ABSTRACT

Title of Thesis: EKO RESILIENCE – (RE)DESIGNING RESIDENTIAL COMMUNITIES THAT ARE RESILIENT FOR THE URBAN POOR IN LAGOS, THE COASTAL CITY.

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This thesis addresses the urgent need for resilient community housing solutions in Lagos, where there is a growing deficit of well-designed, affordable, and accessible homes, particularly for the low-income population. The research recognizes the challenges of urban decay, transportation issues, and flooding, disproportionately affecting the poor. In Lagos, the complex interdependence of rich and poor social networks is evident, with low-income individuals often residing in slums near high-income neighborhoods or facing long commutes. The thesis aims to go beyond providing shelter and explores how affordable housing can contribute to overall urban resilience. Emphasizing four critical criteria, the research aims to show how affordable housing can support social and economic structures, reduce vulnerability

to environmental risks, enhance personal security, and empower communities for self-governance. The thesis adopts a comprehensive approach, considering the broader social, economic, ecological, and political dynamics in the quest for resilient housing solutions.

EKO RESILIENCE

(RE)DESIGNING RESIDENTIAL COMMUNITIES THAT ARE RESILIENT FOR THE URBAN POOR IN LAGOS, THE COASTAL CITY.

by

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Chapter 1: Introduction

In the heavily populated metropolis of Lagos, Nigeria, the urban landscape portrays historical legacies, rapid urbanization, and formidable challenges faced by its diverse and culturally rich population. Shaped by its colonial past, Lagos bears enduring marks on both its social fabric and urban structure, wrestling with the intricate challenges of urban decay, congested transportation networks, and the ever-present peril of flooding. These issues notably weigh heaviest on the shoulders of the city's most marginalized residents – the urban poor. Situated along the coast, Lagos confronts distinctive challenges exacerbated by the imminent impact of climate change. Escalating sea levels and intensified weather phenomena present existential hazards, with the urban poor disproportionately affected by these adversities. Within this context, the "Eko Resilience" initiative emerges as a guiding light of hope and innovation, striving to reimagine residential communities that stand not only as robust structures but, significantly, as resilient entities equipped to face the diverse challenges that confront the urban poor.

Thesis Objectives and Scope

Eko Resilience" thesis, grounded in the principles of the United Nations Sustainable Development Goals (SDGs), seeks to address this pressing issue. With a focus on housing (Goal 11), clean water (Goal 6), and the broader context of poverty eradication and sustainable cities (Goal 1 and Goal 11), the research aims to provide actionable insights into resilient strategies and design principles. By analyzing current conditions and proposing interventions, the thesis endeavors to bridge the gap

between building-scale solutions and city-wide policies. Recognizing that the urban poor are not merely recipients of aid but vital contributors to Lagos' economic vitality, the thesis asserts that their well-being is intrinsically tied to the overall resilience of the city. The stresses imposed on the urban poor, encompassing environmental, social, physical, and psychological dimensions, demand holistic and sustainable responses.

Chapter 2: History of Lagos and the Problem

Background of Lagos State and the Coastal City Eko

This thesis aims to analyze the city of Lagos in the context of affordable housing, which is referred to as a residential community for the urban poor and how it should be approached in Lagos to achieve city resilience. Lagos State was the capital of Nigeria till 1992, and it is the most populated city in Nigeria and south of the Sahara, with a current estimated population of 21 million and a diverse economy, making it the leading contributor to Nigeria's GDP. Lagos State, Nigeria, encompasses several key cities distributed across its administrative divisions. Lagos is the smallest state in Nigeria with a size of about 3,345 square kilometers. Yet, it happens to be the most densely populated state in the whole country. The central and most populous city is the City of Lagos (Eko), often referred to as Lagos, serving as the economic and cultural hub with districts like Victoria Island and Ikoyi known for affluence and commercial activities.

The capital, Ikeja, focuses on administrative functions and hosts government offices, institutions, and the Murtala Muhammed International Airport. To the west lies Badagry, a city of historical significance due to its role in the slave trade and featuring cultural landmarks. Ikorodu, situated to the northeast, is a blend of residential and industrial areas known for its market and educational institutions. To the east is Epe, recognized for fishing, agriculture, and natural attractions, contributing to its status as a significant economic center. These cities collectively form the diverse and dynamic landscape of Lagos State, each playing a unique role in the state's socioeconomic activities. However, the then Western Region Government

administered Ikeja, Agege, Mushin, Ikorodu, Epe, Surulere, and Badagry.[1] Lagos, the city, and these other towns were captured to create the state of Lagos, with the state becoming fully recognized as a semi-autonomous administrative division on 11 April 1968. Lagos served the dual role of State and Federal Capital until 1976 when the state's capital was moved to Ikeja.[2]

Although Lagos (State) is divided into these cities previously mentioned, its significant divisions are usually referred to as the Mainland and the Island. While the Lagos Metropolitan area covers solely 37% of the land area of Lagos State, it is home to over 85% of the population. Geographically, Lagos State is dominated by bodies of water, with nearly a quarter of the state's area being bodies of water.[3] The largest bodies are the Lagos and Lekki lagoons in the state's interior, with the Ogun and Osun rivers flowing into them. Many other rivers and creeks flow throughout the state and serve as vital means of transportation for people and goods. This Thesis will focus mainly on the island areas of Lagos state, such as Lagos Island, Lekki, and Epe.

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[1] "National Bureau of Statistics: State Information," *Internet Archive: Wayback Machine*, n.d., accessed November 13, 2023, https://web.archive.org/web/20151109140122/http://nigerianstat.gov.ng/information/details/Lagos.
[2] "National Bureau of Statistics: State Information," *Internet Archive: Wayback Machine*, n.d., accessed November 13, 2023, https://web.archive.org/web/20151109140122/http://nigerianstat.gov.ng/information/details/Lagos.
[3] "Lagos," *Nigeria Education*, n.d., accessed November 13, 2023, https://web.archive.org/web/20200505120216/http://nigeria-education.org/states/lagos.

Select Cities in Lagos State

Lagos City (Eko)

Lagos, often referred to as the "City of Excellence," stands as Africa's second-most populous urban center, trailing only Cairo, and ranks as the seventh fastest-growing city on a global scale. This bustling metropolis is Nigeria's economic epicenter, boasting a remarkable concentration of industries, financial institutions, and vital seaports.[4] However, the rapid pace of urbanization in Lagos has given rise to a population boom that far outpaces the development of essential socio-economic infrastructure, particularly in the housing realm, necessary for sustainable growth.

Lagos, Nigeria, is renowned for its distinctive topography, shaped by a complex network of islands, sandbars, and lagoons. Historically, the city extended across four primary islands: Lagos, Iddo (now part of the mainland), Ikoyi (now connected to Lagos Island), and Victoria (now situated at the tip of the Lekki Peninsula). However, continuous land reclamation efforts have altered the nature of some of these islands, rendering them no longer valid islands. The historical core, Lagos Island, witnessed developments like the Government House, colonial buildings, and infrastructure projects. Segregation was not officially enforced, making Lagos unique compared to other port cities in the late 19th and 20th centuries.[5]

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[4] T. Editors of Encyclopaedia, "Lagos," *Britannica*, October 23, 2023, Britannica, T. Editors of Encyclopaedia. "Lagos." Encyclopedia Britannica, October 23, 2023. https://www.britannica.com/place/Lagos-Nigeria.

[5] "Colonial Footprints: Lagos, Then and Now," *Google Arts & Culture*, accessed December 14, 2023, https://artsandculture.google.com/story/colonial-footprints-lagos-then-and-now/LAUBxuvCARsA8A.

The city is intricately connected by a series of bridges, linking its various islands and connecting them to the mainland. Notably, the entire region is characterized by its low-lying terrain, with the highest point on Lagos Island reaching 22 feet (7 meters) above sea level.[6] This makes it prone to intense flooding events. Intriguingly, the original settlement at the northwestern tip of Lagos Island has evolved into a densely populated slum area marked by narrow streets, substandard housing, and severe overcrowding. In stark contrast, the city's primary business district graces the southwestern shore of Lagos Island, adorned with a growing number of skyscrapers. This bustling core is the epicenter of commerce, finance, administration, and education. Lagos also hosts a diverse range of manufacturing industries, encompassing the production of electronics, automobile assembly, food processing, metalworks, paints, and soap manufacturing. The textile, cosmetic, and pharmaceutical sectors also play pivotal roles in the city's economic landscape, alongside a thriving fishing industry.

[6] Ibid.

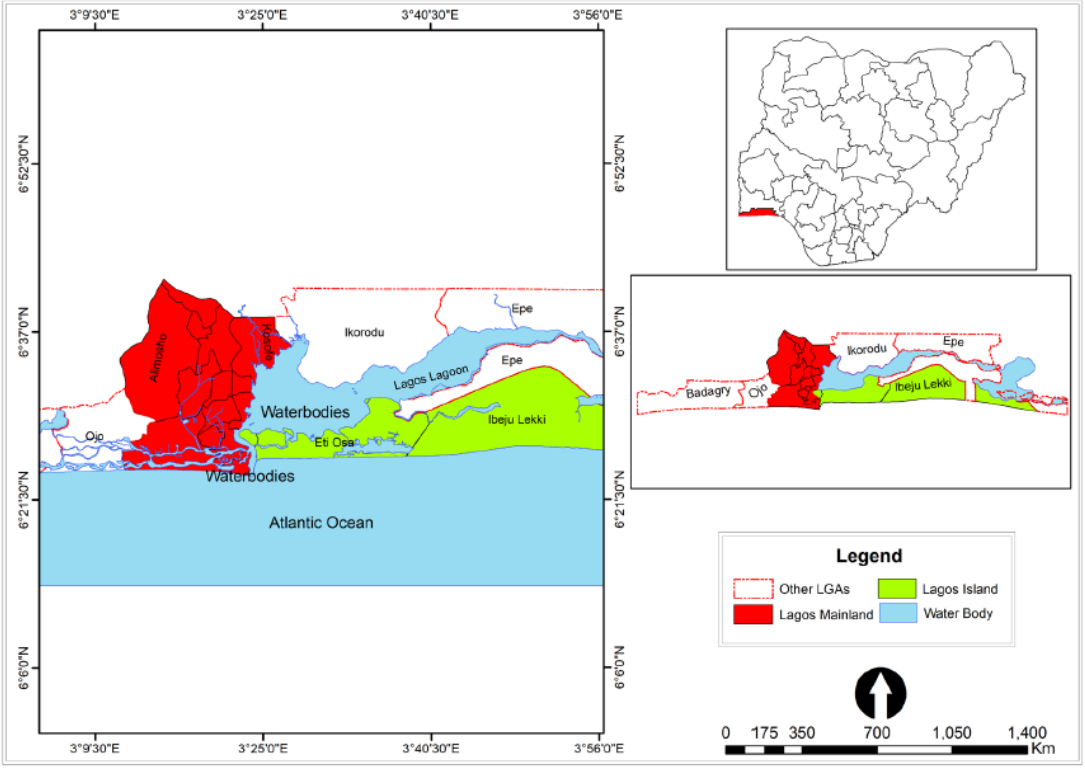

Figure 1: Map of Lagos showing major divisions and Local Government Areas[7]

Lekki

Lekki, situated in Lagos State, Nigeria, is positioned south-east of Lagos city. Characterized by its natural formation as a peninsula, Lekki borders the west of Victoria Island and Ikoyi districts of Lagos, with the Atlantic Ocean to the south, Lagos Lagoon to the north, and Lekki Lagoon to the east. The city's southeast extends to the western edge of Refuge Island, connecting with the eastern part of Ibeju-Lekki LGA. Although still predominantly under construction as of 2015, with only Phase 1 completed and Phase 2 nearing its conclusion, Lekki spans approximately 70 to 80

[7] Femi Aiyegbajeje, "DETERMINANTS OF TRAVEL BEHAVIOR IN TAXI TRANSPORT SYSTEM IN THE LAGOS METROPOLIS OF NIGERIA Determinanty Zachowań Komunikacyjnych Pasażerów Na Rynku Korporacji Taksówkowych w Aglomeracji Lagos w Nigerii" 22 (March 29, 2019): 13–21.

km long and boasts an average width of 10 km. Currently, home to gated residential developments, agricultural farmlands, and designated areas for a Free Trade Zone, Lekki is undergoing ambitious expansion plans, including constructing an airport and seaport. The proposed land-use master plan envisions Lekki as a "Blue-Green Environment City," anticipating a residential population of over 3.4 million and a non-residential population exceeding 1.9 million.[8] According to the proposed land-use plan, Lekki New City is slated to undergo development in a structured manner, organized into five distinct linear development zones, excluding the Lekki Free Trade Zone.

The Lekki Free Trade Zone (Lekki FTZ), situated at the eastern part of Lekki, is a significant economic undertaking covering approximately 155 square kilometres. The first phase of this expansive free zone spans 30 square kilometres, with 27 square kilometres designated for urban construction, accommodating an envisaged resident population of 120,000.[9] According to the Master Plan, the Lekki FTZ is slated to transform into a modern city within a city, integrating industries, commerce, business, real estate development, warehousing and logistics, as well as tourism and entertainment. The entire Lekki area being studied shows that the government has carried out future development plans for this area. However, informal settlements next to these beautiful residential estates reveal that the Lagos government does not have these low-income masses in mind when planning or is not doing a great job providing for them.

[8] "Lekki Master Plan," *Internet Archive: Wayback Machine*, n.d., https://web.archive.org/web/20151018091652/http://www.lagosstate.gov.ng/pagelinks.php?p=19.
[9] "Plans of Lekki Trade Zone (Lekki FTZ)" (China-Africa Lekki Investment Ltd, n.d.).

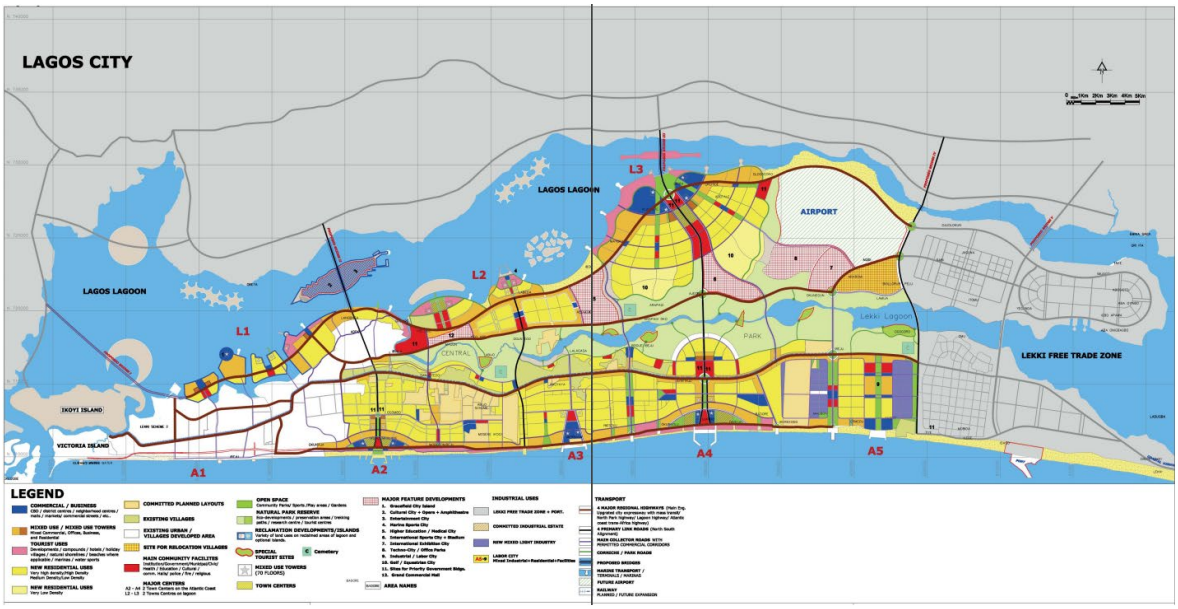

Figure 2: Lagos City Zoning map[10]

Urbanization Trends and Challenges

When managed carefully, urbanization could reduce hardship and human suffering; however, it could also increase poverty and squalor.[11] According to World Bank, the Urban population in Nigeria in 2012 was reported to be 45% and grew to 53% in 2022.[12] Lagos, Nigeria, is a testament to urbanization's dynamic and transformative force, emerging as one of the fastest-growing megacities globally. With a population exceeding ten million, Lagos has become the nation's economic heartbeat, contributing 26.7% to Nigeria's total GDP and over 50% to the non-oil GDP.[13]

[10] "LFZ Master Plan – Lekki Free Zone Development Company (LFZDC)," n.d., accessed December 13, 2023, https://lfzdc.org/lfz-master-plan/.
[11] Alhaji A. Aliyu and Lawal Amadu, "Urbanization, Cities, and Health: The Challenges to Nigeria - A Review.," *Annals of African medicine* 16, no. 4 (December 2017): 149–158.
[12] "Nigeria-Urban Population," *Trade Economics*, n.d.
[13] LAGOS BUREAU OF STATISTICS MINISTRY OF ECONOMIC PLANNING AND BUDGET, ALAUSA, IKEJA, *LAGOS STATE GROSS DOMESTIC PRODUCT (GDP) SURVEY: 2010*, n.d.,

Urbanization in Lagos has brought about many challenges, particularly in insufficient housing for the urban poor and the proliferation of informal settlements. As the city undergoes rapid population growth, there is a pressing issue of inadequate and unaffordable housing options. The urban poor often find themselves marginalized, struggling to secure decent living spaces within the city's constraints. This scarcity has led to informal settlements and slums characterized by substandard living conditions, limited access to essential services, and a lack of proper infrastructure. Although representing a survival strategy for some, these areas contribute to a cycle of poverty and exacerbate social inequalities, highlighting the urgent need for comprehensive housing policies and initiatives to address the housing deficit in Lagos.

Furthermore, the increase in informal settlements poses challenges for the residents and amplifies broader urban problems. Infrastructure strain becomes apparent as these areas lack proper sanitation, waste management, and essential utilities, impacting inhabitants' overall quality of life. The lack of effective urban planning in response to rapid urbanization has resulted in traffic congestion, environmental degradation, and strained public services. As Lagos grapples with these multifaceted challenges, it becomes crucial for the city's authorities to adopt sustainable urban development strategies, focusing on inclusive housing solutions, infrastructure improvement, and policies that uplift the urban poor, ensuring a more equitable and resilient urban landscape.

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chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://mepb.lagosstate.gov.ng/wp-content/uploads/sites/29/2017/01/GDP-2010-REPORT.pdf.

In addition to the housing crisis, its transportation sector is heavily affected as 40 percent of Nigeria's cars are registered in the metropolis. Commuters endure a daily three-hour traffic ordeal, resulting in a high fatal accident rate (28 per 100,000 people) and air pollution exceeding recommended limits by over five times.[14] Despite the Lagos Metropolitan Area Transport Authority's (LAMATA) efforts, challenges persist, notably with overcrowded minibuses. Commercial motorcycles are also one of the cheapest ways people get around neighborhoods to address this, Lagos initiated a comprehensive Transport Master Plan, including successfully introducing the bus rapid transit (BRT) system and the Lagos Rail Mass Transit (LRMT). The LRMT, operational since 2016, carries seven times more passengers than the BRT. The broader plan integrates road, rail, and waterway networks, dedicated bus lanes, a new airport, and mixed-use urban developments to reduce travel demands and enhance sustainable commuting options.[15]

[14] "Traffic Congestion in Lagos," *Internet Geography*, accessed December 13, 2023, https://www.internetgeography.net/topics/traffic-congestion-in-lagos/.
[15] Ibid.

Chapter 3: The Plight of the Urban Poor

Understanding the Urban Poor

Urban poverty may be defined as the situation where people who live below a certain amount of income in the city have limited access to some social means.[16] Okosun et. al, ana expert in environmental and development studies, argues that there is no objective definition of poverty or way of measuring how many people are poor.[17] The prevailing working definition for international poverty comparisons centers on a poverty line established at per capita expenditures of US $1 per person per day, adjusted to account for variations in purchasing power (World Bank, 1990).[18] Onibokun et al. (1995) view urban poverty as the experience of residing in sub-standard and sub-human environments marked by slums, squalor, and a severe lack of essential social amenities, including health facilities, schools, and recreational opportunities.[19] Galbraith (1968) identifies poverty as a condition characterized by limited access to sufficient food and clothing, people living in overcrowded, cold, and unsanitary shelters, and individuals enduring painful and relatively short lives.[20] Aluko (1975) presents a more simplistic and materialistic concept of poverty,

[16] Emrah Ozturk, *The Political Economy of Urban Transformation: Ecumenopolis: City Without Limits – An Analysis of the Documentary*, 2020, https://books.google.com/books?id=A2Z2EAAAQBAJ&pg=PA322&lpg=PA322&dq=10.4018/978-1-7998-3270-6.ch018&source=bl&ots=1zxLIkMpp1&sig=ACfU3U3nV7N9v2td4HOFSudMZhjKOah8Uw&hl=en&sa=X&ved=2ahUKEwiN3d6GocWCAxUNEVkFHaYCBVMQ6AF6BAghEAM#v=onepage&q=10.4018%2F978-1-7998-3270-6.ch018&f=false.

[17] Ignatius Okosun et al., "Urban Poverty in Nigeria and Approaches to Poverty Alleviation: A Review," *African Journal of Political Science and International Relations* 6 (February 1, 2012): 8–14.

[18] Ehtisham Ahmad, Robert L. Ayres, and Gary Fields, "World Development Report" (World Bank Group, June 1, 1990), http://documents.worldbank.org/curated/en/424631468163162670/World-development-report-1990-poverty.

[19] A Onibokun et al, "Urban and Housing in Nigeria" (Nigerian Institute of Social and Economic Research., 1996).

[20] J Galbraith, "The Affluent Society" (My italics. New York, 1968).

defining it as an inadequate level of consumption leading to insufficient provisions of food, clothing, and/or shelter.[21] It is widely agreed that poverty is a relative term, and as such, its meaning and measurement parameters inevitably vary across different locations. In Lagos, the presence of the urban poor is evident in the appearance of informal settlements.

In 2021, United Nations World Urbanization Prospects reported that Lagos City has the largest slum settlement in Nigeria, with about 66% of Lagosians living in slums.[22] These settlements are illegal and unplanned in parts of the city where health services and other social services, such as schools and shopping centers, are inaccessible. The settlements do not officially exist and are liable to eviction and demolition. Such demolition exercises have taken place in different areas across Lagos and have often rendered hundreds of thousands of this demographic homeless. Well, not precisely, because they have a pattern of locating other areas to erect informal structures, and the cycle continues.

Economic Struggles and Socio-Economic Characteristics

The struggle for economic stability lies at the heart of the urban poor's plight. Limited access to formal employment and the rising cost of living exacerbates financial hardships. This economic strain not only hinders personal growth but also extends cycles of poverty within these communities. Compounded by Africa's high dependency ratio and households characterized by an extensive network of family

[21] S Aluko, "Poverty and Its Remedies" (Presented at the Annual Conference of the Nigerian Economic Society, 1975).
[22] United Nations Population Division, "World Urbanization Prospects: The 2011 Revision," 2012, https://www.emerald.com/insight/content/doi/10.1108/REPS-06-2022-0040/full/pdf?title=a-tripartite-approach-to-social-inclusion-in-selected-slums-in-lagos-state-nigeria.

members, slum households in Lagos are notably large, often including numerous extended relatives.[23] The heads of these households face formidable challenges as they strive to provide for their families.

Unfortunately, urban development initiatives often exacerbate the marginalization of specific neighborhoods, as is evident in the Makoko slum near Lagos Island[24] While most Lagos Island residents belong to the middle and higher socio-economic classes, the inhabitants of Makoko slum face extreme poverty and deplorable living conditions. In squatter and informal settlements in Lagos, the urban poor engage in many informal employment activities, including street vending, handicrafts, domestic work, petty trading, transport services, recycling, artisanal services, and food services.[25] These endeavors collectively contribute to an average income of approximately one dollar a day for these residents, highlighting the challenging economic circumstances and the resilience of individuals who navigate the informal economy to sustain their livelihoods.

To further understand the socioeconomic characteristics of this population, a review was made of a 2022 study.[26] This study analyzed select informal settlements in Lagos state, namely Makoko, Iwaya, and Ilaje. The findings showed that Makoko had a higher participation rate of males, while Iwaya and Ilaje had a predominance of female respondents. The age distribution revealed that Makoko participants were

[23] "World Bank Open Data," *World Bank Open Data*, accessed December 13, 2023, https://data.worldbank.org.
[24] R.F. Simon, A.K. Adegoke, and Bukola Adewale, "Slum Settlement Regeneration in Lagos Mega-City: An Overview of a Waterfront Makoko Community," *Int. J. Educ. Res.* 1 (January 1, 2013): 1–16.
[25] Olaoluwa Pheabian Akinwale, "Urban Health in Lagos' Slums: Ensuring Healthy Living Conditions," *Urbanet*, last modified October 25, 2018, accessed December 13, 2023, https://www.urbanet.info/nigeria-lagos-slums-urban-health/.
[26] Oluwaseyi Omowunmi Popogbe, Simeon Oludiran Akinleye, and David Mautin Oke, "A Tripartite Approach to Social Inclusion in Selected Slums in Lagos State, Nigeria," *Review of Economics and Political Science* 8, no. 1 (October 2022): 2–18.

predominantly aged 25 and below and 26–35. Iwaya and Ilaje had a higher representation of middle-aged respondents falling within the 26–35 and 36–45 age brackets. Marriage status varied across locations, with most respondents being married. Household size patterns indicated that a significant proportion had 5–7 members, particularly in Makoko, while others had smaller households of four members and below. Notably, smaller households often comprise newly married couples or groups of siblings, with the eldest assuming familial responsibilities.[27]

Education levels reflected a predominant trend of below formal education for most respondents, aligning with the broader literature on slum dwellers.[28] In Iwaya and Ilaje, a few had tertiary education, but none in Makoko. Occupational diversity was observed, with fishing prominent in Makoko and petty trading prevalent in Iwaya and Ilaje. Artisanal professions such as plumbing, carpentry, painting, and welding was common across locations. Residents reported long durations of residence in the slums, particularly in Makoko and Iwaya, where a majority claimed 11–15 years of residency. Notably, most participants across all locations had lived in the slums for over 5 years, with those reporting shorter durations having previously resided in similar slum conditions. Daily income analysis revealed a majority earning N1000 ($2) and below in Makoko and Ilaje, while Iwaya had a majority earning between N1001 and N2000 ($2–$4) daily. Few respondents earned above N5000 ($10) daily in all locations, highlighting that most earned below the national minimum wage of N30000 ($60) monthly.

[27] Oluwaseyi Omowunmi Popogbe, Simeon Oludiran Akinleye, and David Mautin Oke, "A Tripartite Approach to Social Inclusion in Selected Slums in Lagos State, Nigeria," *Review of Economics and Political Science* 8, no. 1 (October 2022): 2–18.
[28] Ibid.

Settlement Pattern of the Urban Poor in Lagos

In Lagos, the urban landscape is dynamically shaped by the actions of the city's impoverished residents, who adapt the environment to meet their needs, often in conflict with official regulations. These individuals predominantly inhabit slums and makeshift settlements dispersed across the city, engaging in informal occupations, frequently running small, self-owned businesses. Notably, a discernible pattern emerges in Lagos, where each urban area is accompanied by a low-income informal settlement, creating distinct associations like Ikoyi-Obalende, Yaba-Makoko, Maroko, and Lekki. This settlement pattern has stratified the metropolis into neighborhoods characterized by varying housing and income levels, ranging from low-income/high-density areas to medium income/medium density and high income/low density zones.

The housing scenario in Lagos is marked by pervasive inadequacy, with a substantial portion of the population lacking decent homes. Even those with residences often contend with substandard living conditions. The magnitude of the housing problem is substantial, impacting numerous families across the city. Unfortunately, a significant proportion of the populace resides in poor-quality houses, contributing to the surge in the number of slums from 42 in 1985 to over 100 by January 2010.[29] This alarming

[29] Olugbenga Enisan and Adekemi Ogundiran, "Challenges of Housing Delivery in Metropolitan Lagos," *Research on Humanities and Social Sciences* 3, no. 20 (2013): 1–8.

increase highlights a shortage of homes and underscores the prevalence of inadequate housing, collectively intensifying the complexity of the housing situation in Lagos. [30]

[30] Olugbenga Enisan and Adekemi Ogundiran, "Challenges of Housing Delivery in Metropolitan Lagos," *Research on Humanities and Social Sciences* 3, no. 20 (2013): 1–8.

Chapter 4: Housing for the Urban Poor

Understanding the housing situation is paramount, considering the backdrop pf Lagos' urbanization trends, rapid population growth, and the prevailing deficit in well-designed, affordable housing options, particularly for low-income residents. Navigating through the nuances of this housing landscape helps to unravel the layers of complexity, encompassing accessibility, affordability, and the broader socio-economic and environmental factors that contribute to the urban poor's housing predicament.

Overview of Housing Situation for the Urban Poor

Housing is globally recognized as a fundamental human right vital to the well-being of individuals, families, and communities.[31] However, Nigeria's low-income households struggle to find sufficient shelter that does not render them bankrupt. Housing plays a crucial role in the well-being of a nation's economy.[32] Currently, the number of slums in the city is estimated at 100, housing almost 70 percent of Lagos' population. Most slum communities are located in the oldest settled areas of mainland Lagos, especially in marshy areas and near the lagoons. Anderson et al., in a 2003 study, stressed that when low-income households lack access to suitable, affordable housing, they redirect other resources required for food, medical or dental services,

[31] Select Committee on Housing Affordability in Australia, "A Good House Is Hard to Find: Housing Affordability in Australia," 2008, https://www.aph.gov.au/~/media/wopapub/senate/committee/hsaf_ctte/report/report_pdf.ashx.
[32] Inita Henilane, "Housing Concept and Analysis of Housing Classification," *Baltic Journal of Real Estate Economics and Construction Management* 4, no. 1 (2016): 168–179.

and other necessities to housing costs.[33] Many households in Lagos allocate over 30% to 50% of their spending to housing.[34] This high expenditure ratio implies that even minor increases in housing prices significantly impact non-residential consumption, affecting essentials like food, recreation, learning, family maintenance, and well-being.

Nigeria exhibits a low housing ownership rate of 25%, trailing behind Indonesia (84%), Kenya (73%), and South Africa (56%), resulting in a housing deficit of five million in Lagos alone.[35] Currently, over 91% of Lagos's population resides in the city, facing a population density of approximately 20,000 people per square kilometer. The majority (72.5%) live in one-room apartments with an occupancy ratio of 8-10 individuals per room, exposing them to adverse impacts such as psychological distress, poor living conditions, and housing insecurity-related challenges (Lagos State Ministry of Housing, 2010). Efforts by governments and private initiatives to provide affordable housing have shown limited impact, particularly for low-income masses, contributing to the formation of slums in cities.[36] Despite attempts, the housing needs of low-income earners, especially non-public workers, remain largely unmet.

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[33] Laurie Anderson, Joseph Charles, and M Fullilove, "Providing Affordable Family Housing and Reducing Residential Segregation by Income," *American Journal of Preventive Medicine* 24, no. 3 (April 2023): 47–67.

[34] J Abimaje and D Akingbohungbe, "Housing Affordability in Nigerian Towns: A Case of Idah, Nigeria," . *International Journal of Civil Engineering, Construction and Estate Management* 1, no. 2 (2014): 31–38.

[35] Chuka Uroko, "Nigeria Lags Peers in Home Ownership Rate at 25% for 200m Population – Businessday NG," October 10, 2019, accessed December 13, 2023, https://businessday.ng/real-estate/article/nigeria-lags-peers-in-home-ownership-rate-at-25-for-200m-population/.

[36] O. B. Adegun, A. Joseph, and A. M. Adebusuyi, "Housing Affordability among Low-Income Earners in Akure, Nigeria," *IOP Conference Series: Materials Science and Engineering* 640, no. 1 (November 2019): 012009.

In Lagos Island, particularly around high-end areas like Ikoyi, Victoria Island, and parts of Lekki, exorbitant housing rents have led to informal settlements, such as Aro. Despite the allure of beautiful luxurious houses in these areas, over 70% of the population cannot afford the rent, resulting in a surplus of unoccupied real estate developments. The disparity in rent prices between Lekki and areas like Aro is stark. A three-bedroom apartment in Lekki may command an annual rent of ₦4,000,000, while a similar dwelling in Ogba or Ikorodu could cost less than ₦300,000. The high cost of living on the island often drives low-income workers, including cleaners, service personnel, drivers, and factory workers, to settle in proximity to their workplaces, giving rise to informal settlements. There are also bankers, architects, and other professionals who reside comfortably in the wooden ghetto.

The blog post by Gabriel Nwogu on Sep 11, 2018, further emphasizes the challenges faced by individuals like Mr. Ajibade, who relocated to Lekki for employment opportunities but found the housing costs prohibitive.[37] The author highlights how the disparity in rent prices on the island is driven not merely by demand but also by the reluctance of property owners in gated estates to lower prices, resulting in many unoccupied houses. One specific settlement, Aro, is explored in the blog. Initially a fenced piece of land, Aro has grown to accommodate over 1500 people in just three years. The blog sheds light on the struggles faced by the inhabitants of Aro, especially during a government-led demolition attempt. Despite the challenges, Aro provides a unique perspective on housing, with wooden shanties, a lack of waste disposal, and the absence of rent payments. The residents of Aro,

[37] Gabriel Nwogu, "How Lekki Rent Is Driving People to Settlements," accessed November 15, 2023, https://www.stears.co/article/how-lekki-rent-is-driving-people-to-settlements/.

primarily engaged in blue-collar jobs, contribute to the community through a security levy and NEPA money, creating a self-sufficient and resilient settlement.

The story of Aro showcases the adaptive nature of these settlements, where the residents become landlords of their makeshift homes, usually made of wood, thick nylon walls, and rusted zinc roofs. Ajibade, a resident of Aro, expresses cautious optimism about his living situation, stating that he will stay until he can afford the rent in Lekki. Due to challenges related to transportation costs and accessibility, this workforce often establishes informal settlements, such as squatter and slum communities.

Identifying Possible challenges in Housing the Urban poor.

It is possible to discover many obstacles to providing housing for the urban poor, especially in a place like Lagos.[38] As urbanization accelerates in Lagos, housing the urban poor becomes a critical concern due to the challenges that arise. This section aims to identify and analyze the significant hurdles faced in providing adequate housing for the urban poor in Lagos. Some constraints to the provision of low-income housing are access to land, access to finance (developers), access to finance (end-user), Cost of building materials/need for alternative materials, Implementation of policies/bureaucracy, Skilled labor/technology, Infrastructure, Corruption/insincerity/lack of political will, Lack of cooperation between different actors, Understanding of housing / Nigerian mindset These challenges can be grouped

[38] Tade Aina, "The Construction of Housing for the Urban Poor of Lagos," *Habitat Intl* 12, no. 1 (1988): 31–48.

into physical challenges, socio-cultural perceptions, economic barriers, and weak political and professional interests.[39]

Physical Challenges (Access to land)

Rapid urbanization, population growth, and economic development contribute to the increasing demand for land, intensifying competition and limiting accessibility. The housing market in Nigeria is constrained mainly by inadequate access to finance, the high cost of land registration and titling, the high cost of building materials, and lengthy regulatory procedures. The challenges associated with land access in Lagos's urban areas have profound implications for the built environment, leading to numerous issues such as unauthorized constructions, unrealistic housing standards, and the marginalization of low-income earners. This situation often compels individuals to seek accommodation on the outskirts, resulting in the emergence of unplanned slums and exacerbating housing shortages.[40] The Land Use Act of 1978, conceived to simplify the process of obtaining land for various uses, including housing development, has not lived up to its progressive aspirations. Instead of providing widespread access to land, it has become a tool of nationalization, concentrating ownership and management in the hands of the state.[41] This centralization has limited access to land, effectively excluding a significant portion of the population and leaving the privilege of land ownership to a select few.

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[39] A. O. Olatuah and A.A. Taiwo, "HOUSING THE URBAN POOR IN NIGERIA THROUGH LOW COST HOUSING SCHEMES," *International Journal of Physical and Human Geography* 1, no. 3 (September 2013): 1–8.

[40] Aliyu Abubakar, Mohammed Umar, and Rukaiyatu Ahmed, "Contemporary Barriers to Affordable Housing in Nigeria," *Dutse International Journal of Social and Economic Research* 6, no. 3 (July 3, 2021).

[41] M Daniel, "Enabling Access to Housing in Jos, Nigeria: Implementation and the New Bureaucrats" (Sheffield Hallam University, 2014), http://shura.shu.ac.uk/information.html.

Economic Barriers

According to KPMG's Mortgage Industry Overview (2015) and insights from the AfDB, financial access to end users stands out as the foremost obstacle the low-income demographic faces in the pursuit of adequate housing. The intricacies of mortgage processes, high lending rates, and stringent eligibility criteria often create barriers, limiting the housing opportunities for those with limited financial means.[42] The fact that most of this urban poor demographic is involved in informal employment complicates the process of monitoring their incomes for fund collection and collateral. The housing finance and mortgage system in Lagos closely mirrors the broader scenario in Nigeria. Broadly speaking, there is a noticeable absence of a credit or finance structure tailored to the needs of the low-income demographic for acquiring land, housing, and essential services in Nigeria. The primary avenue available to all Nigerians seeking financial assistance for land, housing, and essential services is the National Housing Fund (NHF), instituted in 1992.[43]

However, the existing finance structure poses significant challenges, making it difficult for builders and consumers to access funds for housing projects readily. This difficulty arises from the stringent conditions associated with mortgage loans and the elevated interest rates prevailing in the commercial market. The NHF, while intended to facilitate broader access to housing finance, faces limitations that hinder its effectiveness in addressing the financial needs of low-income groups. As a result, the

[42] C Raschke, "Best Practices- Affordable Housing in Nigeria" (InclusiveBusiness.net, January 1, 2016), accessed November 15, 2023, https://www.inclusivebusiness.net/node/1747.
[43] "Federal Mortgage | NHF," accessed December 13, 2023, https://fmbn.gov.ng/National%20Housing%20Fund/nhf.html.

prevailing conditions contribute to the broader struggle for affordable housing initiatives, creating obstacles for those in the low-income bracket to secure adequate financing for their housing needs. Despite the various institutional sources through which housing is financed, the Federal Mortgage Bank of Nigeria (FMBN) is the country's secondary mortgage institution.[44] The Federal Republic of Nigeria, in a 2012 statement, underscores that the funding constraints are further compounded by the conservative lending policies of insurance companies and the hesitancy of commercial banks to engage in long-term loans essential for housing projects.[45] Consequently, housing developers must focus on commercial projects catering to high-income earners. This shift is primarily attributed to the prevalent practice of operating on short-term loans from commercial banks, which necessitate swift repayment within a brief timeframe. The challenges in securing sustained and long-term financial support contribute to the perpetuation of housing developments targeted at a more affluent demographic, limiting the scope of affordable housing initiatives.

Socio-cultural perceptions (Understanding of Housing/ Nigerian Mindset)

Housing policies and programs usually do not meet the required long-term goals in the context of socio-cultural aspects of sustainability because enacted policies are treated as projects rather than a process. A handful of studies discuss that policies tend to ignore this aspect of their beneficiaries. Frequently, housing designs fail to

[44] Y Adedeji and A Olotuah, "An Evaluation of Accessibility of Low-Income Earners to Housing Finance in Nigeria," *American-Eurasian Journal of Scientific Research* 7, no. 1 (2012): 23–31.
[45] Abubakar, Umar, and Ahmed, "Contemporary Barriers to Affordable Housing in Nigeria."

consider the socio-cultural needs of low-income groups. [46] A 1993 study argues that policy officials in Abuja prioritize medium and high-income housing for their perceived impact on the city's image, overlooking affordable low-cost dwellings. This results in the city's preference for Western-style designs and materials, neglecting indigenous styles. Even when targeting low-income populations, government housing programs often lack cultural relevance. For example, the Shagari housing scheme in the early '80s differentiated low and medium-income sections by bedrooms. However, it used the same Western-style plans, excluding large families with multiple wives common in the northern part of Nigeria.

Weak Political and Professional Interest

The effectiveness of housing provision in developed nations can be attributed mainly to the unwavering political commitment of successive governments to implement policies for the citizens' benefit. In contrast, the private sector's failure to address the housing needs of low-income groups is linked to their unchecked profit motives. This has resulted in prioritizing privileged and high-income earners as the preferred beneficiaries in most government housing projects.[47] Even though most of the housing needs are reduced from lower-income markets, most private businesses do not believe that serving the needs of low-income earners can be profitable – and neither does the government.

[46] Ghada Farouk Hassan, "The Enabling Approach for Housing Supply: Drawbacks & Prerequisites – Egyptian Experiences," *Alexandria Engineering Journal* 50, no. 4 (2011): 421–429.
[47] U Ikejiofor, "Access to Land, Development Control and Low-Income Housing in Abuja, Nigeria: Policy, Politics and Bureaucracy," *Planning Practice and Research* 13, no. 3 (1998): 299–309.

Affordable Housing Shortage and Past Interventions in Lagos

The shortage of affordable housing in Lagos has been a persistent challenge, requiring attention and intervention. A 2009 study outlined the housing initiatives of the Lagos State Government to address the housing crisis. The Lagos Executive Development Board (LEDB) started housing provision in the 1950s, delivering 4,502 units from 1955 to 1972. After LEDB was dissolved, the Lagos State Development and Property Corporation (LSDPC) took over in 1972, focusing on low-cost housing under Alhaji L. K. Jakande's leadership in 1979. Between 1972 and 1999, LSDPC.

Jakande Estates as a crucial Past Intervention for Affordable Housing in Lagos

Developing low-cost housing estates in Lagos, including Lekki Jakande Estate, was crucial in providing shelter for the urban poor.[48] These estates were strategically located in various areas such as Amuwo Odofin, Ijaiye, Dolphin, Oke-afa, Ije, Abesan, Ilasan, Iponri, Ipaja, Abule Nla, Epe, Anikantamo, Surulere, Iba, Ikorodu, and Badagry. Notably, the Ilasan Estate in Lekki accommodated individuals forcefully evicted from Maroko in 1990. To become a resident, people had to show interest by procuring a N50 form and depositing N1,200 for a 3-bedroom flat or N1,000 for a 2-bedroom flat.[49]

In the early 1980s, becoming a landlord in these estates did not require political affiliations or civil service status; it was open to low-income earners. Jakande's mass housing policy, driven by determination and commitment, resulted in

[48] Risikat Ramoni, Abdullateef Aliyu, and Ibrahim Kegbegbe, "How Jakande's Mass Housing Policy Helped the Poor - Daily Trust," *Daily Trust*, accessed November 15, 2023, https://dailytrust.com/how-jakandes-mass-housing-policy-helped-the-poor/.
[49] Guardian Nigeria, "Stakeholders Urge Leaders to Emulate Jakande's Mass Housing Policy," *The Guardian Nigeria News - Nigeria and World News*, November 25, 2022, accessed December 13, 2023, https://guardian.ng/news/stakeholders-urge-leaders-to-emulate-jakandes-mass-housing-policy/.

thousands of affordable housing units being constructed. These flats were initially placed on mortgage, with the cost of a three-bedroom flat in a two-storey building being less than N7,000. Over time, residents have encountered challenges related to water supply, with some resorting to communal efforts to address the issue. The estates featured amenities like drainage and sewage systems, health facilities, mosques, churches, markets, and schools.

However, there are current challenges, especially in Ilasan Estate, where residents urge the government to address insecurity, flooding, road conditions, electricity, and drinkable water. The development was made on a large scale without thought for future maintenance and incorporating the lifestyle of these class of people. The cost of rent has also evolved, with a flat in Ilasan Estate now costing N400,000 per year. Despite these challenges, residents have maintained the structural integrity of the buildings, and the estates remain integral to the lives of many. They expect the Lagos State Government to play a more active role in addressing infrastructure and management issues, ensuring the well-being of the residents and preserving the legacy of Alhaji Lateef Jakande.

Chapter 5: Environmental Vulnerabilities in Lagos

Lagos, a prominent coastal megacity in Africa and a thriving economic hub stands at the intersection of rapid urbanization and pressing challenges in housing and infrastructure. As established, over 70% of the population, comprising migrants and individuals with low incomes, grapple with precarious living conditions. Many reside in informal settlements characterized by a lack of access to essential infrastructure services and limited political influence.[50]

Adding to these challenges, Lagos faces the looming threats of climate change. The Intergovernmental Panel on Climate Change (IPCC) in 2014 highlighted the likelihood of sea-level rise and an escalation in extreme weather events, including heat stress and heavy precipitation, across various regions. These climatic shifts, driven by broader global environmental changes, pose additional risks to an already vulnerable population in Lagos.[51]

Flooding

Flooding is a big problem for people living in African cities, especially those trying to escape poverty. It is a significant hurdle in achieving the goal of improving the lives of those in urban slums. Dealing with flooding is crucial to tackle immediate issues and make progress in overall development for these communities.[52] Lagos is

[50] Bimbola Oyesola, "Urban Headaches," *D+C*, last modified March 15, 2012, accessed November 19, 2023, https://www.dandc.eu/en/article/lagos-city-dreams-and-nightmares.
[51] "Chapter 4: Sea Level Rise and Implications for Low-Lying Islands, Coasts and Communities — Special Report on the Ocean and Cryosphere in a Changing Climate," n.d., accessed December 13, 2023, https://www.ipcc.ch/srocc/chapter/chapter-4-sea-level-rise-and-implications-for-low-lying-islands-coasts-and-communities/.
[52] actionaid, *Climate Change, Urban Flooding and the Rights of the Urban Poor in Africa: Key Findings from Six African Cities*, 2006, accessed November 19, 2023, https://actionaid.org/.

surrounded by freshwater streams, a lagoon, and the Atlantic Ocean, and its flat topography, with an average elevation of just 1.5 meters above sea level, makes it prone to coastal flooding. [53] The city is sinking at a rate of approximately 87 mm per year, exacerbating the encroachment of the sea at its edges.[54] The economic toll on Lagos due to flooding is staggering, estimated at as much as $4 billion per year, including damages, economic productivity losses, and mortality.[55] The frequent flooding results in the destruction of critical infrastructure, homes, businesses, schools, markets, roads, and more, with an estimated annual cost of $22.2 million[56]. Moreover, flooding has adverse effects on human health, contributing to the contamination of water bodies and the spread of waterborne diseases like malaria, cholera, typhoid, yellow fever, diarrhoea, leptospirosis, and hepatitis A. [57]

Specific poor coastal communities, such as Makoko, Ilaje-Bariga, Ijora-OloyeMarine, and BeachApapa, are known to face annual flooding. The extensive land cover changes in metropolitan Lagos, resulting from reclamation activities for urban development, have further reduced the flood storage capacity of the area. The destruction of mangroves and wetlands has played a role in this, contributing to the vulnerability of coastal neighborhoods. The rapid urbanization and expansion, especially in areas like Eti-Osa LGA and the Lekki Peninsula, have occurred without

[53] Idowu Ajibade and Gordon McBean, "Climate Extremes and Housing Rights: A Political Ecology of Impacts, Early Warning and Adaptation Constraints in Lagos Slum Communities," *Geoforum* 55 (2014): 76–86.
[54] Ikuemonisan and Vitalis Ozebo, "Characterisation and Mapping of Land Subsidence Based on Geodetic Observations in Lagos, Nigeria," *Geodesy and Geodynamics,* 11, no. 2 (2020): 151–62.
[55] Croitoru and Leila, "The Cost of Coastal Zone Degradation in Nigeria: Cross River, Delta and Lagos States.," *Washington, D.C.: World Bank* (2020).
[56] InsuResilience Solutions Fund, *CLIMADA Climate Risk Analysis: Urban Flood Resilience against Riverine Floods in Uganda and Nigeria*, n.d., https://www.insuresilience-solutions-fund.org/content/1-our-work/1-climate-riskanalysis/climate-risk-analysis_uga-nga_5-pager_final.pdf.
[57] Olanrewaju and Caroline, "Impacts of Flood Disasters in Nigeria: A Critical Evaluation of Health Implications and Management," *Jamba* 11, no. 1 (2019): 1–9.

adequate consideration for sea-level rise and climate change risks, making these regions and their growing populations highly susceptible to flooding.[58]

Rapid Urbanization Changes

The rapid urbanization of Lagos, fueled by population growth and economic development, has transformed the cityscape with towering high-rise buildings, expansive road networks, and diverse land covers like asphalt and concrete pavements. Uwadiegwu et al. (2011) highlighted the exponential surge in population growth from 1.4 million in 1970 to a staggering 21 million in 2014, underscoring the profound impact on the city's landscape. [59] [60] This demographic explosion has triggered extensive construction and infrastructure development, significantly altering the physical fabric of the city and contributing to the Urban Heat Island (UHI) effect.[61] These urban features absorb and radiate heat, intensifying air temperatures, especially at night.

[58] Croitoru and Leila, "The Cost of Coastal Zone Degradation in Nigeria: Cross River, Delta and Lagos States."
[59] National population commission (NPC), *Publications of National Population Commission*, 2014.
[60] Ibeabuchi Uwadiegwu, A Egbu, and A Kalu, "A Study of Urban Heat Island Areas in Lagos Metropolis Using Satellite Imagery," *ABSU Journal of Environment, Science and Technology* 1 (2011): 145–159.
[61] Olalekan Ilesanmi, "(18) Urban Heat Island Effects In Metropolitan City of Lagos | LinkedIn," *Linkedin*, last modified October 7, 2015, accessed November 21, 2023, https://www.linkedin.com/pulse/urban-heat-island-effects-metropolitan-city-lagos-olalekan-ilesanmi/.

Pollution and Industrial Activities:

The dense urban fabric, compounded by traffic congestion and industrial manufacturing, results in elevated levels of air pollution and heat from vehicles and generators. These anthropogenic factors exacerbate the UHI effect, creating a challenging environment for the city's residents. Geometric designs, particularly the positioning of high-rise buildings in commercial districts, exacerbate the UHI effect by creating multiple surfaces that absorb and reflect sunlight. This intricate interplay of architectural elements intensifies the heating of urban areas, contributing to the heat island effect. Additionally, these designs impede wind flow, altering cooling mechanisms and preventing the dissipation of pollution, further entrenching the heat island effect.

The repercussions of the UHI effect extend beyond temperature increases, affecting the health and well-being of Lagos residents. According to Wole Kukoyi, the principal medical director of the Ace Medicare Clinic in Ota, ongoing extreme weather conditions pose severe health risks, including kidney failure, strokes, excessive bleeding, and an elevated risk of skin cancer for individuals with albinism. The urban poor, already vulnerable, bear the brunt of heat-related health hazards, including depression, restlessness, heat rashes, and sleeplessness. Lack of proper public transit infrastructure forces reliance on diverse modes of transportation, such as mini-buses and motorcycles, contributing to air pollution and the heat island effect.

Unreliable Power Supply

Nigeria's unreliable power supply forces many residents to resort to fuel-powered generators, exacerbating the heat island effect due to increased emissions. The ongoing heatwave, worsened by power outages, disrupts daily activities, affecting businesses and compelling lifestyle adaptations. Addressing the complex challenges posed by the UHI effect in Lagos requires comprehensive strategies that consider urban planning, sustainable construction practices, and measures to mitigate the impact on vulnerable populations, especially the urban poor. As climate change intensifies, urgent action is needed to create resilient and sustainable urban environments in Lagos. Communities can proactively tackle and counter these trends by implementing measures to mitigate local heat islands. Practical strategies include the installation of cool roofs and the expansion of tree canopy coverage. These initiatives reduce heat island temperatures and mitigate city residents' exposure and vulnerability to climate change's impacts. Additionally, such actions contribute to lowering greenhouse gas emissions, addressing the root causes of climate change, and fostering a more sustainable urban environment.

Chapter 6: Urban Resilience and Resilient Housing

The Concept of Urban Resilience and its Components

Because this thesis aims to develop resilient residential communities for the urban poor in Lagos, It is crucial to understand that while this is a smaller scope of urban resilience, it is an aspect that will improve the resilience of Lagos. Urban resilience means how well a city can handle and recover from problems, whether they are caused by people or nature. As already established, Lagos is vulnerable to many stresses and shocks. It involves the city's ability to deal with challenges, adapt to changes, and learn how to control future issues. Studying how urban resilience works and understanding the factors that affect it are essential for making wise decisions when planning how a city can be more resilient.[62] It revolves around stability, achieved through a balanced mix of social, spatial, infrastructural, environmental, and cultural elements.[63]

These components stabilize the urban system, providing the capacity to recover and confront external threats.

Economic resilience, a pivotal component, scrutinizes the economic conditions prevalent in cities. In Lagos, economic disparities are starkly evident, with the urban poor grappling with limited economic resources. For instance, the dependency on restricted financial outlets contributes to income inequality. The economic dimension underscores the importance of diverse economies, innovative capacity, reliable

[62] Xuehua Han et al., "Research Progress and Framework Construction of Urban Resilience Computational Simulation," *Sustainability* 14, no. 19 (2022), https://www.mdpi.com/2071-1050/14/19/11929.

[63] Mazdak Irani and Payam Rahnamayiezekavat, "AN OVERVIEW OF URBAN RESILIENCE: DIMENSIONS, COMPONENTS, AND APPROACHES," *Acta Sci. Pol., Administratio Locorum 2* 20, no. 4 (2021): 305–322.

infrastructure, and a skilled workforce in resilient cities. With its vast population engaged in informal economic activities, Lagos illustrates the challenges the urban poor face in accessing sustainable livelihoods, housing, and essential services.

Social resilience, the second component, accentuates the role of social structures in withstanding and recovering from disasters. Lagos, characterized by a diverse and dynamic population, showcases the significance of social bonds in disaster recovery. However, uneven distribution of environmental damage exacerbates vulnerability, particularly for poor communities. The concept of social capital emerges as a linchpin, emphasizing its pivotal role in disaster recovery. In Lagos, the resilience of communities is intricately linked to social factors such as population density, socio-economic status, and access to resources, all of which significantly impact the urban poor.

Institutional resilience, the third dimension, revolves around the capacity of urban management and governance systems. With its intricate web of formal and informal institutions, Lagos grapples with weaknesses in urban management and governance. This, in turn, impedes sustainable urban development and hinders adaptive efficiency. Planning capacity is a crucial factor influencing the city's ability to prepare, mitigate, recover, and respond to emergencies. In Lagos, planning challenges are evident, ranging from inadequate zoning regulations to insufficient risk analysis and mapping. The institutional factors crucial for designing a resilient city, including good urban governance, public participation, and transparency, underscore the need for a

comprehensive approach to address the complexities faced by the urban poor in Lagos.

Interplay between Housing and City Resilience

Mentions of affordable housing quickly trigger questions: Affordable for whom? Affordable for how long? What is affordable? Is paying 30 percent of income? An appropriate threshold for defining affordability for everyone, regardless of their income? Politics, policy, and design questions also apply: Who should be responsible for providing affordable housing—the government, private sector, or nonprofit organizations? How does affordable housing remain affordable? Should affordable housing look the same as market-rate housing—except that residents receive subsidies—or should it be designed, sited, and built differently?

Diving into the intricate relationship between these two fundamental aspects of urban dynamics is crucial. A well-designed residential community for the urban poor involves more than providing safe, decent, and inexpensive shelter; it needs to be central to the resilience of cities. To optimize the potential of affordable housing in bolstering urban resilience, its proponents should encourage its alignment with as many of the subsequent four criteria as possible:

1. Nurture the community's residents' social fabric and economic well-being.
2. Diminish the residents' susceptibility to environmental risks and pressures.
3. Augment the personal security of residents confronted with violence or the prospect of displacement.

4. Empower communities by reinforcing their capacity to participate in self-governance.[64]

Urban design scholar Jon Lang, inspired by psychologist James Gibson, introduced the concept of affordance to aid designers in comprehending the relationship between the built environment, human behavior, and the fulfillment of values and needs. In the context of housing, affordance suggests that well-designed housing environments connect residents to broader opportunities, while poorly designed ones act as constraints.[65]

In its complex nature, designing for the poor is pivotal in influencing various outcomes, such as employment, climate change resilience, healthy lifestyles, security, and community engagement for these residents. It encompasses various facets, including neighborhood design, institutional programming, environmental and infrastructure systems, long-term affordability, neighborhood security, livelihood support and services, social organization, community, and transportation networks.

[64] Lawrence Vale et al., "What Affordable Housing Should Afford: Housing for Resilient Cities," *Cityscape* 16, no. 2 (2014): 21–50.
[65] James J Gibson, *The Ecological Approach to Visual Perception: Classic Edition* (Psychology press, 2014).

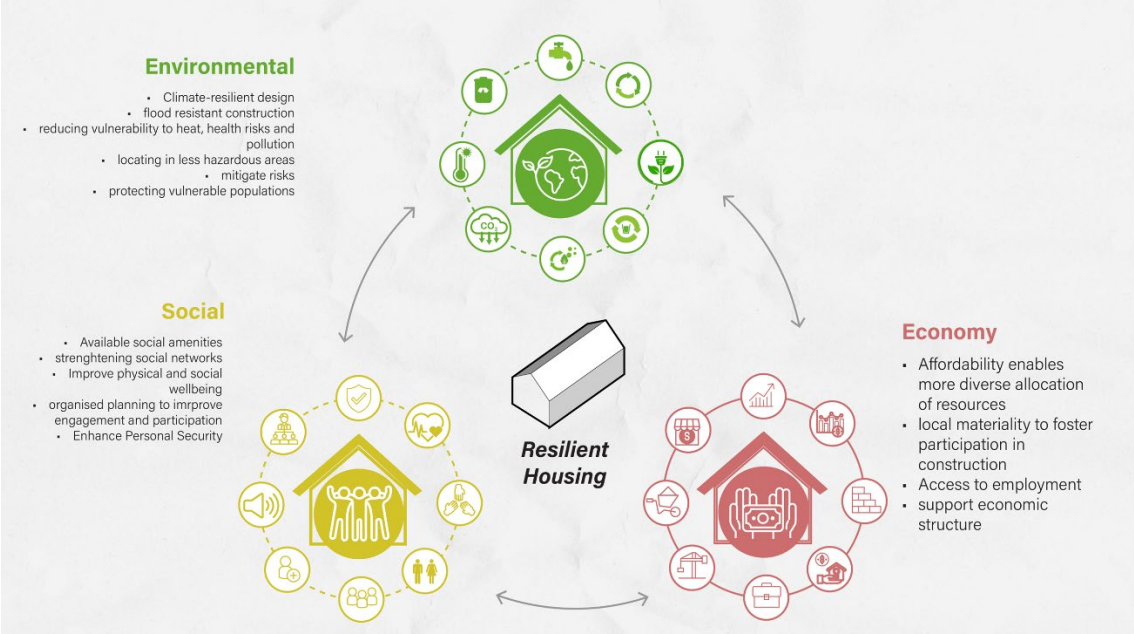

Figure 3: Resilient Housing. Figure by author.

Resilient Building Strategies

Lagos as a coastal city faces risk of climate change effects especially flooding and high heat levels.[66] So it is crucial to consider certain steps when building for the urban poor in the coastal city. With a goal to achieve adaptation and mitigation strategies for climate resilience, a key focus lies in land use planning and the built environment. Proper land use planning involves strategic measures such as setback zones to curtail development near shorelines and sustainable practices to minimize vulnerabilities, preserving natural habitats and open spaces.[67] Simultaneously, the built environment also works to strengthen assets against potential hazards, including elevating structures, incorporating green infrastructure elements, using energy-

[66] Peter Elias and Ademola Omojola, "Case Study: The Challenges of Climate Change for Lagos, Nigeria," *Current Opinion in Environmental Sustainability* 13 (2015): 74–78.
[67] "Four Steps to Building Resilient Coastal Cities," accessed December 13, 2023, https://www.csrwire.com/press_releases/779991-four-steps-building-resilient-coastal-cities.

efficient measures, and constructing erosion control structures.[68] The building's site and orientation are crucial, ensuring optimal solar gain in different climates and considering existing elements for shading or sun exposure. Strategies include promoting natural ventilation through well-planned building orientation, facilitating cross-ventilation, and creating positive and negative pressure zones for cooling effects.

Additional strategies address challenges posed by stronger storms and flooding, emphasizing the importance of avoiding flood-prone areas, raising buildings above flood levels, and introducing innovative solutions like amphibious design. To counter the Urban Heat Island effect, climate-resilient design focuses on lighter, reflective surfaces, vegetation, and light-colored materials to reduce ambient temperatures and energy consumption. Designing heat-resilient facilities involves adopting strategies such as green roofs, permeable pavements, and solar panels. Material selection is crucial, prioritizing locally available and sustainably produced materials in alignment with sustainability goals for 2050 and beyond.[69]

Policy Advocacy for low-cost Housing Schemes in Lagos

Addressing the housing deficit requires a collective effort, given the government's ultimate ownership of all land. Developers collaborating with the Family Homes Fund (FHF) can access strategically located lands, minimizing acquisition costs and ensuring optimal community service. The efficient allocation process enables

[68] Najlaa Rachidi, "A Guide to Climate Resilient Design," *RTF | Rethinking The Future*, last modified June 24, 2022, accessed December 13, 2023, https://www.re-thinkingthefuture.com/sustainable-architecture/a7119-a-guide-to-climate-resilient-design/.
[69] Ibid.

developers to obtain land for projects, fostering the creation of affordable housing units aligned with FHF goals. [70] This partnership emphasizes that affordable housing is a shared responsibility between the government and the private sector, streamlining the development process.

In Lagos, the Family Mortgage Bank of Nigeria plays a crucial role in making homeownership accessible to low-income individuals.[71] By offering favorable financing options and ensuring properties are on government-owned lands, the bank reinforces the government's commitment to affordability. This strategic alignment between financial institutions and government lands not only tackles affordability challenges but also contributes to sustainable urban development in Lagos.

The National Housing Fund (NHF), fueled by contributions from employees and employers, remains instrumental in promoting inclusive homeownership. Utilizing a collective pool of resources, the NHF finances mortgages for low-income earners on government-owned lands.[72] This approach underscores the shared responsibility for land access, with the government facilitating equitable opportunities. Rent-to-own programs, supported by these institutions, consider the availability of government lands, allowing individuals with modest incomes to contribute toward acquiring homes. This flexibility ensures that the benefits of land access extend to a broader

[70] FHFL, "Building Affordable Communities That Inspire Change," *FHFL*, accessed November 21, 2023, https://fhfl.com.ng/.
[71] "Federal Mortgage," accessed November 10, 2023, https://www.fmbn.gov.ng/.
[72] Urowayino Jeremiah, "Family Homes Fund Limited, Where Are the 500,000 Housing Units Created, Nigerians?," *Vanguard News*, October 27, 2022, accessed November 21, 2023, https://www.vanguardngr.com/2022/10/family-homes-fund-limited-where-are-the-500000-housing-units-created-nigerians/.

population segment, making housing affordable for all citizens. It is essential to make these institutions known to these group of people, because most of them may not have any knowledge about helpful schemes that can aid in acquiring their own home.

Chapter 7: Program

In the dynamic urban landscape of Lagos, the innovative residential community for the urban poor integrates diverse zones to foster a robust and inclusive living environment. The Residential Zone forms the heart of this community, offering a spectrum of housing options, from Affordable Living spaces to Studio Apartments and 2–3-bedroom residences. This zone ensures accessibility and diversity, catering to the varied needs of the residents.

Program Abstract

Complementing the Residential Zone, the Social Zone stands as a cultural, educational, and religious anchor. The Cultural and Educational Hub boasts Linear galleries, a Cultural Awareness Art Space, Educational Mural facades, a Library, and Flexible Learning Spaces. Simultaneously, the Religious Section provides dedicated spaces for worship, including a Church and a Mosque/Prayer Room. The Community Engagement and Recreation area further enriches the social fabric with Central Courtyards, Relaxation Gardens, Neighborhood Playgrounds, Multifunctional Recreational Spaces, a Local Market, Shared Communal Terraces, and Bars/Kitchens hosting Street Food Vendors. These spaces create a vibrant, inclusive social environment that fosters community bonds.

The Economic Zone emerges as a catalyst for local economic growth. Featuring Retail Stores, Food Vendor Stalls, and Repair Shops, this zone not only provides essential services but also facilitates entrepreneurial opportunities, contributing to

economic empowerment within the community. Environmental sustainability is ingrained in the design through the Environmental Zone. Green and Agricultural Initiatives, such as Vertical Gardens and Mixed-Crop Cultivation Spaces, promote sustainability and green living. The inclusion of essential Medical and Health Services, including a Health Clinic and Pharmacy, reinforces the holistic well-being of residents.

Together, these thoughtfully curated zones converge to create a dynamic, self-sustaining community, addressing the unique challenges faced by the urban poor in Lagos. This comprehensive approach ensures that the residential project not only meets the immediate housing needs but also establishes a foundation for long-term socio-economic development and environmental sustainability.

Precedent Analysis

GrandLuvu Estate, Masaka, Nigeria

The GrandLuvu Estate, a project by the Millard Fuller Foundation (MFF), stands as a beacon of innovation and collaboration in the realm of affordable housing. As a faith-driven organization, MFF has made it its mission to forge sustainable partnerships, exemplified by winning the prestigious "Affordable Housing Project of the Year 2018" at the Nigerian Housing Awards for the third consecutive time. This recognition underscores the foundation's commitment to providing affordable housing

for all, a principle that aligns seamlessly with the goals of your low-cost housing project.

Situated in Luvu-Madaki, Masaka, Nasarawa, on the outskirts of Abuja, the GrandLuvu Estate consists of 600 one and two-bedroom semi-detached bungalows. Targeting a specific demographic of Nigerians earning between ₦50,000 to ₦150,000 a month, this housing solution caters to those in dire need. The cost-conscious approach is evident in the construction details, with 32sqm one-bedroom homes priced at ₦2.9 Million ($8,040), a remarkable feat given the rising costs in the real estate market.

Figure 4: GrandLuvu Estate, Masaka[73]

[73] "At N2.9 Million, These Homes in Nasarawa by the Millard Fuller Foundation Are the Most Affordable Homes in Africa. - Livin Spaces," November 11, 2019, accessed November 21, 2023, https://livinspaces.net/news/at-n2-9-million-these-homes-in-nasarawa-by-the-millard-fuller-foundation-are-the-most-affordable-homes-in-africa/.

Noteworthy is the strategic use of cost-effective materials, exemplified by 150mm hollow concrete block walls, aluminum casement windows, and locally sourced materials like sharp sand from a nearby river and Dangote cement. The focus on affordability extends to the interior, featuring essentials with a utilitarian approach—screeded floor finish, tiled wet rooms and kitchen, and a PVC ceiling finish. Adopting 0.55 long-span aluminum roofing sheets on well-seasoned wood trusses contributes to durability and cost-effectiveness.

The estate provides homes and integrates communal and agricultural spaces, fostering a sense of community resilience. Ancillary facilities such as overhead and underground water tanks, a well-planned road network, dedicated estate transformers, efficient drainage, sewage systems, and water reticulation further enhance the quality of life for residents. The success of the project is evident in its ability to attract investments; the Family Homes Fund's bulk purchase of 400 completed units in 2018 enabled MFF to fully repay the original loan from 2016. This financial sustainability underscores the viability of market-based affordable housing in Nigeria, a crucial lesson for your own endeavor in creating a resilient low-income residential community. As Abuja's population continues to surge, projects like GrandLuvu Estate exemplify the urgency and efficacy of affordable housing initiatives.

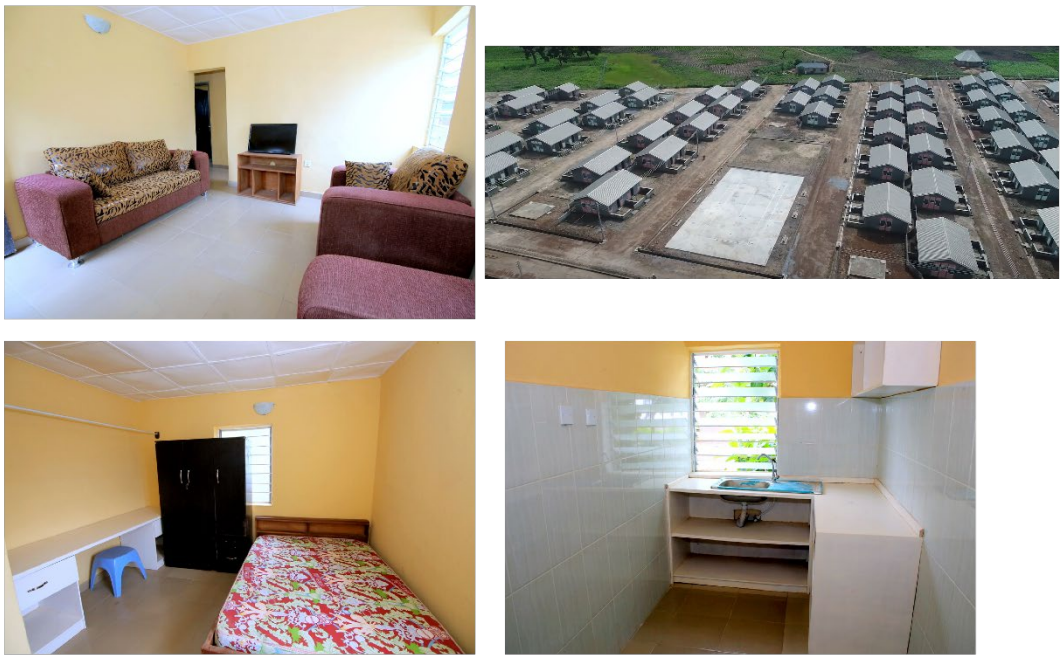

Figure 5: GrandLuvu Estate,Interior and Aerial views[74]

Komera Leadership Center

The Komera Leadership Center is an inspiring example for a low-cost housing project, particularly in its commitment to multifunctional spaces and community engagement. While this project focuses on affordable living, the principles embedded in the Komera Leadership Center can provide valuable insights.

[74] "At N2.9 Million, These Homes in Nasarawa by the Millard Fuller Foundation Are the Most Affordable Homes in Africa. - Livin Spaces," November 11, 2019, accessed November 21, 2023, https://livinspaces.net/news/at-n2-9-million-these-homes-in-nasarawa-by-the-millard-fuller-foundation-are-the-most-affordable-homes-in-africa/.

The Leadership Center's innovative use of flexible spaces directly applies to my programs. The adaptable central space, which transforms to accommodate various activities, aligns with the need for versatile living spaces in a low-cost housing community. By integrating such flexibility, your project can allow residents to use communal areas for multiple purposes, fostering a sense of community and promoting resource-efficient design.

Furthermore, the Center's emphasis on locally sourced materials and engagement with the community aligns with the sustainable and community-centric approach that may be adopted. Learning from their collaboration with Rwanda Village Enterprises, this project could explore partnerships with local businesses and communities to source materials, involve the local workforce, and create a project that addresses housing needs and contributes to the community's economic development.

The commitment to cultural identity evident in the design, inspired by local art and traditions, offers a valuable lesson for this project. Incorporating elements that resonate with the residents' cultural context can enhance the community's sense of belonging and pride.

The Komera Leadership Center provides a model for creating a community-centric, adaptable, and culturally resonant low-cost housing project. By drawing inspiration from its design principles and community engagement strategies, this project can aim to provide shelter and empower and uplift the residents holistically.

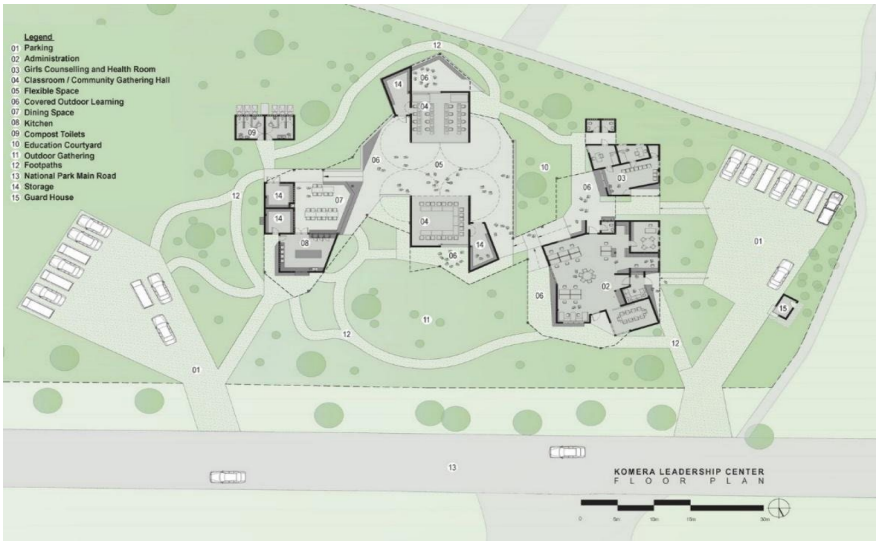

Figure 6: Komera Leadership Center floor plan / BE_Design[75]

[75] "Komera Leadership Center / BE_Design," *ArchDaily*, last modified July 13, 2023, accessed November 21, 2023, https://www.archdaily.com/1003793/komera-leadership-center-be-design-east-africa.

Sanjaynagar Slum Redevelopment Project

The Sanjaynagar Slum Redevelopment Project in Ahmednagar, India, spearheaded by the Community Design Agency (CDA), stands as an exemplary in-situ initiative aimed at transforming the living conditions of a vibrant yet underserved community. Implemented in collaboration with the Ahmednagar Municipal Corporation (AMC) and local non-profit Snehalaya, the project addresses the challenges faced by 298 families residing in a 2-acre slum, characterized by a lack of basic infrastructure and utilities. Initiated in November 2018, the first phase of construction, consisting of 33 homes, reached completion in March 2022, with the second phase, comprising 265 homes, slated to commence later this year.[76] The endeavor operates as a public/private partnership, securing partial funding from the Indian government's Housing for All (PMAY- Urban) program, contributions from AMC, the US-based Curry Stone Foundation, and philanthropic donations from residents.

CDA's approach diverges from conventional low-income housing paradigms that prioritize sheer unit quantity over community-centric design. The firm contends that addressing housing inequality involves more than erecting individual units; it necessitates cultivating communities. The Sanjaynagar project embodies this philosophy by fostering a balance between safe, private spaces and communal areas, emphasizing social bonds and facilitating human flourishing.

[76] Diya Koshy George, "How Sanjayanagar Slum Residents Designed a Vibrant Housing Community," *YourStory.Com*, last modified April 7, 2022, accessed December 14, 2023, https://yourstory.com/socialstory/2022/04/housing-sustainability-slum-community.

Central to the success of the project is a highly replicable participatory planning and design process, enabling Sanjaynagar residents to contribute to decisions at various scales, from neighborhood layouts to individual home customizations. The 298 dwelling units, organized into eight G+2 buildings, revolve around eight courtyards of varying sizes, enhancing the social infrastructure of the slum. In addition to design considerations, the project focuses on the quality of construction, accommodating local soil conditions and weather patterns. The buildings feature load bearing, reinforced masonry walls, a vernacular plank and joist slab system, and shading devices like bamboo screens and pergolas. Common spaces within the wide corridors promote social interaction, natural lighting, and adequate ventilation.[77]

Beyond the construction phase, CDA is actively engaging with the first completed building's residents to develop a long-term maintenance plan. The success of the Sanjaynagar redevelopment exemplifies the transformative potential of participatory design in influencing health, well-being, and the resilience of marginalized communities. The Sanjaynagar project is particularly noteworthy against the backdrop of prevalent slum conditions in India, where more than 65 million people inhabit such areas, facing significant challenges in terms of living conditions and basic amenities. The success of Sanjaynagar serves as a testament to the impact of collective action and government support in creating sustainable and vibrant communities. The Pradhan Mantri Awas Yojana (Urban) Mission played a crucial role, providing financial aid to residents for housing construction. Collaborations with local NGOs like Snehalaya and support from organizations like the Curry Stone

[77] Ibid.

Foundation underscore the significance of partnerships in implementing impactful social housing projects.

The participatory approach, evident in the residents' involvement in decision-making, showcases the importance of community-driven design in ensuring the success and sustainability of such initiatives. The residents' focus on creating better opportunities for their children, prioritizing lighting and ventilation, and emphasizing social interaction and outdoor spaces underscores the human-centric approach adopted in the project. The name "Swapnapurti," translating to 'Fulfillment of Dreams,' chosen by the residents for the first phase, encapsulates the transformative nature of the project, realizing the aspirations of the community. Despite challenges posed by the lack of precedents for such redevelopment projects and the additional complexities introduced by the COVID-19 pandemic, the Sanjaynagar Slum Redevelopment Project stands as a beacon of hope and inspiration. It demonstrates the potential for participatory design, government support, and community collaboration to bring about positive change in the lives of marginalized populations, offering a model for future sustainable and inclusive housing initiatives.

Figure 7: Sanjaynagar Slum Redevelopment Project / Community Design Agency [78]

[78] "Sanjaynagar Slum Redevelopment Project / Community Design Agency," *ArchDaily*, last modified May 26, 2022, accessed December 14, 2023, https://www.archdaily.com/982534/sanjaynagar-slum-rehabilitation-project-community-design-agency.

Ko’olauloa Community Resilience Hub

The Ko'olauloa Community Resilience Hub, located in O'ahu's vulnerable Ko'olauloa District, embodies a multifaceted approach to community resilience. Identified as a crucial facility for both everyday community activities and disaster preparedness by the City & County of Honolulu, this hub addresses the region's vulnerability to coastal hazards, providing a safe haven for residents. Unique to this hub is its dual functionality as both a resilience hub and a recreation/community gathering space. The Urban Sustainability Directors Network (USDN) recognizes it as a Resilience Hub, emphasizing its role in supporting residents, coordinating communication, distributing resources, and enhancing overall quality of life. This integration of daily community functions with disaster resilience aligns with the USDN's three-part approach: disruption, recovery, and daily life.[79]

Designed to address specific hazards like tsunamis and typhoons, the Ko'olauloa Community Center engages the local community actively. Residents collaborated in the design process, working closely with architects from +Lab. The center spans approximately 87,285 square feet across two buildings, featuring commercial, childcare/adult care, educational, and medical facilities. Daily, the center serves various community needs. The medical center operates as a care clinic and dialysis center, offering 2,000 square feet for daily healthcare. Childcare/adult care facilities cover an additional 1,000 square feet, while educational spaces, including a community college and workforce development center, total 10,000 square feet. Most

[79] “SHADE-Ko’olauloa Community Resilience Hub,” *SHADE*, accessed November 21, 2023, http://www.shadegroup.org/koolauloa-community-resilience-hub-1.

of the space, approximately 62,750 square feet, is dedicated to commercial purposes, including an auditorium that transforms into a shelter space during disruptions.

The site plan reflects the community's influence, preserving forested areas and incorporating an agricultural zone for food security. An innovative addition includes space for growing medicinal plants, enhancing the island's self-sufficiency during disruptions. This holistic design, shaped by the community's input, emphasizes the importance of preserving natural resources and promoting self-sustainability.

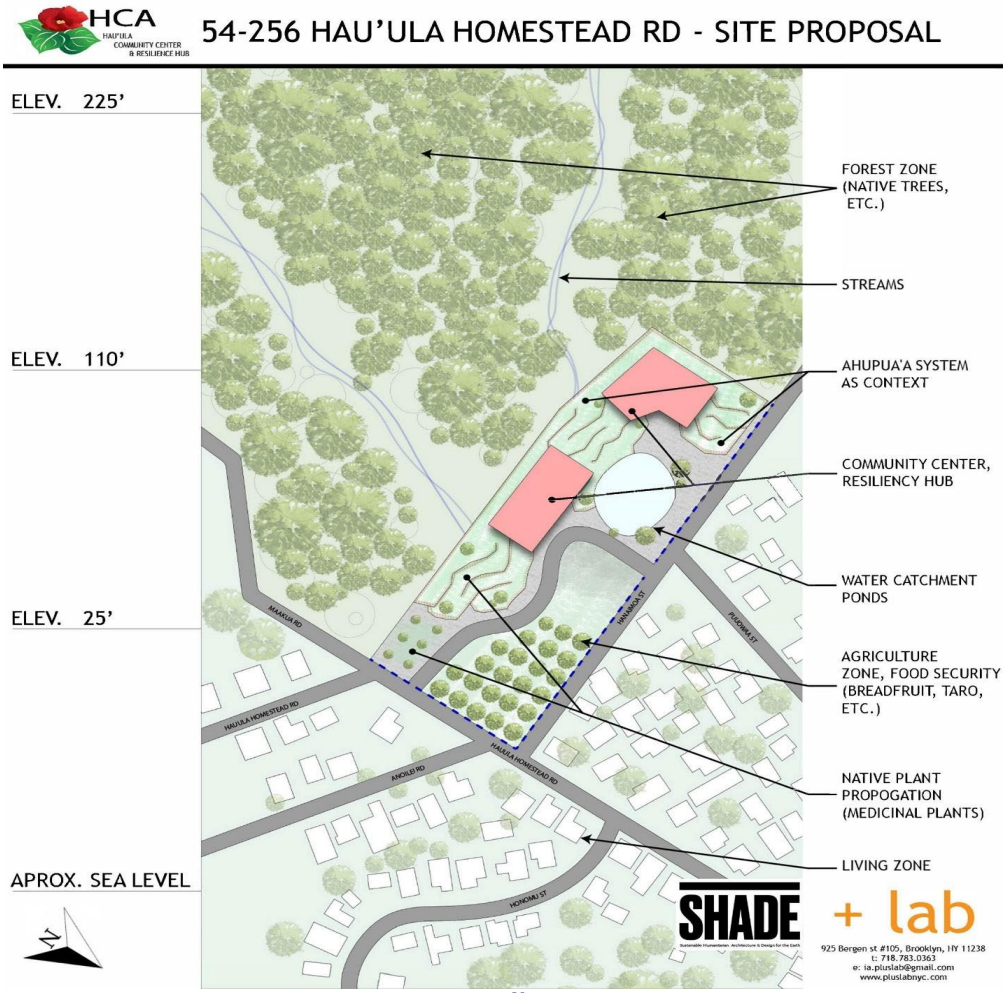

Figure 8: Ko'olauloa Community Resilince Hub [80]

[80] "SHADE-Ko'olauloa Community Resilience Hub," *SHADE*, accessed November 21, 2023, http://www.shadegroup.org/koolauloa-community-resilience-hub-1.

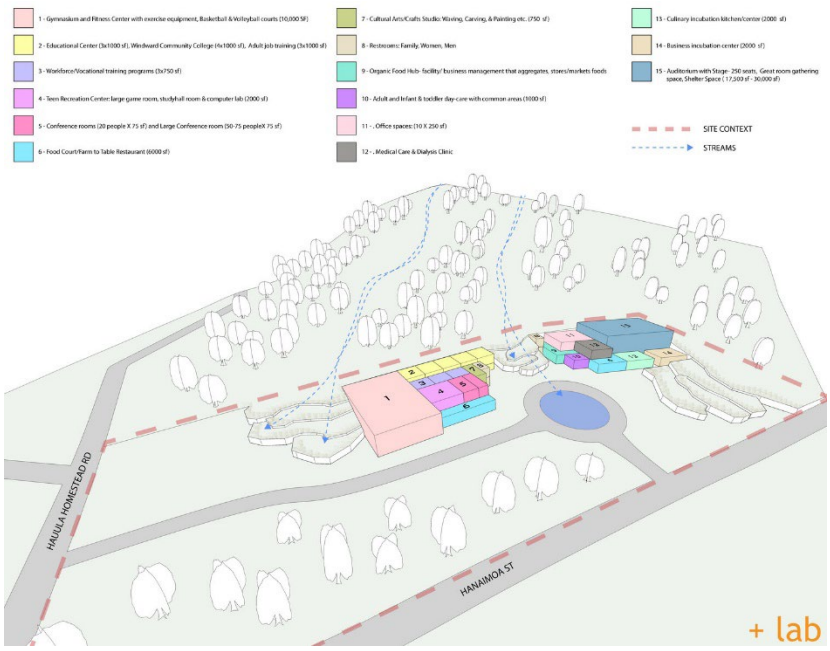

Figure 9: Ko'olauloa Community Resilince Hub[81]

[81] "SHADE-Ko'olauloa Community Resilience Hub."

Thesis Program Tabulation

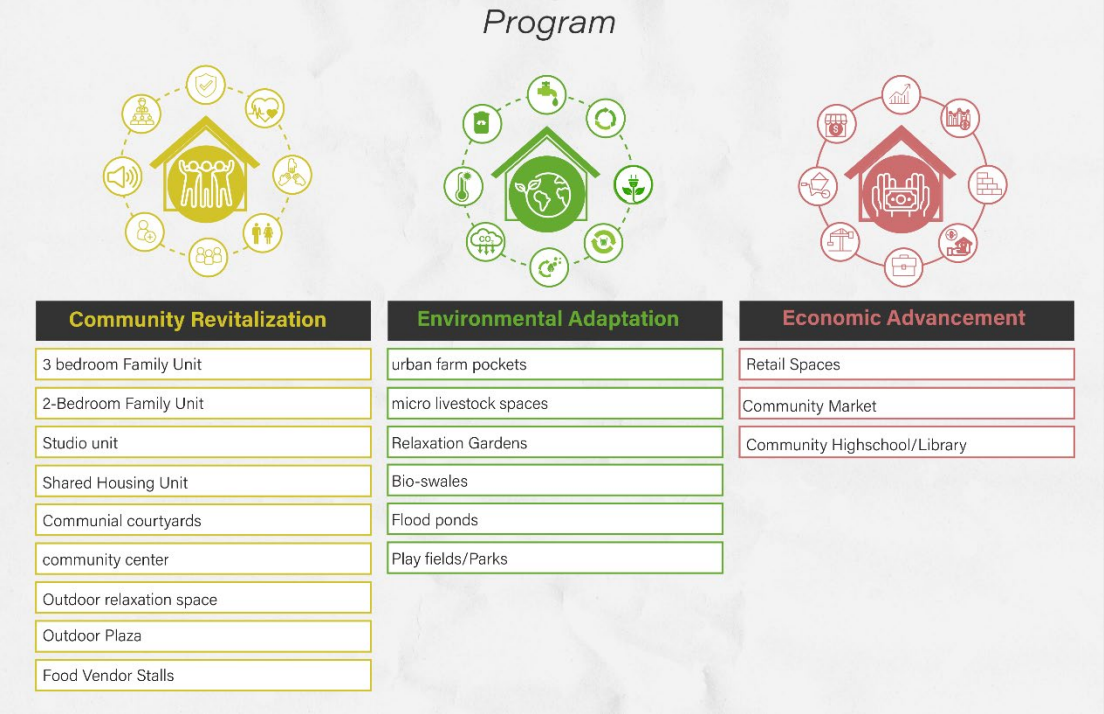

Figure 10: Table showing proposed programs, by author

Chapter 8: Site Selection and Analysis

The site selection process for the project was not easy due to the complexity of specific criteria in relation to the study area, which is Lagos. Because the study is about integrating the urban poor in affluent residential neighborhoods, the target was Eti-Osa Local Government Area in Lekki, the neighboring city to Lagos Island (metropolitan area). These sites can all be accessed from the city's major transit, the Lekki-Epe Expressway. What separated each site majorly was their distance to central business districts, local markets, and their size. They are all located a few kilometers from water bodies such as lagoons or the Atlantic Ocean. Lekki is situated on a strip of land mass bordered by water. (Figure below).

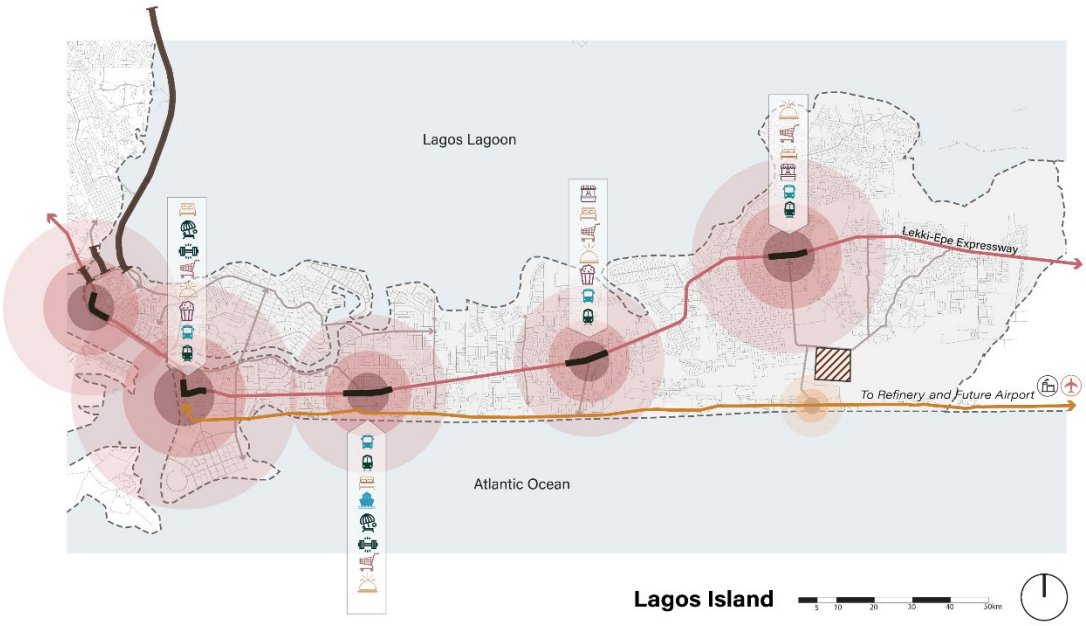

Figure 11: Map showing Lekki and Lagos Island nodes. Image by author.

Site Selection Abstract

The site selection criteria for this project were meticulously devised to optimize the overall effectiveness and sustainability of the envisioned low-income residential community. A substantial land size was prioritized to accommodate residential spaces and outdoor agricultural areas, fostering self-sufficiency and community engagement. Proximity to a business district was considered to enhance economic opportunities for residents, while accessibility and reliable transportation infrastructure were crucial for ease of movement. The availability of existing infrastructure was assessed to streamline development efforts. Community support and engagement were pivotal, ensuring the project aligned with local needs and aspirations. Security and safety considerations were paramount, with a preference for areas less prone to flooding and far from water bodies. The potential for future expansion was a key factor, allowing for adaptability and sustained community growth. Lastly, a focus on areas with a high concentration of the low-income demographic aimed to address the specific needs and challenges the target population faces.

Site Analysis

The selection of the Lekki Peninsula in Lagos, Nigeria, as the site for a residential community for low-income residents is strategic and well-founded. Lekki's proximity to the bustling business districts in Victoria Island and affluent neighborhoods in Ikoyi makes it an ideal location for the targeted population, many of whom work in

these areas. The ongoing development of Lekki, as outlined in previous chapters, reveals a comprehensive plan encompassing commercial, industrial, residential, and recreational zone. As of 2015, only phase 1 of the Lekki project had been completed, with phase 2 nearing its conclusion. The expansive peninsula, measuring approximately 70 to 80 km long and with an average width of 10 km,[82] currently features gated residential developments, agricultural farmlands, and allocated areas for a Free Trade Zone, airport, and a seaport under construction.

Figure 12: Map showing Lekki and Lagos Island + Selected Sites (ArcGIS)

One crucial aspect of the area's development is its future transportation infrastructure. The Lekki Peninsula is set to benefit from upcoming rail and BRT

[82] "LFZ Master Plan – Lekki Free Zone Development Company (LFZDC)."

(Bus Rapid Transit) systems, aiming to alleviate transportation challenges.[83] The major routes along the peninsula, such as the Lekki-Epe expressway, currently face significant traffic congestion. However, the planned rail system, including the Green Line connecting Marina to Lekki FTZ, promises to enhance connectivity and reduce reliance on road transportation.[84] Ajah Market, recognized as the largest market in the Lekki Peninsula, is an essential focal point for economic activities. Its prominence adds another layer to the appeal of Lekki as a potential site for a low-income residential community. The market serves as a vital hub for trade and commerce, attracting both local residents and those from neighboring areas. The strategic location of Ajah Market is expected to have a positive impact on the proposed residential community. The market's presence not only provides residents with convenient access to essential goods and services but also contributes to the overall vibrancy and economic viability of the Lekki Peninsula.

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[83] T Adeniyi, "Lagos & Ogun State Rail Lines (Update & Map)," *BBB INTERNATIONAL*, last modified June 1, 2015, accessed December 19, 2023, http://blackborderbuild.weebly.com/4/post/2015/06/lagos-ogun-state-rail-lines-update-map.html.
[84] "Lekki Master Plan," *Internet Archive: Wayback Machine*, n.d., https://web.archive.org/web/20151018091652/http://www.lagosstate.gov.ng/pagelinks.php?p=19.

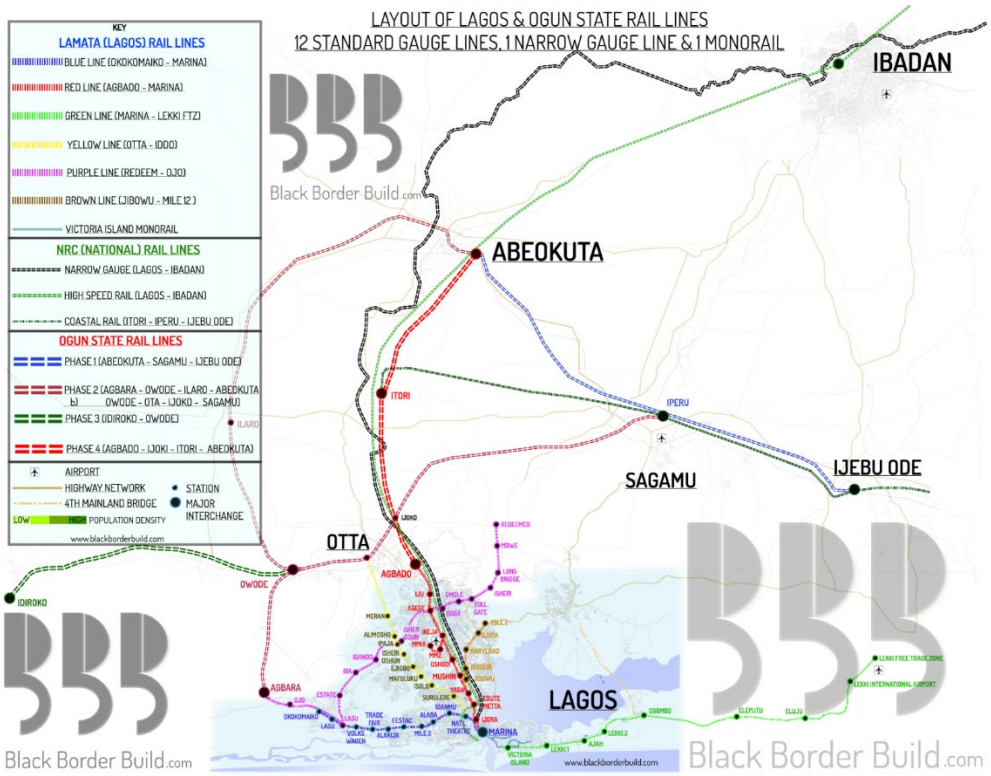

Figure 13: Map of Lagos showing future transit routes[85]

[85] Adeniyi, "Lagos & Ogun State Rail Lines (Update & Map)."

Figure 14: Map of Lagos showing income area. Image by author.

Site Selection Criteria and Selected Site

Site 1

Nestled near the major access route of the Lekki-Epe Highway, this site offers strategic advantages for the envisioned low-income residential community. Surrounded by predominantly high-income residential estates, the location fosters a dynamic social landscape while maintaining accessibility to essential services. The site's advantageous proximity to central business districts, easily reachable via the highway, ensures economic opportunities for residents. Positioned farther from local markets, the community enjoys a balanced environment, minimizing potential disruptions associated with market activities. Additionally, the site boasts a favorable topography, characterized by lower flood risk, enhancing the safety and resilience of the proposed community. This site selection aligns with the project's goals of creating a secure, accessible, and economically viable living space for the target demographic.

Land size	6
Proximity to Business District	9
Accessibility and Transportation	10
Infrastructure Availability	10
Community Support and engagement	8
Security and Safety	9
Less Flood Prone	9
Distant from water body	10
Future expansion opportunity	5
Low income demographic	5
	81

Figure 15: Site selection 1. Image by author.

Site 2: Chevron, Eti-Osa

This site is situated near the pivotal Lekki-Epe Highway and holds strategic significance for the envisioned project. A predominantly high-income residential context surrounds the location and ensures a harmonious integration into affluent neighborhoods. While farther from the central business districts accessible through

the highway, the site gains an advantageous distance from the bustling urban core. Its proximity to Ajah Market provides convenient access to local commercial activities, fostering a connection with the broader community. Although there may be a higher susceptibility to flooding, the site's closeness to the lagoon introduces opportunities for activities such as fishing, adding a valuable dimension to the community's potential lifestyle.

Land size	8.5
Proximity to Business District	7.5
Accessibility and Transportation	10
Infrastructure Availability	10
Community Support and engagement	8
Security and Safety	9
Less Flood Prone	7
Distant from water body	8
Future expansion opportunity	8
Low income demographic	6
	82

Figure 16: Site selection 2. Image by author.

Site 3: Ogombo Rd, Eti-Osa (Ajah) (Selected Site)

This site has been carefully selected due to its strategic location, offering a more enabling community atmosphere and proximity to major markets. Situated near the Lekki-Epe Highway and accessible through the Lekki-Epe expressway, it provides a convenient and well-connected setting. Moreover, its proximity to both low-income and middle-income neighborhoods reflects a diverse and inclusive community. The presence of Ajah Markets in the vicinity adds to the appeal, ensuring that residents have easy access to essential commercial activities. However, it's crucial to acknowledge the potential for flood tendencies in the area, emphasizing the need for thorough planning and resilient strategies to address such challenges.

Land size	10
Proximity to Business District	6.5
Accessibility and Transportation	9
Infrastructure Availability	8.5
Community Support and engagement	9
Security and Safety	7
Less Flood Prone	6
Distant from water body	8
Future expansion opportunity	10
Low income demographic	9
	83

Figure 17: Site selection 3. Image by author.

Chapter 9: Design

Design Criteria

While carrying out the study, it was discovered that resilience and resilient affordable housing can be split into three main criteria: economic, social, and environmental resilience. These findings highlight that a low-income residential community, especially in the context of Lagos, must fulfill these aspects of sustainability to be termed resilient. The goal of the design, therefore, is to demonstrate how these criteria can be addressed at different scales: site selection, surrounding context, site planning, cluster, building, and unit scale. This comprehensive approach informed every aspect of the project, from choosing the location to determining the specific programs and overall design.

Program

In the thesis design for sustainable and resilient affordable housing, the allocation of spaces into three distinct groups—community revitalization, environmental adaptation, and economic advancement—serves as a strategic framework to address the central ideas of sustainable housing. The spaces designated for community revitalization aim to foster social resilience by promoting interaction, cohesion, and well-being among residents. These areas may include communal gathering spaces, recreational facilities, and shared amenities that encourage community engagement and support networks. Simultaneously, spaces dedicated to environmental adaptation focus on enhancing the ecological sustainability of the housing development. This includes features such as green infrastructure, energy-efficient systems, and passive

design strategies that mitigate environmental impacts, improve resource efficiency, and promote resilience to climate change. Finally, spaces allocated for economic advancement are designed to bolster economic resilience by creating opportunities for income generation, skill development, and entrepreneurship within the community. These areas may encompass mixed-use commercial spaces, vocational training centers within the community center, or skill acquisition spaces in the community school to empower residents and contribute to long-term financial stability.

Site Approach

After locating the site in a viable zone in the city to support the livelihood of the residents, the next step was to adopt the design to the surrounding context, mostly new residential developments. The public-facing streets will be lined with shops and markets to encourage economic growth by drawing the neighboring communities to patronize (economic strategy). The was designed in zones with clusters organized around community gardens to promote social interaction in the site plan scale (social resilience strategy). The East-West direction of the buildings was to maximize sun shading and ventilation. Because the site is relatively flat, the green spaces were connected regularly through a system of rain gardens and bioswales that drained to floodable zones to ease flooding (environmental strategy).

Cluster and Building Scale

Buildings were designed in regular clusters to ensure ventilation and shading in the buildings. Each cluster had courtyards that provided social spaces that doubled as recreational and economic support spaces for agricultural purposes. The clusters comprised the two building types A and B.

Building type A contains Studio, two-bedroom, and three-bedroom apartments. This diversity helps to encourage social interaction in the units as these three types are designed around courtyards. Cross-ventilation was enforced in each room of every unit and the public living areas face the courtyards within each building to improve personal security and encourage neighborhood watch.

Building Type B contains shared apartments of two bedrooms to one kitchen and a personal bathroom space. These units were also designed around courtyards to enforce social interaction and improve cooling and sun shading while providing recreational and agricultural outdoor spaces that are shaded.

The buildings took a more extreme design approach by being raised above ground floor level. This is due to the future sea level rise statistics in Lagos. Materiality was considered as an important aspect of affordability in the design. The enclosure was made of Compressed Earth Bricks, the main structure was made of concrete. The roof was made of corrugated metal sheet and the louvre windows were made of plexiglass from recycled plastic material.

Chapter 10: Conclusion

In conclusion, this thesis has explored the intricate relationship between sustainable housing and resilience, specifically within the context of low-income residential communities in Lagos. By identifying and addressing the three main criteria of economic, social, and environmental resilience, the study has demonstrated how a holistic and integrated approach to design can create robust, vibrant, and sustainable communities. Through thoughtful site selection, context-aware planning, and innovative design strategies at various scales, the proposed development aims to foster a resilient living environment that supports economic empowerment, social cohesion, and environmental adaptation. Ultimately, this project serves as a model for future affordable housing developments, showcasing how comprehensive design principles can significantly enhance the quality of life for urban poor populations while promoting overall city resilience.

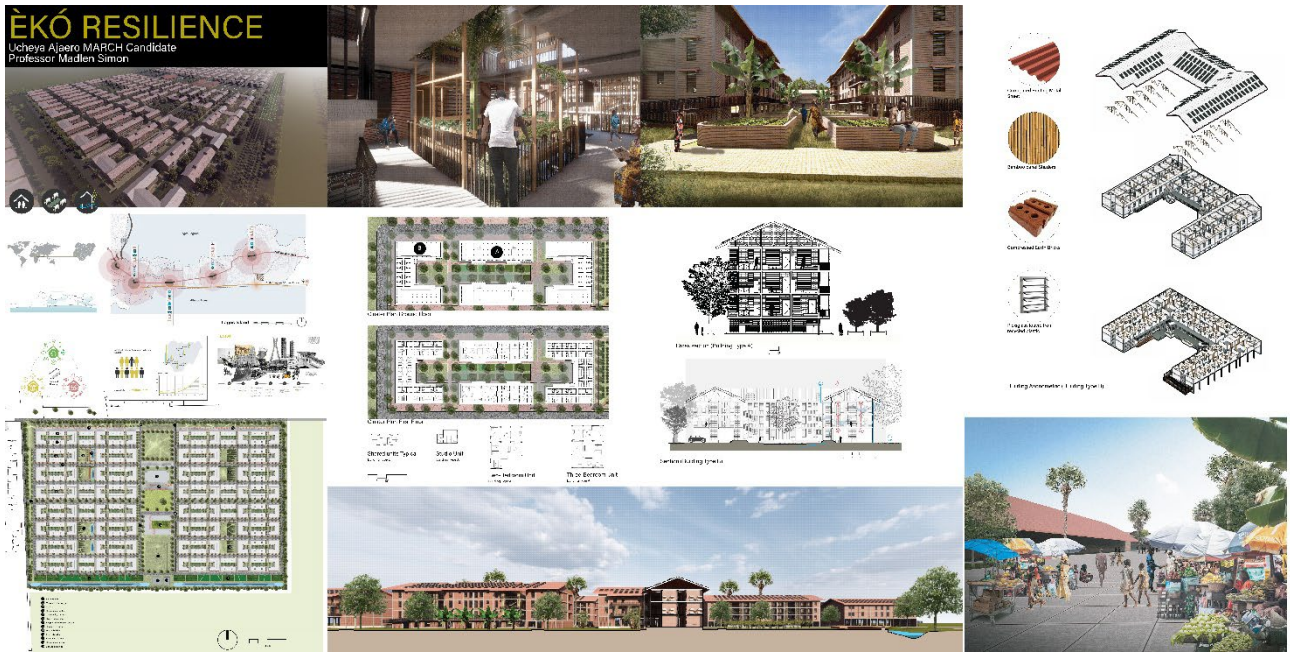

Figure 18: Presentation Boards. Image by author

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