage systems, resulting in flooding that damages property and threatens lives.

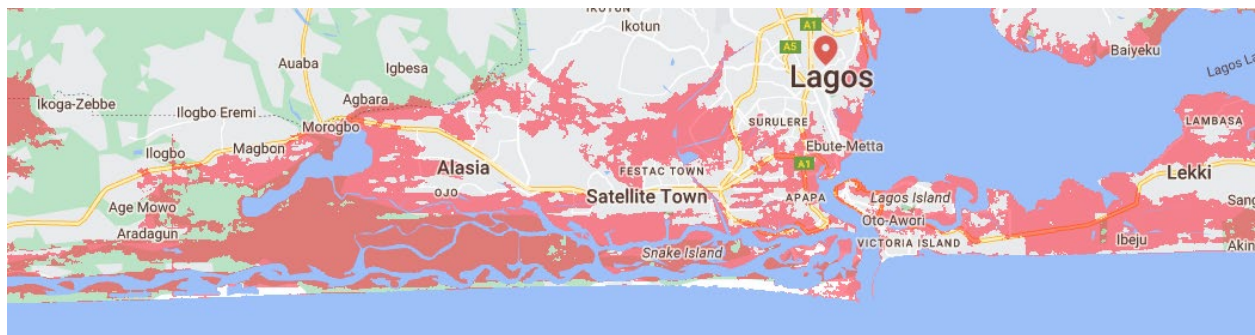
**Figure 1: All land below a water level of 0.5m**



**Figure 2: All land below a water level of 1.0 m**



**Figure 3: All land below a water level of 2.0 m**



Source: Coastal Risk Screening Tool by Climate Central.

Note: The areas of Lagos are majorly categorized into two—the island and the mainland. A bridge measuring 7.3 miles 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.

## Land market pricing of flood risk: Factors influencing the capitalization of flood risk in property prices

Land markets in Lagos, Nigeria, are shaped by various factors that influence the supply, demand, and pricing dynamics within the city.

- *Rapid urbanization and population growth:* Lagos has experienced rapid urbanization and population growth, driven by rural-urban migration and natural population increase. In 2021, the population of Lagos grew at 3.5 percent, with similar growth rates predicted over the next 15 years (World Bank 2022). This surge in demand for residential, commercial, and industrial land has outpaced the available supply, creating intense competition for plots within the city limits, and increasing land prices.
- *Scarcity of developable land:* Lagos is a coastal city with limited land area suitable for development due to its geographic constraints, such as waterways, wetlands, and environmental considerations. This scarcity of developable land further intensifies the competition for available plots, driving up their value over time. As Lagos continues to grow as an economic hub, there is increasing demand from local and international investors, as well as real estate developers, for prime plots within the city. This heightened demand, coupled with limited supply, contributes to a gradual increase in land values.

The urban development focus in Lagos is concentrated on the island areas, including Lagos Island, Lekki, and Ikoyi. In high-income areas such as Victoria Island and Lekki, the attractiveness and market value of real estate are bolstered by significant government investments but also valuable amenities. Areas on the islands are largely associated with middle-and high-income earners. These locations continue to draw affluent demographics despite their susceptibility to floods. Projects like Eko Atlantic City exemplify the trend of encroaching into low-lying, flood-prone areas, driven by government and private development initiatives (Abubakar et al. 2020). However, informal housing structures occupied by lower income groups can be found in these areas, especially around the creek (Ekoh and Teron 2023).

- *Short-term focus and speculative behavior:* Developers and investors, driven by the allure of a prevalent short-term investment view and immediate financial returns, frequently disregard the looming shadow of long-term disaster risks. This myopic focus on short-term profitability jeopardizes the resilience and sustainability of urban developments, as the specter of future catastrophes is eclipsed by the quest for quick gains (Ton and Truong 2011).

Land banking is a usual business (Nigeria Property Center 2024). Given the expectation of continued population growth and economic development in Lagos, some landowners hold vacant plots in anticipation of future price appreciation. Investing in land is a lucrative business, even greater than real estate construction. This practice of speculative land holdings contributes to the shortage of available land for immediate development and further escalates land values. Compared to housing maintenance, the cost of

maintaining land is relatively low, and property taxation is insignificant. Investors have multiple options to realize their returns, such as selling a portion of the land to a developer and using the funds to develop the remaining land liquidating all or part of the land to a developer, and also co-developing the land with a developer, realizing the land value, and sharing the profits.

- *Inadequate urban planning and land management:* Inefficient urban planning and land management practices in Lagos have led to haphazard development, informal settlements, and inefficient land use. The complicated and cost-prohibitive planning permit and building approval process plays a significant role, leading residents to evade the process and resulting in the proliferation of informality and unsafe buildings (World Bank 2023). Furthermore, the inherent drive for a return on investment often relegates hazard risks to the periphery of planning concerns. Lagos is the smallest state in the country geographically, with an area of only 3,345 square kilometers. However, it's also the most populated, which adds to the area's high demand and cost of real estate. Economic imperatives dominate, with factors such as location desirability, market demand, and cost minimization taking precedence over the integration of risk mitigation strategies into development plans. This prioritization, while understandable from a business perspective, can lead to a perilous underestimation of disaster risks, leaving the built environment and its inhabitants exposed to the caprices of climate change (Ton and Truong 2011).
- *Compliance and enforcement of the existing zoning regulations:* A marked regulatory weakness is evident; the city's zoning laws, ostensibly designed to restrict development in vulnerable areas, are often rendered ineffective by a culture of circumvention and insufficient enforcement. In terms of the effectiveness of plans, many plans are not followed as most development takes place informally and plans lack regulatory instruments to enforce compliance. This laxity in regulation emboldens development in locales that are well-recognized for their susceptibility to climate-induced disasters (Givental 2014). The challenges in Lagos reflect a broader issue faced by many rapidly urbanizing cities in the Global South, where regulatory enforcement struggles to keep pace with the speed of development (Goytia et al. 2022).
- *Accessibility and transportation infrastructure:* Investments in transport have not kept up with the extension of urban areas and population growth. Public transport is limited outside the urban core, while the poor intra-city road and rail systems are in poor condition, which increases land values in well-serviced areas, compensating differentials in accessibility with a high premium in land values. Transport investments are planned and underway, but delays have occurred due to funding issues.<sup>5</sup>

## **Land and real estate markets and risk pricing**

Urban growth in Lagos initially followed the natural choices of flood-free lands. However, the scarcity of flood-free land compared to the demand for development has led many private land developers to fill rivers, canals, and water bodies for housing and industries (Givental 2014).

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<sup>5</sup> Lagos State Transport Sector Reform Law 2018.

This has resulted in the obstruction of water flow, reduction in floodplain areas, and increased flood risks, transferring the costs of fluvial flooding to public authorities and users.

In Lagos, flood risk and sea level rise pose significant threats to land markets, but these risks are often not effectively capitalized or priced into the land values. In the hedonic pricing model analysis of the Lagos real estate market (Iliyasu et al. 2023), certain attributes, such as sea views, command a premium, indicating that environmental amenities significantly influence property valuations. Beachfront residential real estate sells at a 5.2 percent premium for every kilometer closer to the coastline. In fact, these neighborhoods remain highly exposed to the risk of flooding due to their coastal locations. This fact confirms that aesthetic and locational factors are crucial in shaping the market (Mok et al. 1995). The premium placed on these properties reflects the desirability of amenities and perceived social status rather than environmental resilience (Babawale & Johnson, 2012).

Projections suggest that approximately 32 percent of Lagos City will be inundated by 2100, with significant impacts expected as early as 2050 (Iliyasu et al. 2023). The real estate market expects a 37-year window before areas become submerged, which will eventually render affected properties valueless. Residential real estate highly exposed to sea level rise sells at only a 0.5 percent discount relative to a comparable unexposed property. Conversely, low-income areas like Ikorodu, which lack such amenities and are more vulnerable physically due to inadequate infrastructure, witness lower property values. Yet, these prices do not fully encapsulate the heightened risk of flooding these areas endure.

The concept of resilience inequality is stark in Lagos, where socioeconomic status dictates the ability to navigate climate risks. Low-income individuals usually assume disproportionate environmental risks, as they are the ones most likely to purchase more affordable yet hazard-exposed lands (Abubakar, Lawanson, and Usman 2020). Landowners in Lagos's low-regulated land markets tend to offload flood-prone land at reduced costs, transferring risk to purchasers who are disproportionately from the lower-income groups. Poorer residents, face restricted mobility and limited resources to either prevent or cope with the consequences of flooding. Following flood events, there is a reported trend in low-income areas where landlords reduce rents to retain and attract tenants, suggesting an implicit, if insufficient, adjustment in risk pricing.

Contrastingly, wealthier residents possess the means to relocate temporarily and invest in protective measures for their properties, effectively mitigating at least some of their risk exposure. The government's approach to land acquisition and development may favor investments in high-income neighborhoods which may exacerbate the vulnerabilities of the poor, who are frequently displaced to more affordable but riskier areas.

### **Lagos's aspirations to be a model megacity**

Development is taking place in the context of increasing natural disasters and climate change. Recognizing the growing exposure to climate risks and non-climatic hazards, the government has developed plans and policies to tackle the challenges, but they have yet to be fully implemented. There is an urgent need to commit to development that spatially integrates and coordinates

investment actions (World Bank 2023). Several plans have been enacted, but these policies are only visionary.<sup>6</sup> For example, in 2013, the Lagos State Government (LASG) rolled out a development plan aimed at making Lagos "Africa's model megacity and global economic and financial hub that is safe, functional, and productive" by 2025 (2013). Recognizing flooding as a significant concern, the strategy outlines comprehensive interventions such as structural modifications, wetlands management, and flood warning systems (LASG 2013). However, the real-world realization of this ambitious plan appears challenged (World Bank 2020). Despite the roadmap's vision, Lagos continues to grapple with limited basic amenities and inadequate infrastructure (Abubakar et al. 2020; Shiru et al. 2020; World Bank 2023). Urban redevelopment and investments continue to be skewed towards areas traditionally occupied by the elites (Bigon 2008; Elias and Omojola 2015).

Weak urban governance and finance systems are a central part of the problem (World Bank 2023). Federal, state, and local governments perform municipal functions, but the unclear delegation of responsibilities hampers effective urban management and results in a lack of accountability. Without city or municipal governments, urban public goods and services are not adequately being delivered to meet the needs of Lagos's rapidly growing population. The lack of an urban finance system also creates challenges for the effective delivery of urban goods and services. Low revenues, highly inflexible expenditures, increasing reliance on borrowing, and budget transparency issues are major concerns (World Bank 2023).

### **Inadequate risk pricing determinants**

Several factors contribute to this inadequate pricing of environmental risks, such as a variety of socio-economic, behavioral, and geographic factors, including information asymmetries, inappropriate land use regulations, insurance market dynamics, public perceptions and biases regarding climate change, the influence of institutional actors, and the impact of social vulnerability on these markets.

- *Lack of comprehensive risk assessment:* There is a lack of robust and comprehensive risk assessments that accurately quantify the potential impacts of flooding and sea level rise on specific parcels of land in different areas of Lagos. Without reliable data and projections, it becomes challenging to incorporate these risks into land pricing effectively (World Bank 2023). Without geographic systems and data, all agents are unable to determine the best-suited locations, and no consideration is given to environmental risks in land markets.
- *Inadequate risk awareness and understanding:* The availability and dissemination of hazard risk information—or the lack thereof—significantly influence construction decisions. Many landowners, developers, and market participants may not fully comprehend or appreciate the magnitude of the flood and sea level rise risks in Lagos. This lack of awareness and understanding leads to an underestimation of the potential

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<sup>6</sup> The Lagos State Development Plan (LSDP) 2012-2025, LSDP 2022-2052 that put forward the vision and mission of the mega-city, Lagos Resilience Strategy (2020) articulates an integrated approach to addressing the shocks and stresses the city experiences or might experience, and the Climate Action Plan was also developed as a commitment to the C40 Cities Climate Leadership Group.

consequences, resulting in insufficient risk pricing. In fact, when developers and investors are not fully apprised of the potential risks due to insufficient or inaccessible information, their projects may unwittingly contribute to the amplification of the city's vulnerabilities (Givental 2014).

- *Uncertainties and information asymmetries:* There may be uncertainties and information asymmetries regarding the extent and timing of flood and sea level rise impacts, as well as the effectiveness of potential mitigation measures. Such uncertainties can make it challenging to accurately quantify and price these risks into land values. The discretion granted to public officials in the approval of planning permits introduces a level of unpredictability in the urban development sector (OECD-LILP 2022). Inadequate enforcement of land-use regulations, building codes, and environmental protection measures can contribute to the underpricing of these risks. Without robust enforcement mechanisms, developers and landowners may overlook or disregard the potential impacts of flooding and sea level rise.

In response to the acute flood risk in certain areas, such as Isheri North—which is especially vulnerable to flooding from the Ogun River—the government has issued mandates to halt physical development. These areas had previously been approved for building development, highlighting a retrospective shift in recognizing the importance of preserving wetlands and other high-risk zones from further urban encroachment (Adelekan 2013). The directive for a nationwide campaign on flood awareness by the National Emergency Management Agency underscores the urgency of enhancing public understanding of flood risks. The dissemination of information and the fostering of awareness are crucial components in cultivating a culture of compliance with zoning regulations and in promoting adaptive behaviors among residents and developers alike.

- *Lack of regulatory enforcement:* The rampant disregard for such regulations is evidenced by the prevalence of structures encroaching upon designated no-build zones, such as drainage paths and flood plains, as well as those perilously close to the coastline. The regulatory frameworks in place are designed with the understanding that strategic urban planning must incorporate climate change mitigation and adaptation measures, including safeguards against flood risk. These measures encompass regulations on the minimum distance of construction from bodies of water such as the ocean, lagoons, rivers, creeks, and drainage channels. However, the reality on the ground reflects a disconnect between policy and practice. The ineffective enforcement of these provisions not only exacerbates the susceptibility of urban areas to flood damage but also undermines the integrity of urban planning efforts designed to enhance the city's resilience to climate impacts (Adelekan 2013).
- *Insurance:* The insurance sector, which typically prices flood risks by charging higher premiums for properties in flood-prone areas, is not widespread in Lagos, and most property owners bear the costs of flood damages themselves. The 2011 floods in Lagos resulted in an estimated loss of NGN 30 billion (USD 200 million), marking the highest claims settlement in the Nigerian insurance industry's history (Popoola 2011). However, a significant portion of properties damaged or lost to the floods, predominantly owned by the middle class and the poor, were uninsured. The 2010 and 2011 floods, which

particularly affected the urban poor residing in high-risk areas, prompted substantial public expenditure by the Lagos state government on relief measures, including the establishment of relief camps.

Recently, UNDP's Insurance and Risk Finance Facility (IRFF) issued a financial vehicle for insurance and risk finance to cover Lagos State from pluvial, fluvial, and coastal flooding. The project for risk management designs a parametric flood insurance cover that could rapidly release funding to cover emergency disaster relief or rapid repair/reconstruction of critical network infrastructures, especially for the poor and vulnerable living in flood-prone areas. It is a remedial instrument, not a preventive one (UNDP 2023).

- *Inadequate investment in risk mitigation measures and resilient infrastructure:* The absence of comprehensive risk mitigation strategies, such as adequate drainage systems, coastal protection infrastructure, and resilient urban planning, can exacerbate the vulnerability of land parcels to flooding and sea level rise. This lack of mitigation measures often translates into an underestimation of the associated risks in land pricing.

### **Vulnerable population and urban planning: Lagos's development plan and the question of its efficacy**

Most of the new development initiatives prioritized economic growth but focused less on environmental concerns (Lawanson and Agunbiade 2018; Olajide and Lawanson 2021).<sup>7</sup> This trend is evident in the LASG's reliance on international funding and private sector developers, including foreign contractor firms, to drive urban (re)development projects (Olajide and Lawanson 2021).<sup>8</sup> Initiatives like the Lekki Free Trade Zone project and the Eko Atlantic City project have resulted in the displacement of native communities and low-income groups, exacerbating their vulnerabilities and flood risks (Ajibade 2017; Lawanson and Agunbiade 2018). Government interventions, such as the "Great Wall of Lagos", though intended to mitigate flooding, have displaced low-income groups further (Adelekan 2016). Climate gentrification could also become a significant concern as climate change impacts become more pronounced, referring to the potential reconfiguration of property desirability based on climate risk, which may result in even more displacement of lower-income populations as high-risk areas experience a decrease in property values (InsuResilience Solutions Fund 2021).

To address the systemic issue of unchecked development on marginal lands – areas particularly prone to environmental hazards – the Lagos State Government has employed an innovative

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<sup>7</sup> Residents of an estate known as Lekki Palm Estate in the Ajah area of Lagos State have raised the alarm over persistent flooding of their neighborhood as a result of uncontrolled development activities by real estate investors. <https://businessday.ng/real-estate/article/estate-residents-in-ajah-kick-as-development-activities-cause-flooding-in-Neighbourhood>.

<sup>8</sup> Currently there is a strong drive by international property developers to invest in Sub-Saharan Africa and these developers are often active in locating land for large-scale developments which may or may not be well located in relation to the city (DfID – Urban Infrastructure in Sub-Saharan Africa – Guide to Cities on land-based financing for urban infrastructure structure).

approach. By offering land to private estate developers at reduced costs, the government aims to deter haphazard development practices that contribute to the city's flood vulnerability. This incentive-based strategy is a soft measure intended to integrate flood risk reduction considerations into urban development (Adelekan 2013). In particular, the land swap initiatives in the Federal Capital Territory, intended as a mechanism to provide serviced land for development, have largely failed due to inadequate planning and implementation. These failures underscore the broader challenges of managing urban growth and infrastructure financing in a setting characterized by extensive informal settlements and a general resistance to structured urban development.

Increased access to formal, affordable, and climate- and disaster-proofed housing can be achieved through comprehensive planning, increased private sector participation, innovative design, housing finance, and slum upgrading programs. At present, new programs led by multilateral organizations are suggesting exploring the use of land-based financing tools and developer incentives to build affordable housing (e.g., density bonuses, conveying land at no cost, payment-in-lieu-of-taxes, mixed-income development to allow for cross-subsidization).

### **New real estate developments, climate risk and adaptation**

Government plans to redevelop Lagos into a world-class city should include climate change adaptation. However, the city faces the risk of accelerating the privatization of infrastructure and construction of elite urban enclaves. A decade ago, the city witnessed multiple real estate projects on the Lekki Peninsular and other coastal areas in Lagos facing flood risks and ocean surges. Property values in the peninsula have risen due to several developments, such as the Dangote Refinery, Lekki Deep Sea Port, and export zones, but the rapid development has brought sanitation and flooding risks. Among the most ambitious business and residential projects, it creates an 850-hectare island to house a new business center for Lagos, accommodating approximately 400,000 residents and 200,000 daily commuters (van der Spek 2009). Real estate development exacerbates disaster risks (Adelekan 2010). The rapid urbanization of this region, undertaken with limited regard for potential sea level rise and coastal flooding risks, renders its growing populace highly susceptible to related disaster threats. The intensification of ocean storm surges along the Lagos coast is attributed to the extensive dredging and sand-filling activities (Obiefuna et al. 2021).

The repercussions of flood risks in these areas have been manifold. Property owners have faced significant costs, with some in Lekki Phase II even abandoning their properties. The real estate market in Lekki has been adversely affected, leading to substantial economic losses for property owners. To reverse that, residents of Goshen Beach Estate in Lekki have levied an ocean surge protection fee of N1 million to fund protective measures for the estate. Private adaptation investments by property owners have been a way to reverse risks (Obiefuna et al. 2021).

A new coastal city aims to address the dire shortage of secure and resilient real estate. The Eko Atlantic project in Lagos, is a public-private partnership real estate approach to addressing the challenges of urban land scarcity and climate-induced risks such as rising sea levels and coastal erosion. Situated on Victoria Island, the centerpiece of Eko Atlantic is its formidable defense

structure, standing an impressive eight-and-a-half meters above sea level.<sup>9</sup> While Eko Atlantic is poised to deliver a high degree of climate resilience and urban sophistication, it also introduces the possibility of a dual land market within Lagos. Developments like this could lead to a scenario where well-equipped, resilient infrastructure is a commodity mostly reserved for the wealthy, potentially contrasting with areas that may lack such advancements. It also highlights the potential disparities in adaptive capacities between different socioeconomic segments in Lagos, with comprehensive climate-proofing becoming a premium service rather than a generalized standard.

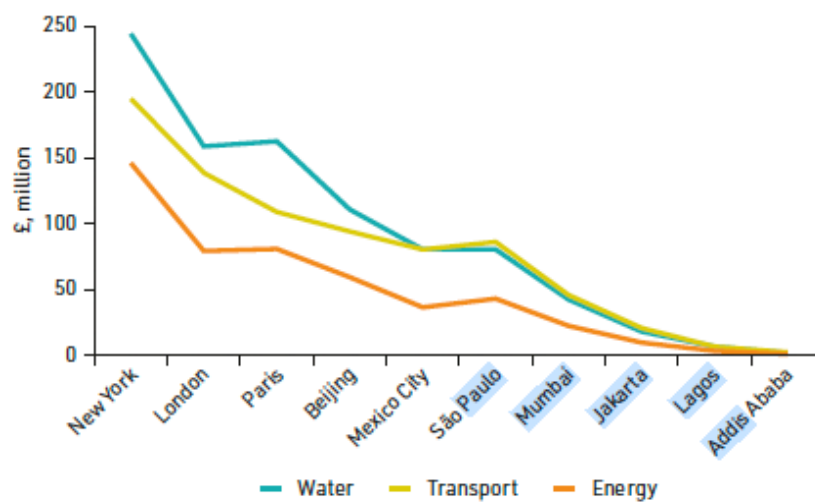
### **Constraints and drivers of change**

- *Weak urban governance and finance systems:* Local governments have constitutionally prescribed mandates and fiscal powers that are more restricted than is typically the case for municipalities in other countries. The lack of an urban or municipal finance system results in poor ability to deliver sufficient urban goods and services for Lagos's growing population. As a result, local governments are marginalized players in urban finance, and urban public goods and services are provided and financed in a largely ad hoc or residual way. The current system is insufficient to address the needs of Lagos's quality of life, resilience, and adaptation investments (World Bank 2016).
- *Revenues are insufficient to support needed capital investments:* Lagos estimates that it needs over USD 50 billion to address an investment gap. By comparison, Lagos has managed to invest less than USD 1 billion annually over the last decade (World Bank 2019). At current levels of capital spending, it will take 50 years for Lagos to address the investment gaps. Figure 4 isolates total climate adaptation spending by urban infrastructure sectors across ten large metropolitan cities (Georgeson et al. 2016), showing that Lagos is among the lowest, given the current needs. This is particularly relevant in a dynamic market where climate risks could significantly depreciate land and property values if left unmitigated.

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<sup>9</sup> Phase 1 includes a Shoreline protection and reclamation activities of over 1000 ha of land, while Phase 2 includes creating of a development platform and implementing a masterplan to enable the construction of a new mixed-use development and city (2015 –2040) (African Development Bank 2018) .

**Figure 4: Total climate adaptation spending by urban infrastructure sectors in 10 global megacities, 2014–15**



Source: World Bank, 2019, from Georgeson et al. (2016).

At the state level, own source revenues, also known as internally generated revenues (IGR), constitute approximately 70 percent of total state revenues in Lagos, Nigeria. These revenues are generated through state-administered taxes and fees. However, despite the potential for property taxes to significantly contribute to IGR, their role remains limited, accounting for only 2 percent of total IGR (World Bank 2016). This untapped potential can be attributed to an incomplete land registration system and low property tax rates (World Bank 2021). The current yield of property tax in Lagos is trivial, equivalent to US\$0.43 per capita in 2019, compared to US\$160 per capita in Johannesburg, South Africa. Additionally, poor enforcement of property tax collection exacerbates the issue.

To address these challenges, the Lagos State government is focusing on strengthening its tax administration, particularly in the area of property taxation. The state aims to update at least 50 percent of records of all properties in urban areas to expand the tax base (World Bank 2020). However, at the local level, Local Government Areas (LGAs) receive minimal federal transfers, and their local IGRs are insufficient to support sustainable urban development.

### **The land use charge**

The city's ability to finance necessary infrastructure and adaptation measures is critically linked to its capacity to generate revenue through property taxation. The Land Use Charge (LUC), a consolidated property tax system established by the Land Use Charge Law No. 11 of 2001, serves as a key fiscal tool for the state (Lagos State Government 2001).<sup>10</sup> However, low compliance rates and a narrow tax base have limited the potential of the LUC to support climate adaptation investments (World Bank 2022). The LUC consolidates various land and property-based rates and charges previously payable under separate laws, including the Lands Rates, Neighborhood Improvement Charge, and Tenement Rates Laws (Lagos State Government 2001).

<sup>10</sup> Property taxation is fairer, more progressive and efficient than other taxes (Haas 2017).

The tax liability falls on the property owner, broadly defined to include long-term lessees, occupiers receiving rent, and holders of state-granted property rights (Lagos State Government 2020). The LUC rates vary based on property type and usage, ranging from 0.01 percent for agricultural land to 0.394 percent for commercial properties and residential properties without the owner in residence (Lagos State Government 2020). This differential rate structure reflects the varied nature and income-generating potential of properties within the city.

Despite its comprehensive design, the LUC has been constrained by low compliance rates, estimated at 30 percent, and a limited tax base (World Bank 2022). This under-collection restricts the government's fiscal capacity to invest in critical infrastructure and adaptation measures, such as improved drainage systems and flood defenses (Haas 2017).

The revision of the LUC law presents an opportunity to incorporate climate risk into property valuation and taxation. By adjusting tax rates based on a property's exposure to climate risks, such as flooding, the LUC could incentivize risk-informed land use and development (McGaffin et al. 2020). This risk-based pricing approach would encourage investment in resilient infrastructure and contribute to a more sustainable urban environment.

Because public sector sources alone are inadequate to close the deficits, scholars such as Famuyiwa (2019, 2020) prescribes and provides deeper insight into the innovative use of property taxes in supporting urban infrastructure and development. The viability and success of this instrument depend to a large degree on the ability to directly link the tax to the benefits received (McGaffin et al. 2020). This is of particular relevance in Nigeria where there is no evidence found that the revenue raised from the Lagos state LUC was used to finance infrastructure (UKAid 2015). At present, the government is working on a sensitization campaign to ensure compliance with the payment of LUC bills, adding that the payment is for the infrastructural development of the state.

To harness the LUC for climate adaptation financing, Lagos State could consider the following strategic adaptations to the existing legislation and its application:

- a. Expanding the tax base: Strengthen efforts to identify and register all taxable properties, including informal settlements, to broaden the tax base and increase revenue potential. To do this, it will require improving land administration through the complete digitization of information and capacity building (World Bank 2023).
- b. Gaps in land registry and valuation practices: A critical gap in Nigeria's urban governance is the outdated, inaccurate, or incomplete land registry records in urban areas. The non-market approach to land valuation, predominantly managed at the state level, relies on proxies rather than market values. Recently, states like Lagos and Kaduna have started employing hedonic valuation methods to enhance property tax collections, but the process is hampered by unclear property rights and the dominance of certain landowners or developers, which stifles the land market.
- c. Risk-based property valuation: Incorporate climate risk assessments into property valuation processes, adjusting tax rates based on a property's vulnerability to climate hazards.

- d. Green incentives: Offer tax rebates or discounts for properties that adopt green infrastructure, such as permeable surfaces, green roofs, or rainwater harvesting systems.
- e. Earmarking revenues: Dedicate a portion of LUC revenues to a climate adaptation fund, ensuring that the proceeds are directly invested in resilience-building projects.
- f. Transparency and accountability: Enhance transparency in the collection and allocation of LUC revenues, demonstrating the link between property taxes and climate adaptation investments to improve taxpayer trust and compliance.
- g. Adaptations to the existing legislation and its application: To effectively utilize the LUC for climate adaptation financing in Lagos State, legislative updates to the LUC Law may be necessary to explicitly incorporate provisions for climate adaptation funding. These amendments would ensure that the legal framework supports the strategic redirection of resources towards climate resilience initiatives.
- h. Neighborhood improvements: The neighborhood improvement component of the LUC could also be expanded to include climate adaptation improvements, such as the development of green spaces, urban forestry initiatives, and community flood barriers. These improvements would not only enhance the city's resilience but also increase property values, leading to greater tax collection.

Given the low revenue generation, additional borrowing will be necessary to finance capital investments in Lagos State. Efforts to increase revenues are crucial to support the required capital investments (Fitch Ratings 2022).<sup>11</sup> The state's debt profile is rapidly increasing due to its ambitious plan to accelerate the completion of several infrastructure projects and enhance the state's technology capacity and food security (Fitch Ratings 2022). Land-based finance, adding to property taxation, can provide a useful fiscal space for adaptation investments, especially as business improvement districts or through levies on improvements. For example, insufficient drainage capacity contributes to urban flooding, while paved areas and buildings lacking infiltration and clogged stormwater canals exacerbate flood risk (World Bank 2022)

In the context of Lagos, a city grappling with the challenges of rapid urbanization and climate-related risks such as flooding, the effective collection of property taxes is paramount. The LUC in Lagos State, as established by the LUC Law No. 11 of 2001, serves as a comprehensive fiscal tool, assimilating all property and land-based rates and levies previously administered under separate statutes such as Land Rates, Neighborhood Improvement Charges, and Tenement Rates Laws. This unified property tax system not only streamlines the collection process but also provides a substantial revenue stream for the state.

### **Land-Based finance: Feasibility of adoption**

Several obstacles undermine effective urban planning and land management in Nigeria. These include a poor-quality cadaster, ambiguous development norms and land use regulations, lack of a comprehensive legal framework, and inadequate administrative capacity. These issues not only complicate the calculation and enforcement of charges for development approvals but also hinder

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<sup>11</sup> Lagos State is the most indebted state in the country. The state's debt profile is rising rapidly due to the city's ambitious plan to speed up completion of several infrastructure projects and to boost the state's technology capacity and food security. (Fitch Ratings 2022).

strategic land management efforts and can impede the implementation of land value capture (LVC) tools.

On the other side, LVC has significant potential for use due to the city's rapidly growing population and the prospect of channeling the increased land values resulting from public investments back to the public instead of private investors (or those benefiting from land banking). Haas (2019) explains that LVC is a powerful instrument for rapidly growing cities, and Oualalou (2012) writes that by producing immediate substantial revenues, which reduces dependence on debt, the use of LVC is well adapted to cities witnessing particularly fast urban growth. Moreover, utilizing land to generate wealth is a key benefit of LVC, and experts such as Tomori (2003) have explained that the wealth from land in Nigeria could be sufficient to develop and sustain local governments, states, and the Federal Capital Territory (FCT) if managed and administered well. Famuyiwa (2017) advocated for the use of value capture instruments and land-based financing strategies for infrastructure finance in Nigeria, observing a major policy gap in Lagos. But, the lack of clear and strategic policies on infrastructure finance is a constraint. More recently, the instrument has been analyzed for application to new transportation investments (UKAid, 2015; World Bank 2019).

However, despite the widespread belief that a portion of 'unearned increments' should be used for the public good, pragmatic and legal challenges persist (Huston and Lahbash 2018). Ibrahim and Fosudo (2017) encouraged the use of LVC in infrastructure delivery for cities like Lagos, highlighting challenges such as insufficient property market data and insecure land ownership arrangements. They point to the role and capacity of local governments to manage infrastructure as a public good as crucial to the success of LVC (Walters 2013; UKAid 2015). Additionally, establishing local government fiscal autonomy can be essential, and LVC systems can support this.

Some instruments that can be considered are:

- *Developer obligations and charges:* In the absence of a clear legal basis from national law, developer obligations in Nigeria typically involve cash contributions to mitigate the impacts of new developments on existing infrastructure. These obligations are triggered during the approval processes for projects proposing increased density or height. For instance, in Lagos and the Federal Capital Territory, submission of a building plan for approval incurs an additional 50 percent charge on the original development permit fees. Such fees aim to offset the infrastructure demands created by new developments, though they are not systematically enforced across all regions.
- *Infrastructure levies and public participation:* The application of infrastructure levies, as seen in Lagos with the Neighborhood Improvement Levy, is sporadic and limited. These levies are intended to recoup the costs of public infrastructure improvements that benefit property owners. However, the implementation faces significant resistance from landowners, further complicated by their occasional inability to pay and the overarching lack of a supportive legal and administrative framework. At the same time, wealthy residents in affected neighborhoods are using community levies for private improvements (OECD-LILP 2022).

- *Strategic land management and urban growth*: Strategic land management, which could be a tool for controlling urban growth and spatial planning, lacks legal backing at the national level. Land acquisitions for strategic purposes are confined within the acquiring jurisdiction and predominantly involve greenfield sites. The Nigerian government does not practice freezing land prices prior to public investments or rezoning, which limits the effectiveness of strategic land management. Furthermore, the government and its entities retain the right to lease acquired land to stimulate real estate development and encourage planned urban growth, aligning with public objectives like affordable housing construction and foreign direct investment attraction (OECD-LILP 2022).

The closest policy to LVC is the Lagos State 'Public Private Partnership (PPP) Law of 2011,' but it is not strategic in terms of utilizing land value uplifts attributable to infrastructure developments. PPPs can be instrumental in advancing adaptation investments. These collaborations can leverage public funding and policy support with private sector innovation and capital, creating synergistic solutions that enhance urban resilience. The Ministry of Urban Development (2017) notes that LVC encourages and facilitates the intervention of PPPs, resulting in a legal basis for introducing financial benefits from investment due to increased land values (DfID) (UKAid 2015; World Bank 2020).

Despite the legal and institutional challenges, the benefits of LVC for providing a more equitable and efficient taxation and land-based finance system to fund infrastructure can outweigh the multiple challenges that its implementations would face in Lagos.

### **Why land-based finance?**

Land-based finance (LBF) mechanisms, including LVC, present promising avenues for funding adaptation projects. LVC is a public financing method whereby governments trigger an increase in land or property value because of a regulatory decision (such as a change in development rights) or an investment in infrastructure or an amenity, like parks. The use of LVC to support climate resilience investments is a newer notion, predicated on the idea that an infrastructure investment that makes a neighborhood less prone to flooding might enhance its value compared with other areas of the city. For example, special assessment districts or tax increment financing can generate revenue by capturing the increase in land value attributed to public investments in infrastructure. LVC techniques, such as development charges or negotiated exactions, can oblige developers to contribute to community-wide resilience measures in exchange for the right to develop. Furthermore, if a new flood defense system increases nearby property values, a portion of that increase can be captured through mechanisms like development impact fees or negotiated exactions in new developments. All these approaches can mobilize substantial funds for adaptation while ensuring that the beneficiaries of enhanced resilience contribute to its costs.

There may also be other ways to structure LVC approaches so they support investments in climate resilience. In São Paulo, for example, the local authority identified a section of the city it wished to see redeveloped, and then it issued bonds (known as Certificates of Potential Additional Construction, or CEPACs) for auction to developers to allow them to build a new allowed height or density levels (Smolka 2013). There are no restrictions on how these funds are

to be utilized, meaning some or all the funds raised could be devoted to climate resilience investments.

Second, the concept of value retention through climate adaptation investments is increasingly pertinent in the higher-income segments of the market. As the city grapples with the risks posed by climate change, investments in adaptation have the potential to serve as a critical mechanism for sustaining and enhancing property values over time. Private sector developers are pivotal in this equation, possessing the potential to augment the city's adaptive capacity through sustainable construction practices and infrastructure development. To catalyze private sector engagement in adaptation measures, several strategies can be employed.

Investment in climate adaptation measures by private developers can lead to value retention in several ways. Firstly, by constructing buildings that are resistant to climate impacts, developers can ensure that the value of their properties does not diminish due to damage from extreme weather events. For example, a developer who invests in elevated structures or flood defenses can be granted a density bonus, allowing for a greater return on investment through increased developable floor area, thereby recouping the costs of adaptation measures. Furthermore, properties that incorporate adaptation measures are likely to be more attractive to buyers who are increasingly climate-conscious, thus maintaining or even increasing their market value.

Treating urban resilience as a service provided locally and funded by property owners and landowners can create a direct link between the beneficiaries of adaptation measures and their costs. This approach reframes resilience as an essential utility, akin to water or electricity, for which users are willing to pay. Depending on the type of infrastructure system in question, user fees or tariffs are often assessed as a means of supporting partial or full recovery of a system's operations and maintenance (O&M) costs. The amount of cost recovery achieved is generally a political or regulatory issue because the need for resources to cover O&M costs, or any necessary capital upgrades, must be balanced against the risk of pricing customers out. The problem of lack of funding for resilience services is particularly acute in South Asia and Sub-Saharan Africa (World Bank 2020). There is a long track record of user fees that are applied to infrastructure that has a climate link, meaning there are many implementation models from which to learn. Further, as cities advance and require other main investments, this infrastructure may be best funded through charges or betterment levies.

But there are also adaptation co-benefits, which, in this case, can be substantial. Climate adaptation investments often bring additional benefits such as improved aesthetics, enhanced public spaces, and biodiversity conservation. These co-benefits can increase the desirability and, thus, the value of properties. Instruments like betterment levies can be used to ensure that a portion of the increased property value that results from these co-benefits is channeled back into funding resilience efforts.

### **Conclusions and recommendations**

Lagos, Nigeria, a coastal megacity, faces significant flooding challenges exacerbated by climate change, rapid urbanization, and ineffective land management. The built-up land has doubled since 2000, and the deficient regulatory system and fragmented land administration have

contributed to the proliferation of structures in high-risk areas, increasing the potential for catastrophic losses. The city's vulnerability to climate-induced flooding is heightened by the fact that 70 percent of its population lives in informal settlements lacking proper drainage and waste disposal infrastructure.

The ineffective enforcement of zoning regulations, such as the minimum distance of construction from water bodies, and the prioritization of short-term economic gains over long-term resilience have exacerbated the city's vulnerability. As a result, Lagos performs poorly in all indicators of livability and services, necessitating major reforms and investments. The lack of an urban or municipal finance system hinders the ability to deliver sufficient urban goods and services for Lagos's growing population. Moreover, flood vulnerabilities in Lagos are differentiated among residents based on factors such as income. The government's approach to urban development, including the concentration of projects in high-income areas, has contributed to these vulnerabilities. This disparity gives rise to "resilience inequality," where the ability to mitigate and adapt to climate risks is largely determined by financial resources.

The study reveals that many properties in the area are overpriced, given their risk level. High-income areas command a premium despite their exposure to floods due to enhanced amenities and sea views, while properties in low-income neighborhoods fail to fully internalize the heightened risks they face. The underpricing of risk in Lagos's land markets can be attributed to several dysfunctions, as highlighted in the study. These include a lack of comprehensive risk assessments, inadequate risk awareness among stakeholders, information asymmetries between buyers and sellers, speculative behavior driven by short-term economic gains, and weak enforcement of land use regulations and building codes. The study also points to the influence of socioeconomic factors, such as the perceived value of amenities and sea views in high-income areas, which can lead to the overvaluation of properties despite their exposure to climate risks.

The city's vulnerability to climate-induced hazards, such as flooding, sea level rise, and coastal erosion, is exacerbated by factors like unchecked urban sprawl, environmental degradation, increased real estate development, the prevalence of informal settlements lacking adequate infrastructure, and lack of adaptation investments due to very limited fiscal space. Furthermore, the complex and fragmented land governance system in Lagos, characterized by a bifurcated land system, incomplete land registration processes, land speculation, and lack of land regularization exacerbates these dysfunctions.

To address the dysfunctions in Lagos's land markets and promote risk-informed decision-making, a comprehensive approach to land management and planning is necessary. This approach should begin with the development of a comprehensive land use plan that integrates climate risk assessment and adaptation strategies. By identifying high-risk areas and delineating them in the land use plan, the city can guide development towards safer locations and ensure that future growth aligns with climate resilience goals. Effective enforcement of land use regulations and building codes is crucial to discourage development in high-risk areas and ensure compliance with resilience standards. Strengthening the capacity of local authorities to monitor and enforce these regulations can help prevent the proliferation of unsafe and unsustainable developments. This can be achieved through improved coordination between relevant agencies,

the provision of adequate resources and training for enforcement personnel, and the imposition of penalties for non-compliance.

Enhancing risk information and awareness is another critical component of addressing land market dysfunctions. This can be accomplished through better data collection, analysis, and dissemination. Developing a robust land information system that incorporates climate risk data and makes it accessible to all stakeholders can enable informed decision-making by buyers, sellers, and investors. This system should include up-to-date information on flood risk, sea level rise projections, and other climate hazards, as well as data on land ownership, land use, and property transactions. Promoting transparency and disclosure of climate risk information in real estate transactions is essential for fostering risk-informed land markets. By mandating the disclosure of climate risk information in property listings, valuation reports, and other relevant documents, the city can ensure that buyers and sellers have access to accurate and reliable information about the potential long-term costs and benefits of investing in different locations. This can help correct the underpricing of climate risks and encourage the redirection of development towards safer and more sustainable areas.

The concept of risk-informed land markets becomes crucial in this context. By integrating risk assessment into land valuation and market operations, buyers and sellers can make more informed decisions that account for the long-term implications of climate change. Properties in areas with robust adaptation measures, such as flood defenses, elevated buildings, and green infrastructure, should theoretically command higher prices, reflecting their reduced vulnerability to climate hazards. Conversely, properties in high-risk areas that lack adequate protection measures may experience a decline in value, as the costs and risks associated with climate impacts become more apparent. To support the development of risk-informed land markets, the city can invest in the creation of climate risk maps and tools that help stakeholders assess the vulnerability of different locations to climate hazards. These tools can be integrated into the land information system and made available to the public through user-friendly interfaces. The city can also work with the real estate industry and professional associations to develop guidelines and standards for incorporating climate risk assessment into property valuation and market analysis. By implementing these measures, Lagos can create a more resilient and sustainable urban development trajectory and ensure that future growth is guided by a long-term vision of resilience and sustainability. This approach can also help attract investment in climate adaptation measures and green infrastructure, as the value of resilience becomes more apparent in the land market.

Improving revenue collection through taxation is crucial for generating the necessary funds to invest in climate adaptation and resilience measures in Lagos. One key avenue for reform is the LUC law, which can be updated to integrate climate risk into property valuation and taxation. By assessing the vulnerability of properties to climate hazards and adjusting tax rates accordingly, the city can create a more equitable and sustainable taxation system that reflects the true costs and benefits of owning property in different locations.

Implementing a tiered taxation system that levies higher rates on properties with higher value or in prime locations can generate additional revenue for adaptation projects. The additional

revenue generated through this tiered system can be earmarked for investments in flood defenses, green infrastructure, and other adaptation measures.

Offering tax incentives or rebates for properties that adopt green infrastructure and climate-resilient features can encourage investment in resilience measures. For example, properties that install green roofs, permeable pavements, or rainwater harvesting systems can be eligible for reduced property taxes or other financial incentives. This approach can help offset the upfront costs of implementing these measures and create a more attractive market for climate-resilient properties.

Improving transparency and accountability in the collection and allocation of LUC revenues is essential for building public trust and support for climate adaptation investments. By clearly demonstrating the link between property taxes and specific adaptation projects, the city can show taxpayers the tangible benefits of their contributions and encourage greater compliance with tax obligations. This can be achieved through regular reporting on revenue collection and expenditure, as well as through public engagement and consultation on adaptation priorities.

Strengthening enforcement and compliance mechanisms is necessary to ensure the effective collection of property taxes and prevent tax evasion. This can involve investing in modern tax administration systems, such as digital platforms for property registration and payment, as well as increasing the capacity of tax authorities to identify and penalize non-compliant property owners. By creating a more robust and efficient tax collection system, the city can maximize the revenue available for climate adaptation investments.

In addition to taxation reforms, exploring the potential of LVC instruments can provide an additional source of funding for climate adaptation projects. Development charges, betterment levies, and transfer of development rights are all examples of LVC instruments that can be used to capture the increased value of land resulting from public investments in infrastructure or changes in land use regulations. Development charges can be imposed on new developments to fund infrastructure improvements that enhance resilience, such as upgrading drainage systems or constructing flood barriers. Betterment levies can be applied to properties that directly benefit from public investments in climate adaptation measures, such as properties that see a reduction in flood risk due to the construction of a new sea wall, but also green spaces and infrastructure adding to property values. Transfer of development rights can be used to incentivize the preservation of high-risk areas, such as floodplains or coastal zones, by allowing developers to transfer their development rights to safer locations in exchange for conserving the high-risk land. In addition to these measures, Lagos can also explore the potential of land readjustment and land pooling schemes to facilitate the redevelopment of high-risk areas into more resilient and sustainable neighborhoods. These schemes involve the consolidation of land parcels and the redistribution of costs and benefits among participating landowners, enabling the implementation of comprehensive adaptation measures at a neighborhood scale.

Establishing a dedicated climate adaptation fund, financed through a combination of property taxes, LVC instruments, and innovative financing mechanisms such as green bonds, resilience bonds, and impact investment funds, can provide a stable and predictable source of funding for adaptation projects. This fund can be used to support a range of initiatives, from large-scale

infrastructure projects to community-based resilience programs, ensuring that the benefits of adaptation are distributed equitably across the city.

Finally, promoting the concept of resilience as a marketable amenity can create additional incentives for private sector investment in climate-proofing measures. By recognizing the value that climate-resilient features can add to properties, developers can be encouraged to incorporate these features into their projects through a combination of regulatory incentives, such as expedited permitting processes or density bonuses, and market-based mechanisms, such as green building certifications or resilience ratings. This approach can help create a more robust and competitive market for climate-resilient properties while also contributing to the overall resilience of the city.

PPPs can also play a key role in leveraging private sector investment in resilience infrastructure and climate-proofing measures. By structuring PPPs in a way that shares the risks and rewards of adaptation projects, the city can attract private sector expertise and capital while ensuring that public interests are protected. The public sector can provide enabling policies and regulations, such as guaranteed revenue streams or tax incentives, while the private sector can contribute technical know-how and financial resources.

In sum, the creation of robust and effective institutions at the local level is often a lengthy and complex process. However, this challenging journey is precisely what leads to the emergence of institutions that are not only more stable but also tailored to the specific needs and context of the local community. The cities that stand out today as exemplars of livability, economic vibrancy, and environmental sustainability are those that have undergone these institution-building processes over the course of the years, gradually refining and adapting their structures. Lagos, with its rapidly growing population and increasing exposure to climate risks, must embark on this transformative journey to build the necessary institutions and governance frameworks that can support a resilient, sustainable, and inclusive future. By leveraging the recommendations outlined in this study across land management, taxation, and land-based finance while prioritizing accurate risk pricing in land markets, Lagos can accelerate its progress toward becoming a model city for climate adaptation and sustainable urban development in the face of unprecedented challenges posed by climate change and rapid urbanization.

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