Housing Typologies, Quality, And Determinants in Lagos' Waterlogged Informal Settlements: A Case Study of Makoko

ADERINTO ABRAHAM OLUWASEUN[1], DORCAS OLUWASEYI ADEOYE[2], OLASEHINDE OLUWAFEMI[3]
[1, 2, 3]*Department Of Architecture, Faculty of Environmental Sciences, Ladoke Akintola Universities of Technology, Ogbomoso, Oyo State*

Abstract- ***Informal settlements in urban coastal regions of Nigeria, such as Makoko in Lagos State, are increasingly strained by rapid urbanization, environmental hazards, and infrastructural neglect. Despite its cultural vibrancy and adaptive resilience, the settlement suffers from deeply inadequate housing conditions and minimal state intervention. This study investigates the housing typologies, assesses the quality of housing, and identifies the key socio-economic and environmental factors affecting residential conditions in the area. A mixed-methods research design was adopted, combining quantitative surveys (administered to 400 residents across four distinct zones of Makoko) with quantitative tools such as Questionnaire administration. Descriptive statistics tools like percentage, frequency count, weighted values to assess housing typologies, neighbourhood characteristics and evaluate the quality of housing structures. Findings revealed a complex picture. While many residents rated their houses as structurally sound and adequately ventilated, serious challenges emerged. Over 69% reported poor access to clean water and sanitation; 75.9% described waste management and drainage systems as ineffective; and nearly 60% highlighted insufficient housing space, leading to overcrowding. Flooding was identified as a major recurring hazard, exacerbated by poor drainage and the lack of climate-adaptive design. Although some homes use durable materials, resistance to water damage remains inconsistent across the community. Public amenities such as schools, healthcare centre, and markets were largely absent, contributing to socio-spatial deprivation. The study concludes that the overall housing quality in Makoko remains critically low due to environmental vulnerability, socio-economic marginalization, and the absence of strategic urban planning. It recommends the adoption of resilient and context-specific housing designs suited to flood-prone environments, improved access to basic services, and inclusive policy frameworks that prioritize tenure security, infrastructure investment, and community participation. Addressing these multi-dimensional deficits is essential for transforming Makoko into a more sustainable and livable urban habitat.***

Indexed Terms- ***Makoko, Housing Quality, Housing Typologies, Waterlogged Communities, Environmental Vulnerability***

I. INTRODUCTION

Housing is widely recognized as a fundamental human need that supports individual well-being, social stability, and economic development. It encompasses more than just physical shelter, including the infrastructure and amenities necessary for comfortable living—such as roads, waste disposal systems, and water supply (Yoade, Adeyemi, & Yoade, 2018). Housing quality profoundly influences health, security, and socio-economic outcomes, and reflects the standard of living of households (Olotuah, 2016). The perception of housing has evolved from a mere enclosure to a composite system of services, aesthetics, and cultural expression (Owoeye & Ogundiran, 2014).

In Nigeria, the housing deficit is closely tied to rapid urbanization. The urban population has increased from 15.4% in 1960 to over 54% by 2022 (Adedeji, Deveci, & Salman, 2023), and is projected to rise further, placing immense pressure on infrastructure and housing supply. Despite various government initiatives (UN-Habitat, 2013), many urban residents still live in inadequate housing conditions due to

affordability constraints and weak policy implementation (Jamaludin, Mahayuddin, & Hamid, 2018). Consequently, low-income populations are often forced into slums and informal settlements characterized by poor construction quality and environmental vulnerability.

One prominent example is Makoko, a waterfront slum in Lagos State, Nigeria. The community is built on stilts over the Lagos Lagoon and is home to thousands of people living in precarious housing conditions. The area faces chronic challenges including frequent flooding, deteriorating infrastructure, and inadequate access to clean water, sanitation, and waste management. These conditions are compounded by the socio-economic marginalization of its residents, many of whom rely on informal economic activities such as fishing and trading (Ajayi et al., 2014).

Although several studies have examined housing conditions in Nigerian cities (Olotuah, 2016; Amao & Ilesanmi, 2013; Makinde, 2020), there is a significant research gap concerning the typological assessment, quality evaluation, and influencing factors in waterlogged settlements like Makoko. Previous efforts have been fragmented, lacking a comprehensive framework that captures the environmental, cultural, and socio-economic realities of such communities (Adeoye, 2016; Yoade et al., 2015; Owolabi & Oluwaseyi, 2020). Moreover, most housing interventions have failed to account for the unique ecological pressures in riverine areas, particularly the impact of flooding on structural stability and public health.

The housing typologies in Makoko are largely informal and unregulated, often constructed with low-grade materials susceptible to water damage. The absence of spatial planning and regulatory enforcement exacerbates overcrowding and environmental degradation. Without clear benchmarks for housing quality or an understanding of the factors shaping it, any proposed interventions remain ineffective or unsustainable (Olukemi et al., 2022; Ogunlesi, 2016).

This study therefore aims to fill this critical gap by investigating the housing typologies in Makoko, evaluating their quality against recognized standards, and analyzing the environmental and socio-economic factors influencing housing outcomes. By doing so, it contributes to the discourse on sustainable and inclusive housing development in informal, flood-prone urban environments in Nigeria and the Global South.

Aim of the Study

The aim of this study is to examine housing typologies, neighborhood conditions, and overall housing quality in the waterlogged informal settlement of Makoko, Lagos State, with a focus on identifying spatial and environmental deficiencies.

Objectives of the Study

To achieve this aim, the study specifically seeks to:

1. Assess the existing housing typologies and neighborhood characteristics in the Makoko waterlogged area.
2. Evaluate the quality of housing structures, including their physical condition, spatial adequacy, ventilation, and resilience to environmental challenges.

Study Area

Makoko is an informal waterfront community located along the eastern edge of the Lagos Lagoon in Lagos, Nigeria. Often referred to as the “Venice of Africa,” it comprises both land-based and water-based sections, the latter characterized by stilt houses built over the lagoon. Home to an estimated 240,000 to 255,000 residents, the population is ethnically diverse, predominantly Egun and Yoruba.

Despite its rich cultural identity, Makoko faces acute socio-economic and environmental challenges. Most residents live in poverty, relying on fishing and petty trade, with limited access to formal education, healthcare, and public infrastructure. Housing in the area is largely informal, substandard, and vulnerable to frequent flooding. The use of low-quality materials and the absence of essential services such as clean water, sanitation, and waste management contribute to severe health and safety risks.

Environmental hazards including water pollution, inadequate drainage, and poor waste disposal—exacerbate living conditions. Nonetheless, the community remains socially cohesive, with strong

cultural traditions and adaptive resilience. Makoko's complex housing landscape provides a critical context for evaluating informal housing typologies and quality in a waterlogged urban setting.

Map of Makoko Community, Lagos

Overview of Makoko Community, Lagos

II. LITERATURE REVIEW

Housing Quality: Definitions and Indicators

Housing quality encompasses both the physical state of residential structures and the living environment surrounding them. According to Amao (2012), quality housing satisfies minimum health and safety standards and should remain affordable across income groups. Key indicators of housing quality include durability, structural integrity, ventilation, access to water and sanitation, noise levels, and spatial adequacy. Neilson (2004) outlined five essential quality criteria: compliance with tolerable standards, absence of severe disrepair, energy efficiency, availability of modern facilities, and safety.

In Nigeria, research consistently shows that a large proportion of urban housing falls short of acceptable quality. Olotuah (2016) reports that over 75% of urban housing units are substandard, often located in informal settlements or slums. These deficiencies result from inadequate planning, poor maintenance, natural ageing, and lack of access to basic urban services. Aribigbola (2000) emphasizes that inadequate housing reflects broader inequalities in city planning and contributes to poor urban health outcomes.

Informal Settlements and Housing Typologies

Informal settlements have become a defining feature of urban expansion in many developing countries. These areas are often established without formal planning approval and evolve through self-help construction methods. Housing typologies in such settlements are typically characterized by temporary or semi-permanent structures, high population density, and poor access to services (Simon, Adegoke, & Adewale, 2013).

Makoko, in particular, represents a distinctive informal settlement typology, with many homes built on stilts over the Lagos Lagoon. The community's housing reflects an adaptation to the aquatic environment but remains highly vulnerable to environmental stressors such as flooding, water pollution, and seasonal storms (Ajayi et al., 2014). These typologies, while resilient in a cultural sense, fail to meet global standards for healthy living due to overcrowding, lack of sanitation, and inadequate structural materials.

Environmental and Socio-Economic Determinants of Housing Quality

Housing quality in informal, waterlogged settlements like Makoko is influenced by both environmental and socio-economic factors. Adeoye (2016) and Yoade et al. (2015) identified determinants including income level, education, occupation, access to building materials, and environmental exposure. In Makoko, the absence of formal land rights and infrastructure planning has limited residents' ability to invest in durable structures.

Environmental conditions such as constant flooding, poor drainage, and water contamination further

compromise structural integrity and health. According to Olukemi et al. (2022), repeated exposure to environmental hazards in Lagos' slums contributes to increased vulnerability and reduces household capacity to maintain housing. Owoeye and Ogundiran (2014) observed that poor urban governance and spatial neglect exacerbate the deterioration of housing quality in marginalized communities.

Sustainable and Resilient Housing Approaches

Sustainable housing addresses environmental, economic, and social aspects of housing development. As Stevenson and Williams (2005) assert, sustainable housing involves reducing carbon emissions, minimizing ecological footprints, and improving living standards through energy-efficient, low-impact materials. In the context of informal settlements, sustainability must also account for affordability, cultural appropriateness, and adaptability to local climate conditions (Makinde, 2020).

Resilient housing in riverine and waterlogged areas requires elevated building designs, flood-resistant materials, and integration with natural water flows (Adegun & Aigbavboa, 2019). Theories such as the Triple Bottom Line (Elkington, 1997), Cradle to Cradle Design (McDonough & Braungart, 2002), and Resilience Theory support the need for integrated housing solutions that address long-term environmental challenges and community development.

The Riverine Context: Implications for Makoko

Riverine settlements present distinct ecological and infrastructural challenges. Defined by their proximity to water bodies, they are often isolated, underserved, and ecologically fragile. Housing in such areas, as in Makoko, is uniquely shaped by hydrological conditions residents must contend with seasonal floods, unstable soils, and limited access to dry land. These factors limit conventional construction approaches and exacerbate housing vulnerability (Chima & Alexander, 2021).

Despite the harsh living conditions, communities like Makoko exhibit adaptive strategies rooted in cultural identity and economic necessity. However, without targeted interventions, these adaptations remain insufficient to mitigate long-term risks posed by climate change and urbanization.

Research Gaps and Relevance to the Present Study

While numerous studies have addressed general housing challenges in Nigerian cities (e.g., Amao & Ilesanmi, 2013; Makinde, 2020; Olotuah, 2016), few have focused on the intersection of housing typology, quality assessment, and environmental determinants in waterlogged, informal settlements. The unique conditions in Makoko its floating housing typologies, ecological setting, and socio-economic marginalization are rarely studied in an integrated framework.

This study therefore contributes to the literature by providing a comprehensive analysis of housing typologies and quality in Makoko, identifying critical environmental and socio-economic factors that influence housing outcomes. Its findings are intended to inform the development of context-sensitive, sustainable housing strategies for marginalized waterfront communities in Lagos and beyond.

III. RESEARCH METHODOLOGY

Research Design

This study adopted a mixed-methods research design, integrating both quantitative and qualitative approaches to evaluate housing typologies, housing quality, and their influencing factors in the waterlogged Makoko settlement of Lagos State, Nigeria. The mixed-methods strategy enabled a holistic understanding of housing conditions through both statistical analysis and community-based insights. Quantitative data were collected using structured questionnaires with closed-ended items, while qualitative data were gathered via interviews and focus group discussions to capture contextual and experiential perspectives of residents.

Data Collection Methods

Primary data were collected directly from residents of the Makoko community. Instruments used included structured questionnaires. Secondary data were obtained from relevant scholarly journals, government reports, published literature, and official statistics. These included demographic information, housing

distribution data, and environmental conditions relevant to the Makoko area. Maps, archival images, and previous studies were also reviewed to establish contextual understanding and historical background.

Sampling Frame and Sample Size

The sampling frame included all residential wards in the Makoko community, subdivided into four administrative zones: Makoko North, Makoko Central, Makoko South-East, and Makoko Waterside. A total estimated population of 250,000 was used as the base for sampling.

The Slovin formula was applied to determine an appropriate sample size at a 95% confidence level and a 5% margin of error. This yielded a sample size of 400 respondents, proportionally distributed across the four wards to ensure spatial and demographic representation:

i. Makoko North: 112 respondents
ii. Makoko Central: 73 respondents
iii. Makoko South-East: 94 respondents
iv. Makoko Waterside (on water): 121 respondents

This sampling structure ensured statistical reliability and generalizability of findings.

Sampling Technique

A multi-stage sampling technique was employed. In the first stage, purposive sampling was used to select the Makoko community, given its relevance as a waterlogged, informal settlement. Subsequently, systematic sampling was employed within each ward to select respondents. After selecting a random starting point, every third household was approached for participation, ensuring evenly distributed coverage of the area while avoiding sampling bias.

Instruments for Data Collection

The study utilized a range of instruments to enhance data validity and triangulation:

i. Structured questionnaires: For quantitative data on housing typology and quality indicators.
ii. Archival research: Involved the analysis of historical maps, settlement records, and satellite imagery for spatial validation.

Data Analysis Techniques

Quantitative data were analyzed using descriptive statistics, including frequencies, percentages, means, and graphical representations such as bar charts and pie charts. These analyses were used to profile housing types, assess infrastructure availability, and identify trends in housing quality across the study zones.

IV. ANALYSIS AND RESULTS

The Housing Condition and Neighborhood Characteristics of the Makoko waterlogged Area.

Findings from the study as revealed by Table 1 highlights respondents' perceptions of housing conditions and neighborhood characteristics in the Makoko waterlogged area, (Figure 1) Regarding the housing condition and neighborhood characteristics, most of the respondents 44.8% agreed and 39.7% strongly agreed that the houses are well-built, while 34, 8.6% disagreed, 1.7% strongly disagreed, and 5.2% were undecided. The findings indicated a generally positive view of housing quality, with a mean score of 4.12(SD = 0.84) for the statement that houses are well-built. This suggests that the majority of the respondents believe the structures are sound, although the moderate standard deviation indicates some variation in opinions with concerns among a minority due to observable construction deficiencies. 44.8% respondents strongly agreed and 37.1% agreed that durable materials were used for housing construction in Makoko. A small proportion 6.0% disagreed, and 0.9% strongly disagreed. The high mean scores 4.26(SD = 0.87) reflects confidence in the durability of materials despite possible environmental challenges that could reduce longevity. Houses in Makoko received relatively favorable ratings for ventilation and natural lighting, as (45.7%) of the respondents agreed and 138(34.5%) strongly agreed, while only 9.5% disagreed. The mean score of 4.05(SD = 0.87) indicates adequate ventilation and lighting, although a small minority reported deficiencies likely linked to overcrowding or poor house design. Safety and security were also rated positively, with 53.4% of the respondents that agreed and 22.4% who strongly agreed that the houses are safe and secure. However, 7.8% disagreed with the notion. A mean score of 3.80(SD = 0.96) suggests a generally positive view of safety. Although, despite the

overall positive perception, concerns about safety persist among a minority of residents, likely stemming from crime or structural hazards.

Access to clean water and proper sanitation facilities was identified as a critical challenge, as 33.6% of the respondents disagreed and 34.5% strongly disagreed that such facilities are adequate. Only 13.8% of the respondents agreed and 7.8% strongly agreed that they have access to clean water and proper sanitation facilities. A low mean score of 2.26(SD = 1.31) reflects significant challenges regarding water and sanitation access, which are critical for public health.

Housing space was similarly perceived as inadequate, as 56.9% of the respondents disagreed and 14.7% strongly disagreed that the space is sufficient for residents. In contrast, only 13.8% agreed, and 6.9% strongly agreed, while 7.8% were neutral. A low mean score of 2.41(SD = 1.23) suggest that overcrowding which is likely exacerbated by the population density is a prevalent issue, which can negatively impact living conditions in the Makoko waterlogged area. Most respondents criticized and expressed dissatisfaction with the development and accessibility of waterways and pathways, as 49.1% strongly disagreed, and 22.4% disagreed. Only 10.3% agreed and 7.8% strongly agreed, while 10.3% were neutral. The low mean score of 2.06(SD = 1.34) highlights challenges in mobility and accessibility which hinders effective transportation and economic activities in the study area. Similarly, flooding is poorly managed in the area, as 54.3% of the respondents strongly disagreed and 17.2% disagreed that flooding is effectively managed. Only 10.3% of the respondents strongly agreed, 9.5% agreed, while 8.6% remained neutral. A low mean score of 2.13(SD = 1.37) is showing that flooding poses a significant environmental challenge in the Makoko waterlogged area.

Waste disposal and management were described as inefficient by the responses of 60.3% of the respondents who strongly disagreed and 15.5% disagreed. Few respondents 12.9% agreed and 6.9% strongly agreed, while 4.3% were neutral. The mean score of 2.11(SD = 1.40) indicates a general inefficiency in waste management practices in the Makoko waterlogged area which was the likely contributing factor to environmental degradation, flooding and public health risks, emphasizing the urgent need for better waste management systems.

Public amenities such as schools, markets, and parks were considered insufficient in the study area, with 58.6% of the respondents who strongly disagreed and 13.8% that disagreed on the adequacy and availability of these public amenities. The mean score of 2.23(SD = 1.41) reflects the general dissatisfaction of the respondents with the lack of essential social infrastructure such as schools and market, highlighting the pressing needs for social infrastructures. (See Table 1)

Table 1: The housing conditions and neighborhood characteristics in the study area

Housing condition and neighborhood characteristics		Strongly Agree		Agree		Neutral		Disagree		Strongly disagree		TWV	TWV/n	Mean (std. deviation)	
		F	%	F	%	F	%	F	%	F	%			M	SD
1	The houses in Makoko are well-built and structurally sound	159	39.7	179	44.8	21	5.2	34	8.6	7	1.7	1649	4.12	4.12	0.84
2	The materials used for building houses in	179	44.8	148	37.1	13	11.2	7	6.0	1	0.9	1541	3.85	4.26	0.87

	Makoko are durable and long-lasting														
3	Houses in Makoko have adequate ventilation and natural lighting	138	34.5	183	45.7	12	10.3	11	9.5	0	0	1480	3.70	4.05	0.87
4	The houses in Makoko are safe and secure for living	90	22.4	214	53.4	13	11.2	9	7.8	6	5.2	1369	3.42	3.80	0.96
5	There is easy access to clean water and proper sanitation facilities within the housing units	31	7.8	55	13.8	12	10.3	39	33.6	40	34.5	529	1.32	2.26	1.31
6	The space within the houses is sufficient for the number of residents living there	28	6.9	55	13.8	9	7.8	66	56.9	17	14.7	536	1.34	2.41	1.23
7	The waterways and pathways in the Makoko area are well-developed and accessible	31	7.8	41	10.3	12	10.3	26	22.4	57	49.1	464	1.16	2.06	1.34
8	Flooding is effectively managed in Makoko, reducing its impact on the	41	10.3	38	9.5	10	8.6	20	17.2	63	54.3	490	1.23	2.13	1.37

	neighborhood														
9	Waste disposal and management in Makoko are well-organized and efficient	28	6.9	52	12.9	5	4.3	18	15.5	70	60.3	469	1.17	2.11	1.40
10	There are sufficient public amenities (such as schools, markets, and parks) available in the neighborhood	34	8.6	34	8.6	12	10.3	16	13.8	68	58.6	442	1.11	2.23	1.41

Source: Author's computation 2025

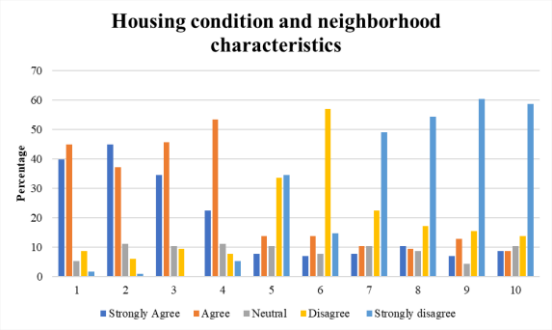

Figure 1: Housing condition and neighborhood characteristics

Source: Author's field work (2025)

Housing quality in the study area

The general overview of respondents' perception on the housing quality in Makoko waterlogged area revealed that the structural integrity of houses, 38.8% of the respondents rated it as very good, while 42.2% rated it as good. Only 10.3% of the respondents considered the structural integrity to be excellent, while 8.6% rated it as very poor. With a mean of 3.5 (SD = 0.9), the data result indicates a generally positive perception of housing quality in the study area, though the standard deviation suggests some variability in opinions. This variability may reflect differences in personal experiences or expectations regarding housing quality.

For the respondents' perception of the quality of building materials, 37.9% of the respondents rated them as very good, while 43.1% as good, with 9.5% indicating excellent quality and just 9.5% describing it as very poor. The mean score of 3.5(SD = 0.9) reaffirms a positive perception of building materials, yet the standard deviation indicates that not all residents share this view. These results suggest that while the majority perceive the structural integrity and materials as satisfactory, only a few minority finds them exceptional, reflecting variability in construction quality and durability of the materials in the study area.

Natural lighting was considered good by 48.3% of the respondents and very good by 36.2%, with 9.5% rating it as excellent. A small proportion, 6.0% of the respondents, rated it as very poor. The mean score of 3.3(SD = 0.9) indicates general satisfaction with natural lighting, but the standard deviation reflects that some respondents still find it lacking. This variability suggests that while most homes provide adequate light, improvements may be necessary for those that do not.

For ventilation and air quality, 56.9% of the respondents rated it as good, 23.3% as very good, while 10.3% rated it excellent. However, 9.5% of the respondents rated ventilation as very poor in the building. The mean of 3.5(SD = 0.9) suggests that most residents feel ventilation meets their needs, but the standard deviation indicates some dissatisfaction. These results indicate that while lighting and ventilation meet basic standards for most residents, some of respondents find them suboptimal, which could affect overall housing comfort and satisfaction. Hence, improvements are necessary to ensure universal adequacy.

The study revealed that 60.3% of the respondents rated the resistance to water damage in the building units as good, and 13.8% as very good. However, 20.7% rated it as very poor. With a mean of 3.2(SD = 1.0), there is a clear concern about the vulnerability of housing to water damage. The higher standard deviation indicates significant variability in perceptions, suggesting that while some homes perform adequately, many do not withstand water challenges effectively.

The space and layout of houses were rated as good by 68.1% of the respondents and very good by 10.3%, while only 5.2% of the respondents rated them as excellent. However, 16.4% of the respondents rated them as very poor, reflecting overcrowding and spatial inadequacies. The mean of 3.2(SD = 1.0) indicates that while most find the space acceptable, the standard deviation signifies dissatisfaction among a notable minority. This suggests issues of overcrowding or inadequate layout in some homes.

Similarly, security was rated as good by 68.1% of the respondents and very good by 16.4%, with 6.0% rating it as excellent. However, 9.5% of the respondents rated it as very poor. The mean score of 3.4 (SD = 1.0) reflects a generally positive view of security, but the standard deviation indicates concerns that may arise from crime or inadequate safety measures in certain areas that undermine residents' satisfaction with housing in the area.

Maintenance services generally received moderate ratings, with 67.2% of the respondents describing them as good, 16.1% as very good and 4.3% as excellent. However, 16.1% rated it as very poor indicating inconsistencies in service delivery. Maintenance house in Makoko is done by the residents in the study area. The mean of 3.2(SD = 1.0) suggests moderate satisfaction, but the variability indicated by the standard deviation highlights inconsistencies in service delivery, which could affect residents' overall satisfaction.

Waste management and sanitation facilities, however, were rated poorly. For waste management, 75.9% of the respondents described it as very poor, while 10.3% rated it as good and 8.6% described it as very good, with a small percentage 5.2% perceiving it as excellent. The mean of 3.0(SD = 1.0) indicates a severe deficiency in waste management services. The high standard deviation reflects a consensus among residents about the inadequacy of services, signaling an urgent need for improvement.

Similarly, sanitation facilities were rated as very poor by most of the respondents 75.9%, while 11.2% rated them as good and 8.6% agreed its very good. The mean of 3.0(SD = 1.0) reinforces the critical deficiencies in basic wasted management and health infrastructure, with a high standard deviation indicating widespread discontent among residents regarding basic health infrastructure.

The level of overall satisfaction with housing quality in the study area reflects a mixed assessment among respondents. As shown in the table (Table 2), 37.0% reported that their overall level of satisfaction with housing quality as satisfied and fair respectively. Furthermore, 12.0% of the respondents were very satisfied with the overall housing quality, suggesting that a significant number of residents have a highly positive perception of housing quality. On the other hand, dissatisfaction was evident among a smaller proportion of respondents on housing quality. Specifically, 12.9% of the respondents reported being dissatisfied, and 1.0% of the respondent indicated being very dissatisfied. This highlights that while the majority of residents are either moderately satisfied or perceive housing quality as fair, there remains a segment of the population that are dissatisfied with their housing conditions.

The findings suggest that while housing quality meets basic expectations for a significant portion of the population, there are aspects of housing that fall short, leading to dissatisfaction for some residents. Factors

such as poor waste management, inadequate sanitation facilities, overcrowding, and issues with water damage identified in earlier sections likely contribute to this dissatisfaction. Addressing these deficiencies through improved infrastructure, better urban services, and enforcement of housing standards could enhance the overall housing experience and increase satisfaction levels among residents.

Table 2: Housing quality evaluation in the study area

Housing quality evaluation	Excellent		Very Good		Good		Very Poor		TWV	TWV/n	Mean (std. deviation)	
	F	%	F	%	F	%	F	%			M	SD
Structural integrity	41	10.3	155	38.8	169	42.2	35	8.6	1002	2.51	3.5	0.9
Quality of building materials	38	9.5	152	37.9	172	43.1	38	9.5	990	2.48	3.5	0.9
Natural lightening	38	9.5	145	36.2	194	48.3	24	6.0	999	2.49	3.3	0.9
Ventilation and air quality	41	10.3	93	23.3	231	56.9	39	9.5	944	2.34	3.5	0.9
Resistance to water damage	21	5.2	55	13.8	241	60.3	83	20.7	814	2.03	3.2	1.0
Space and layout	21	5.2	41	10.3	273	68.1	66	16.4	819	2.04	3.2	1.0
Security	24	6.0	66	16.4	273	68.1	39	9.5	879	2.19	3.4	1.0
Maintenance services	17	4.3	41	10.3	269	67.2	73	16.1	802	2.01	3.2	1.0
Waste management in houses	21	5.2	35	8.6	41	10.3	304	75.9	575	1.43	3.0	1.0
Sanitation facilities	17	4.3	35	8.6	45	11.2	304	75.9	567	1.41	3	1.0
Overall satisfaction with the housing quality												
Overall, how satisfied are you with the housing quality?	Very satisfied		Satisfied		Fair		Dissatisfied				Very dissatisfied	
	F	%	F	%	F	%	F	%			F	%
	48	12.0	148	37.0	148	37.0	52	12.9	984	2.46	4	1.0

Source: Author's computation 2025

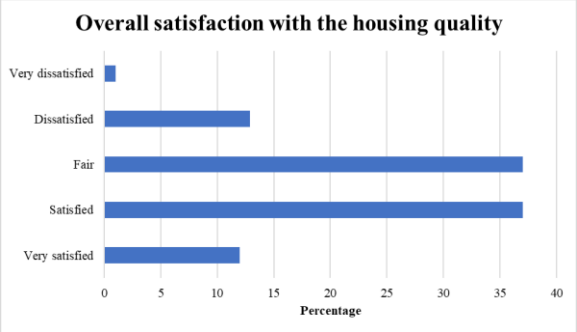

Figure 2: Overall satisfaction with the housing quality

Source: Author's field work (2024)

CONCLUSION

This study assessed the housing typologies, quality, and determinants within the waterlogged informal settlement of Makoko, Lagos State. Drawing from a mixed-methods approach involving surveys, interviews, and observations, the research offers critical insights into the spatial, structural, and socio-environmental conditions that define housing in this uniquely vulnerable community.

The findings revealed a diverse mix of informal housing typologies, predominantly constructed from local materials such as wood and zinc, many of which are erected on stilts over the lagoon. While a significant proportion of residents perceive their housing as structurally sound and adequately ventilated, the study uncovered major deficits in sanitation, spatial adequacy, waste management, and flood control. These deficiencies are compounded by environmental stressors and limited access to public infrastructure.

Furthermore, the research identified key determinants of housing quality, including income level, environmental exposure (e.g., water damage and flooding), building materials, and socio-political neglect. While residents demonstrate resilience and cultural adaptation, many dwellings fall short of internationally recognized housing standards, thereby compromising health, safety, and dignity.

In conclusion, while some physical attributes of housing in Makoko meet basic survival needs, the overall quality of life is severely constrained by systemic infrastructural deficits, environmental vulnerability, and the absence of regulatory planning. A comprehensive intervention combining community participation, resilient design principles, and sustainable urban governance is essential to uplift housing standards in such marginalized, waterlogged settings.

RECOMMENDATIONS

Improving housing quality in Makoko's waterlogged informal settlement requires a multifaceted and inclusive approach. Based on the findings of this study, it is recommended that resilient housing solutions be developed using durable, flood-resistant materials and elevated structural designs. These solutions should be affordable, adaptable, and capable of withstanding the area's frequent environmental challenges. Modular and flexible construction methods that align with the aquatic terrain of Makoko should also be considered to enhance longevity and functionality.

In addition to physical improvements, there is an urgent need to upgrade the basic infrastructure and services in the community. Access to clean water, proper sanitation facilities, and efficient waste management systems is critically inadequate and must be prioritized. Investments in decentralized water purification systems, community toilets, and organized waste disposal can significantly improve public health and reduce environmental degradation.

Urban planning efforts must move beyond conventional top-down models and embrace a more inclusive and context-sensitive framework. Any future interventions in Makoko should reflect the community's unique spatial layout, socio-cultural structure, and economic realities. Rather than displacing residents, urban policy should formalize tenure and provide secure housing rights while integrating local knowledge into the planning process.

Community participation should be central to housing interventions. Engaging residents in the planning, design, and implementation of housing projects can ensure the relevance, acceptance, and sustainability of solutions. This participatory approach also empowers

communities and promotes shared responsibility for maintaining improved living conditions.

To support such initiatives, public-private partnerships (PPPs) should be explored. These partnerships can help mobilize funding for large-scale housing improvements while encouraging innovation and efficiency through private sector involvement. Social impact investments and corporate social responsibility initiatives targeting climate-resilient housing could play a transformative role in improving life in informal settlements like Makoko.

the settlement into a more sustainable, healthy, and dignified living environment.

REFERENCES

[1] Adedeji, I. (2023). Nigerian urbanization and the significance of affordable housing. Journal of Service Science and Management, 16, 351-368.

[2] Adedeji, I., Deveci, G., & Salman, H. (2023). The challenges in providing affordable housing in Nigeria and the adequate sustainable approaches for addressing them. Open Journal of Applied Sciences, 13, 431-448. https://doi.org/10.4236/ojapps.2023.133035

[3] Adeoye D. O. (2016). Challenges of Urban Housing Quality: Insights and Experiences of Akure, Nigeria.1877-0428 © 2016 Published by Elsevier Ltd. (http://creativecommons.org/licenses/by-nc-nd/4.0/).doi:10.1016/j.sbspro.2015.12.036

[4] Agbola, T., & Jinadu, A. M. (1997). Forced eviction and forced relocation in Nigeria: The experience of those evicted from Maroko in 1990. Environment and Urbanization, 9(2), 271-288. https://doi.org/10.1177/095624789700900219

[5] Ajayi O, Oviasogie F., Azuh D., & Duruji M. (2014). Urban Design and Sustainable Development: A Case of Makoko Area of Lagos State, Nigeria. European Scientific Journal June 2014 /SPECIAL/ edition vol.2 ISSN: 1857 – 7881 (Print) e - ISSN 1857- 7431

[6] Amao, F. L. (2012). Housing Quality in Informal Settlements and Urban Upgrading in Ibadan, Nigeria. Developing Country Studies, 2(10), 68–80

[7] Amao, F.L. (2012b). Urbanization, housing quality and environmental degeneration in Nigeria. Journal of Geography and Regional Planning. 5: 422-425.

[8] Amao, F. L., & Ilesanmi, A. O. (2013). Housing Quality in the Urban Fringes of Ibadan, 149–158.

[9] Aravena, A. (2016). Incremental housing and participatory design. Harvard Design Magazine, (42).

[10] Aribigbola, A. (2000). Conceptual issues in housing provision in Nigeria. In O. B. Akinbamijo, A. B. Fawehinmi, D. R. Ogunsemi, & A. Olotuah (Eds.), Effective housing in the 21st century Nigeria: Environmental forum FUTA, Nigeria.

[11] Aziz, A., Hoque, M., Chowdhury, R., & Rasul, M. (2020). Sustainable housing development in waterlogged areas: Challenges and opportunities. Sustainable Cities and Society, 54, 101954.

[12] Aziz, A., Rahman, M., Chowdhury, R., & Rasul, M. (2022). Socio-economic implications of waterlogging on housing quality: A case study of urban settlements in Southeast Asia. Habitat International, 125, 102352.

[13] Bayulken, B., & Huisingh, D. (2015). A literature review of historical trends and emerging theoretical approaches for developing sustainable cities (part 1). Journal of Cleaner Production, 109, 11-24.

[14] Bird, S., & Hernández, D. (2012). Policy options for the split incentive: Increasing energy efficiency for low-income renters. Energy Policy, 48, 506-514. https://doi.org/10.1016/j.enpol.2012.05.053

[15] Burra, S. (2005). Towards a pro-poor framework for slum upgrading in Mumbai, India. Environment and Urbanization, 17(1), 67-88.

[16] Chima Ichendu, & Alexander Chinago Budnukaeku. (2021). Sustainability concept: A key to development of housing for all. Journal of City and Development, 3(2), 82-90. https://doi.org/10.12691/jcd-3-2-3

[17] Cohen, M., New Conceptions of Sufficient Home Size in High-Income Countries: Are We Approaching a Sustainable Consumption

Transition? Housing, Theory and Society, 2021. 38(2): p. 173–203.

[18] Ding, G. K. C. (2008). Sustainable construction—The role of environmental assessment tools. Journal of Environmental Management, 86(3), 451-464. https://doi.org/10.1016/j.jenvman.2006.12.025

[19] Ezeh, A., Oyebode, O., Satterthwaite, D., Chen, Y. F., Ndugwa, R., Sartori, J., ... & Watson, S. I. (2016). The health of people who live in slums. The Lancet, 389(10068), 547- 558. https://doi.org/10.1016/S0140-6736(16)31848-7

[20] Elkington, J. (1997). Cannibals with Forks: The Triple Bottom Line of 21st Century Business. Capstone.

[21] Federal Government of Nigeria. (2009). Federal Government of Nigeria report of the Vision 2020 National Technical Working Group on Housing.

[22] Federal Ministry of Environment Department of Climate Change. (2021). National climate change policy for Nigeria 2021–2030.

[23] Fiori, J., & Brandão, Z. (2010). Spatial strategies and urban social policy: Urbanism and poverty reduction in the favelas of Rio de Janeiro. Progress in Planning, 73(4), 139- 185. https://doi.org/10.1016/j.progress.2010.09.001

[24] Fuerst, F., & McAllister, P. (2011). Green noise or green value? Measuring the effects of environmental certification on office values. Real Estate Economics, 39(1), 45-69. https://doi.org/10.1111/j.1540-6229.2010.00286.x

[25] Ganiyu, B., Fapohunda, J., & Rainer, H. (2014). Developing sustainable housing for low income class in Western Cape Province: Quality check on South African government low cost housing. 7th Annual SACQSP, 465-473.

[26] Gleick, P. H. (2003). Water use. Annual Review of Environment and Resources, 28(1), 275-314. https://doi.org/10.1146/annurev.energy.28.040202.122849

[27] Hillel, D. (2004). Introduction to environmental soil physics. Elsevier Academic Press.

[28] Hoque, M., & Ahmed, F. (2019). Improving housing quality in flood-prone areas: A case study of resilient housing design in Bangladesh. International Journal of Disaster Risk Reduction, 35, 101058.

[29] IPCC. (2021). Summary for policymakers. In V. Masson-Delmotte et al. (Eds.), Climate change 2021: The physical science basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.

[30] Johar, N. (2017). Community participation: A cementing process, theorizing various dimensions and approaches. Journal of Construction in Developing Countries, 22(Supp. 1), 47-61. https://doi.org/10.21315/jcdc2017.22.supp1.3

[31] Karim, H. A., & Rashid, S. M. A. (2012). Participation in Rukun Tetangga in PKNS flats as human responses to community safety. Procedia - Social and Behavioral Sciences, 49, 310-318. https://doi.org/10.1016/j.sbspro.2012.07.029

[32] Kar, S. S., & Ramalingam, A. (2013). Is 30 the magic number? Issues in sample size estimation. National Journal of Community Medicine, 4(1), 175-179.

[33] Kaza, N., Quercia, R. G., & Tian, C. Y. (2014). Home energy efficiency and mortgage risks. Cityscape, 16(1), 279-298.

[34] Kellert, S. R., Heerwagen, J., & Mador, M. (2008). Biophilic Design: The Theory, Science, and Practice of Bringing Buildings to Life. Wiley.

[35] Kwun-ling, B. M. (2011). Community participation in tourism: A case study from Tai O, Hong Kong (The University of Hong Kong). https://doi.org/10.5353/th

[36] Kyei-Nimakoh, M., Carolan-Olah, M., & McCann, T. V. (2016). Millennium Development Goal 5: Progress and challenges in reducing maternal deaths in Ghana. BMC Pregnancy and Childbirth, 16(1), 1-9. https://doi.org/10.1186/s12884-016- 0840-0

[37] Lines, K., & Makau, J. (2017). Muungano wa Wanavijiji—The Muungano alliance in Nairobi, Kenya. Environment and Urbanization, 29(1), 221-236.

[38] Makinde O. O. (2020). A Review of Essential Sustainable Development Principles in Housing: The Case of Nigeria. International Journal of Research and Scientific Innovation (IJRSI) | Volume VII, Issue I | ISSN 2321–2705 www.rsisinternational.org Page 201

[39] McConnell, C., Paul, A., & Paul, K. (2021). Engaging with communities. In International Community Development Practice (pp. 55-84). Routledge.

[40] McDonough, W., & Braungart, M. (2002). Cradle to Cradle: Remaking the Way We Make Things. North Point Press.

[41] McKinney, M. L. (2002). Urbanization, biodiversity, and conservation. BioScience, 52(10), 883-890. https://doi.org/10.1641/0006-3568(2002)052[0883:UBAC]2.0.CO;2

[42] Miller, N., Spivey, J., & Florance, A. (2008). Does green pay off?. Journal of Real Estate Portfolio Management, 14(4), 385-400. https://doi.org/10.1080/10835547.2008.12089747

[43] Mol, A. P. J., & Spaargaren, G. (2000). Ecological modernization theory in debate: A review. Environmental Politics, 9(1), 17-49.

[44] Neilson M (2004): Scottish housing quality Standard (SHQS), Scottish Executive Development Department.

[45] Olotuah, A. O. (2016). An appraisal of housing and neighborhood quality in residential estate in Akure, Nigeria. Mediterranean Journal of Social Sciences, 2(3), 424-430.

[46] Olubi, A. R., & Aseyan, B. S. (2022). Sustainable housing delivery for the urban poor in Nigeria. International Journal of Civil Engineering, Construction and Estate Management, 10(1), 21-34.

[47] Owoeye, J. O., & Ogundiran, A. O. (2014). A study on housing and environmental quality of Moniya community in Ibadan, Nigeria. Journal of Environment and Earth Science, 4(13), 51-60.

[48] Owolabi, & Oluwaseyi, B. (2020). Assessment of Housing Quality in Osun State, Nigeria. Environmental Research Journal, 14(2), 69–102.

[49] Oxford Dictionaries. (2017). Waterlog - definition of waterlog in English. Retrieved from https://www.oxforddictionaries.com

[50] Pomponi, F., & Moncaster, A. (2017). Embodied carbon in buildings: A review of current knowledge and future trends. Energy and Buildings, 149, 232-247. https://doi.org/10.1016/j.enbuild.2017.05.021

[51] Rahman, M., Chowdhury, R., & Rasul, M. (2020). Sustainable housing development in waterlogged areas: Challenges and opportunities. Sustainable Cities and Society, 54, 101954.

[52] Sarker, A., & Hossain, M. (2021). Integrating community perspectives into sustainable housing development in waterlogged areas: Lessons from participatory action research. Building Research & Information, 49(6), 657-672.

[53] Simon, R. F., Adegoke, A.K., Adewale B.A,. Slum Settlements Regeneration in Lagos Mega-city: an Overview of a Waterfront Makoko Community. International Journal of Education and Research Vol. 1 No. 3 March 2013

[54] Smith, J., Jones, A., & Patel, R. (2018). Resilient housing design for flood-prone regions: A review of current practices and future directions. Journal of Environmental Management, 220, 15-24.

[55] Syed Jamaludin, S., Mahayuddin, S., & Hamid, S. (2018). Challenges of integrating affordable and sustainable housing in Malaysia. IOP Conference Series: Earth and Environmental Science, 140, Article ID: 012001. https://doi.org/10.1088/1755-1315/140/1/012001

[56] UN-Habitat. (2013). Planning and design for sustainable urban mobility: Global report on human settlements 2013. Routledge. https://doi.org/10.4324/9781315857152

[57] UN-Habitat. (2018). The state of African cities 2018 - The geography of African investment.

[58] UN-Habitat. (2019). Sustainable urban development in Nigeria: Achieving the sustainable development goals through data-

driven approaches. United Nations Human Settlements Programme.

[59] World Green Building Council. (2024). New report: The building and construction sector can reach net zero carbon emissions by 2050. Retrieved from https://worldgbc.org

[60] Yoade, A., Adeyemi, O., & Yoade, O. (2018). Assessment of housing quality in Ede, Nigeria. Asian Themes in Social Sciences Research, 1(2), 76-83. https://doi.org/10.33094/journal.139.2018.12.76.83

[61] Yoade, A., Adeyemi, O., & Adeyemi, B. (2015). Assessment of housing quality in Ede, Nigeria. Asian Themes in Social Sciences Research, 1(2), 76-83. https://doi.org/10.33094/journal.139.2018.12.76.83