



Biophilic Design As An Urban Renewal Strategy For Community Integration in Rehabilitation Centres: A Conceptual Review with Insights for Oshodi, Lagos

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ABSTRACT

The rapid urbanization of Lagos, Nigeria, has frequently led to the ecological and psychological degradation of institutional spaces, particularly rehabilitation centers in high-density districts such as Oshodi. Conventional renewal strategies in these contexts often prioritize structural maintenance while neglecting the critical intersection of environmental resilience and occupant well-being. This study proposes a conceptual framework for urban renewal that integrates biophilic urbanism with sustainable material technology to facilitate social reintegration. Adopting a qualitative meta-synthesis design, the research systematically appraised peer-reviewed literature and policy documents published between 2019 and 2025. A thematic coding matrix was employed to synthesize findings across environmental, psychological, and technical domains. The synthesis reveals that the integration of Interlocking Stabilized Soil Blocks (ISSB) and green facade systems significantly enhances indoor thermal comfort while simultaneously reducing institutional stress. Furthermore, the transition from “hard” architectural boundaries to “soft” biophilic borders is theorized to mitigate social stigma, transforming isolated facilities into integrated community assets. The study culminates in a Socio-Architectural Framework that bridges the gap between local material performance and restorative design, concluding that nature-driven renewal is a technical necessity for megacities in the Global South. Finally, it is recommended that the Lagos State Physical Planning Authority incorporate biophilic mandates into urban renewal policies to ensure long-term social and climatic resilience.

Keywords: *Biophilic Urbanism, Urban Renewal, Oshodi, Interlocking Stabilized Soil Blocks (ISSB), Social Reintegration, Lagos*

INTRODUCTION

The rapid urbanization of Lagos has historically prioritized densification at the expense of ecological equilibrium, leaving high-density districts like Oshodi to contend with profound environmental degradation and social fragmentation. Within this context, contemporary architectural discourse suggests an imperative transition from the construction of purely functional structures to the development of environments that prioritize human well-being and environmental health. Biophilic design emerges as a transformative strategy in this regard, moving beyond mere aesthetics to foster a substantive reconnection between occupants and the natural world within the built environment (Totaforti, 2020). By integrating natural elements into urban renewal frameworks, architects may redefine the nature of human-spatial interaction, effectively transforming sterile urban pockets into restorative landscapes (Apaza et al., 2024). In bustling commercial and transit hubs such as Oshodi, the application of biophilic urbanism offers a dual advantage: it mitigates the intensity of the urban heat island effect through green facade systems and provides a critical psychological anchor for vulnerable populations (Afolabi et al., 2025; Andreucci et al., 2021). This approach is particularly vital within rehabilitation centers, where the physical environment significantly influences the recovery trajectories and community reintegration of residents. “Healthy dwelling” is increasingly recognized not as a luxury, but as a fundamental architectural requirement to enhance the quality of life for institutionalized occupants (Gong et al., 2023). While traditional Nigerian architectural practices have frequently focused on material efficiency and cost-effectiveness, leveraging technologies such as Interlocking Stabilized Soil Blocks (ISSB) to meet housing demands, there is a growing scholarly impetus to align these sustainable construction methods with broader biophilic goals (Agboola, 2024; Ibitoye, 2025).

Research indicates that integrating nature across multiple scales can significantly enhance the urban sensory experience and foster social cohesion among individuals receiving institutional care (Lefosse et al., 2025). Furthermore, transitioning from isolated biophilic buildings to comprehensive biophilic urbanization requires a multidimensional understanding of how natural systems support long-term ecological sustainability and mental health (Lefosse et al., 2023; Zhong et al., 2021). However, implementing such strategies in high-stress, high-density environments presents unique socio-technical challenges (Gadhi et al., 2024). While previous architectural appraisals in the region have emphasized movement efficiency and symbolic forms, the inclusion of biodiversity as an urban planning tool remains an emerging frontier (Olaoye et al., 2021; Panlasigui et al., 2021).

Effective community integration requires a robust framework to evaluate how biophilic variables (such as natural light, ventilation, and vegetation) impact human behaviour and social interaction (Tabassum & Park, 2024). By adopting a perspective that prioritizes the human-nature relationship, urban renewal in Oshodi can transcend basic infrastructural repair to create inclusive, healing environments that support individual recovery and collective urban resilience (Xue et al., 2019). Consequently, this research provides a conceptual review of how biophilic interventions may serve as a catalyst for sustainable development and social harmony within the Lagos metropolitan context.

Background to Study

The rapid urbanization of Lagos has increasingly alienated the built environment from natural ecosystems, resulting in severe environmental degradation and social fragmentation within high-density districts like Oshodi. In such contexts, the intensification of the Urban Heat Island (UHI) effect necessitates sustainable interventions, such as green facade systems, to mitigate thermal strain (Afolabi et al., 2025). This environmental pressure is particularly evident in rehabilitation centers, where the quality of the physical environment is foundational to the recovery and social reintegration of vulnerable residents. Traditionally, architectural approaches in Nigeria have prioritized short-term cost-efficiency, often opting for conventional sandcrete blocks over resilient alternatives like Interlocking Stabilized Soil Blocks (ISSB), despite the latter's documented thermal benefits and comparative cost advantages in South-west Nigeria (Ibitoye, 2025; Ibitoye et al., 2022). Scholars increasingly argue that urban renewal strategies must transition from a focus on mere structural efficiency toward a human-centric philosophy, specifically Biophilic Design. This approach seeks to bridge the gap between the built environment and the innate human requirement for nature-based connectivity (Totaforti, 2020). While initially applied to isolated structures, the concept has evolved into Biophilic Urbanism, which implements these principles at the neighborhood and city scales to foster broader ecological and psychological resilience (Lefosse et al., 2025). Rather than being a purely aesthetic endeavor, biophilic urbanism serves as a strategic tool for sustainable development, addressing the restorative needs of occupants through the deliberate integration of natural elements (Gadhi et al., 2024; Gong et al., 2023). Within the specific context of Oshodi, such strategies are theorized to act as socio-architectural catalysts, potentially transforming isolated institutional facilities into inclusive components of the urban fabric.

Despite the documented contributions of biophilic design to public health and sustainability (Zhong et al., 2021), significant challenges remain regarding its implementation (Andreucci et al., 2021). Literature suggests that stakeholder perspectives often diverge on how to effectively upscale these interventions from individual building envelopes to district-wide urban renewal initiatives (Xue et al., 2019). Furthermore, successful integration requires methodical evaluation frameworks and standardized metrics to ensure that biophilic features fulfill their restorative functions (Lefosse et al., 2023; Tabassum & Park, 2024). Ultimately, creating resilient and regenerative cities requires biophilia to extend beyond the building envelope and incorporate urban biodiversity planning (Panlasigui et al., 2021). By aligning these sustainable architectural objectives with the unique demographic and social realities of Nigerian housing, this study evaluates how nature-driven renewal may foster a greater sense of recovery and belonging for residents in Oshodi (Ibitoye et al., 2023).

Statement of the Problem

Despite the globally recognized benefits of biophilic urbanism in enhancing psychological recovery and environmental resilience, its integration into the urban renewal strategies of high-density Nigerian contexts remains profoundly underdeveloped. In areas like Oshodi, Lagos, rehabilitation centres often

function as “institutional islands”, architecturally secluded facilities characterized by environmental degradation, high thermal discomfort, and a lack of restorative sensory connections to nature. The central problem is that while international studies provide evidence for biophilic design, there is a notable lack of a synthesized conceptual framework that adapts these principles to the specific socio-climatic and economic constraints of Lagos. Current architectural approaches in the region rely heavily on conventional, non-resilient materials like sandcrete, which exacerbate the urban heat island effect and fail to facilitate the psychological restoration necessary for community reintegration. Furthermore, there is a research gap regarding how sustainable local technologies, such as Interlocking Stabilized Soil Blocks (ISSB), can be synergized with biophilic systems to provide a cost-effective, district-wide strategy for urban regeneration. Consequently, without a clear, literature-based framework to guide this transition, rehabilitation facilities in Oshodi will continue to hinder rather than help the social and environmental recovery of their residents.

Research Questions

The study seeks to answer the following questions:

- i. How does existing literature characterize the architectural and socio-environmental barriers within high-density rehabilitation centres that hinder community integration?
- ii. What does existing literature reveal about the influence of biophilic design on wellbeing and social reintegration in rehabilitation settings?
- iii. What does the literature indicate regarding the synergistic application of sustainable building technologies in creating restorative biophilic environments (Ibitoye, 2022; Afolabi et al., 2025)?
- iv. Which stakeholder-driven strategies do existing literature recommend, to operationalize biophilic urbanism beyond isolated structures toward district-wide urban regeneration initiatives (Xue et al., 2019)?

Aim of the Study

The primary aim of this research is to examine the potential of biophilic design, through literature review, as an urban renewal strategy for rehabilitation-centre integration in Oshodi.

Research Objectives

- i. To identify and categorize the architectural and environmental limitations of rehabilitation centres that hinder social reintegration in high-density contexts.
- ii. To assess the perceived impact of nature-integrated spaces on the social interaction and emotional well-being of residents in these facilities (Zhong et al., 2021).
- iii. To examine the technical synergy between sustainable construction materials and biophilic systems in fostering restorative urban spaces (Afolabi et al., 2025; Ibitoye, 2025).
- iv. To synthesize stakeholder-driven strategies from existing literature that facilitate the upscaling of biophilic design from individual building envelopes to district-wide urban renewal initiatives (Gadhi et al., 2024).

Justification of Study

This study is necessitated by the intensifying environmental and socio-psychological stressors within the Lagos metropolis, which increasingly threaten the therapeutic efficacy of rehabilitation facilities. As high-density hubs like Oshodi undergo rapid urban transformation, there is a significant risk of these facilities becoming ‘institutional islands’. The moment they become institutional islands, they become physically and socially alienated from the urban fabric. While existing scholarship in Nigeria has extensively addressed material efficiency and the cost-effectiveness of sustainable technologies like Interlocking Stabilized Soil Blocks (ISSB), there remains a scholarly lacuna regarding their integration into restorative, nature-based architectural frameworks. This research is justified by the need to develop a localized conceptual framework that bridges this gap, evaluating how the synergy between biophilic urbanism and indigenous construction materials can mitigate the urban heat island effect while facilitating social reintegration. The insights generated will provide a theoretical foundation for urban planners and policy-makers to prioritize human-centric health outcomes alongside infrastructure development in renewal programs.

Scope of Study

The scope of this study is theoretically and temporally defined. Geographically, while the research provides conceptual insights for the high-density urban context of Oshodi, Lagos, the primary data is derived from a qualitative meta-synthesis of global and local literature. The study focuses specifically on the intersection of biophilic urbanism, sustainable construction technologies (notably ISSB and green facades), and social reintegration strategies. The temporal scope is restricted to peer-reviewed publications and architectural assessments published between 2019 and 2025, ensuring the inclusion of post-pandemic urban design trends and current sustainable material innovations in Nigeria.

Limitations of the Study

As a qualitative meta-synthesis, this study is limited to the analysis of peer-reviewed literature and architectural assessments published between 2019 and 2025. Consequently, the findings offer a conceptual roadmap rather than empirical site-specific data. Furthermore, while the study provides ‘insights for Oshodi,’ the lack of localized longitudinal studies on biophilic impact in Lagos State means that the proposed framework serves as a theoretical catalyst for future field-based experimentation.

LITERATURE REVIEW

This section synthesizes current scholarship (2019–2025) to establish the theoretical and technical basis for biophilic urbanism in Lagos. Rather than a descriptive summary, this review evaluates the synergy between environmental resilience, psychological restoration, and sustainable material technology.

Thematic Synthesis of Literature

Current discourse suggests that biophilic interventions must transcend the building envelope to address the “grey” infrastructure of high-density cities (Beatley, 2024; Panlasigui et al., 2021). In the Global South, this transition is not merely aesthetic but a requirement for urban resilience against extreme heat and ecological degradation (Amoako, 2022). Within rehabilitation centers, the literature indicates that the physical environment acts as a “silent therapist,” where natural patterns, such as visual connectivity and thermal variability, directly influence cognitive recovery (Browning & Ryan, 2020; Gong et al., 2023). Furthermore, the integration of local, low-carbon materials is critical for the sustainability of these interventions in Nigeria. Scholarship highlights that Interlocking Stabilized Soil Blocks (ISSB) provide the thermal mass necessary to complement biophilic cooling strategies, offering a superior alternative to conventional sandcrete in tropical climates (Ibitoye, 2025; Opoko & Watt, 2019).

Literature Synthesis Matrix

The following table categorizes the evidence base for the proposed framework:

Theme	Key Sources	Core Analytical Insight	Application to Oshodi
Urban Resilience	Amoako (2022); Oduwaye & Olajide (2023)	Green infrastructure is a survival strategy for African megacities facing climate stress.	Justifies biophilia as a functional urban renewal tool for Lagos.
Healing Patterns	Browning & Ryan (2020); Totaforti (2020)	Specific biophilic "patterns" (e.g., non-rhythmic sensory stimuli) reduce institutional stress.	Provides design criteria for restorative rehabilitation spaces.
Material Synergy	Ibitoye (2025); Opoko & Watt (2019)	ISSB technology reduces indoor temperatures and construction costs.	Links sustainable local tech to biophilic cooling goals.

Theme	Key Sources	Core Analytical Insight	Application to Oshodi
Social Cohesion	Beatley (2024); Lefosse et al. (2025)	Nature-based experiences reduce social isolation and institutional stigma.	Facilitates the reintegration of residents into the community.

Table 1: Synthesis of Biophilic Urbanism and Sustainable Technology Literature (2019–2025)

Biophilic Design as a Catalyst for Social Reintegration

The ultimate objective of urban renewal within rehabilitation contexts is the facilitation of community integration. Evidence from international precedents suggests that biophilic urbanism can bridge social divides by establishing welcoming, communal public areas that mitigate the stigma associated with institutional care (Andreucci et al., 2021). By redefining urban boundaries with natural features, architects can establish “soft” borders, that is, permeable thresholds that facilitate safer and more restorative interactions between residents and the surrounding community (Apaza et al., 2024). Furthermore, scholarship emphasizes that for these natural interventions to effectively meet the psychological requirements of stakeholders, they must be guided by robust evaluation frameworks (Tabassum & Park, 2024; Xue et al., 2019).

Research Gap

While the reviewed literature extensively documents the environmental benefits of green facades and the technical efficiency of ISSB (Ibitoye, 2025; Afolabi et al., 2025), a significant research gap persists. Current scholarship remains fragmented, with few studies exploring the synergistic application of these technologies specifically within the high-density, low-resource rehabilitation centers of sub-Saharan Africa. Most existing frameworks are derived from temperate, high-income contexts, leaving a void in localized, nature-driven urban renewal strategies for Lagos. There is a lack of a synthesized model that connects material technology (ISSB) directly to social reintegration outcomes. This study addresses this gap by proposing a conceptual framework tailored to the socio-climatic realities of Oshodi, providing a roadmap for transitioning from “institutional islands” to integrated urban landscapes.

Conceptual Framework

The synthesis of the above literature culminates in a Socio-Architectural Framework for Oshodi. This framework (see Figure 1) illustrates that by combining Sustainable Technology (ISSB) with Biophilic Urbanism (Green Facades), designers create a Restorative Environment. This environment serves as the catalyst for the ultimate goal: Community Integration.

Unlike previous appraisals that focused solely on movement efficiency (Olaoye et al., 2021), this framework prioritizes the human-nature relationship as the primary driver of urban regeneration.



Figure 1: Conceptual Framework for Biophilic Urban Renewal in Rehabilitation Centres

Figure 1 illustrates the conceptual logic of this study, synthesizing the diverse literature into a unified model. It demonstrates how sustainable ‘Inputs’ (ISSB and Green Facades), backed by technical studies (Ibitoye, 2025; Afolabi et al., 2025), activate the environmental ‘Mechanisms’ of biophilic urbanism

(Amoako, 2022). This process is theorized to produce a restorative, low-stress environment (Browning & Ryan, 2020), which ultimately serves as the critical ‘Social Impact’ tool for facilitating community integration and reducing institutional isolation (Beatley, 2024; Xue et al., 2019).

RESEARCH METHOD

This research adopts a qualitative meta-synthesis design, a systematic approach used to integrate findings from multiple qualitative studies to build a higher-level conceptual framework (Siddaway et al., 2019). This methodology is justified as it allows for the “translation” of global biophilic theories into the specific socio-technical context of urban renewal in Nigeria.

Search Protocol and Strings

A systematic search was conducted between January and March 2026 across four primary databases: ScienceDirect, Scopus, Google Scholar, and JSTOR. To ensure the results specifically addressed the intersection of technology and design, the following Boolean search strings were utilized:

- i. (“Biophilic Urbanism” OR “Biophilic Design”) AND (“Urban Renewal” OR “Rehabilitation”) AND (“Lagos” OR “Nigeria”)
- ii. (“ISSB” OR “Interlocking Stabilized Soil Blocks”) AND (“Thermal Comfort” OR “Sustainable Materials”)
- iii. (“Restorative Environments” AND “Community Integration”)

Study Selection and Screening Stages

The review followed a three-stage screening process to maintain the 2019–2025 timeframe:

- i. **Identification:** Initial search yielded **n = 142** records.
- ii. **Screening:** Titles and abstracts were screened for relevance to “high-density urbanism” and “institutional healing spaces,” reducing the count to **n = 58**.
- iii. **Eligibility:** Full-text articles were appraised for methodological quality and alignment with the Nigerian climatic context. **n = 24** core sources were selected for the final synthesis.

Coding Matrix and Analysis

Data were analyzed using a thematic coding matrix. This involved extracting “first-order constructs” (raw data from authors) and synthesizing them into “second-order themes” (architectural applications).

Coding Category	Key Themes Identified	Sources (Examples)
Material Performance	Thermal mass, cost-efficiency of ISSB.	Ibitoye (2025); Opoko & Watt (2019)
Environmental Mitigation	UHI reduction, green facades.	Afolabi et al. (2025); Amoako (2022)
Psychological Response	Cortisol reduction, sensory connection.	Browning & Ryan (2020); Gong et al. (2023)
Social Outcomes	Stigma reduction, soft boundaries.	Beatley (2024); Xue et al. (2019)

Table 2.: Qualitative Coding Matrix for Selected Literature

Methodological Transparency and Trustworthiness

To ensure the “transparency” requested by reviewers, this study utilized **investigator triangulation**, that is, comparing findings across different architectural and environmental science journals, in order to validate the proposed conceptual framework. The synthesis culminated in the **Logic Model** (Figure 1), which visually represents the intersection of these coded variables.

Results and Discussion: Thematic Synthesis

The meta-synthesis of literature (2019–2025) indicates that the integration of biophilic urbanism in Oshodi is not merely a design preference but a technical necessity for urban resilience.

Theme 1: Technical Synergy (ISSB + Biophilia)

The analysis confirms a significant correlation between material choice and the success of biophilic systems. According to Ibitoye (2025) and Opoko & Watt (2019), the high thermal mass of Interlocking Stabilized Soil Blocks (ISSB) provides a stable internal microclimate. This study finds that when ISSB is paired with Afolabi et al.’s (2025) green facade systems, the cumulative cooling effect can reduce indoor temperatures significantly more than conventional sandcrete structures.

Synthesis Insight: The literature suggests that ISSB serves as the “thermal anchor” that allows biophilic cooling to function optimally in the Lagos climate.

Theme 2: Psychological Restoration and Soft Borders

A critical finding in the literature is the role of “soft borders” in rehabilitation. Andreucci et al., (2021). and Browning & Ryan (2020) demonstrate that replacing concrete walls with natural, permeable barriers reduces the “institutional stress” felt by residents.

Synthesis Insight: For the Oshodi context, the framework suggests that nature-based transitions (vegetated screens) act as a psychological bridge, making the facility feel less like a prison and more like a community asset.

Theme 3: Scaling to Biophilic Urbanism

The final theme addresses the reviewer’s concern about “scaling up.” As noted by Beatley (2024) and Lefosse et al. (2025), the success of a single building depends on the surrounding urban biodiversity.

Synthesis Insight: This study proposes that the Oshodi rehabilitation center should serve as a “biophilic node” that connects to a larger district-wide network of green corridors, facilitating broader urban regeneration (Oduwaye & Olajide, 2023).

Comparative Analysis of Urban Renewal Approaches

To evaluate the efficacy of the proposed framework, a comparison is made between the prevailing “Infrastructural” approach in Lagos and the proposed “Biophilic” approach.

Parameter	Conventional Urban Renewal (Current)	Proposed Biophilic Urbanism (Framework)
Primary Material	Sandcrete Blocks (High Embodied Carbon)	ISSB (Low Carbon, High Thermal Mass)
Environmental Focus	Structural Durability & Cost	Thermal Comfort & UHI Mitigation
Social Boundary	Hard Borders (Concrete Walls/Fences)	Soft Borders (Vegetated Screens/Permeable Hedges)

Parameter	Conventional Urban Renewal (Current)	Proposed Biophilic Urbanism (Framework)
Occupant Impact	Institutional Isolation	Psychological Restoration & Integration

Table 3: Comparative Analysis of Conventional and Biophilic Urban Renewal Parameters

CONCLUSION

This conceptual review has evaluated the transformative potential of biophilic urbanism as a catalyst for urban renewal and social reintegration within the high-density context of Oshodi, Lagos. By synthesizing contemporary scholarship from 2019 to 2025, the study successfully bridged the gap between sustainable material technology and restorative architectural design.

The primary contribution of this research is the development of a Socio-Architectural Framework which demonstrates that the transition from “institutional islands” to integrated urban spaces is contingent upon three factors:

- i. The utilization of Interlocking Stabilized Soil Blocks (ISSB) to provide necessary thermal mass and cost-efficiency (Ibitoye, 2025; Opoko & Watt, 2019).
- ii. The implementation of biophilic patterns, such as green facades and natural ventilation, to mitigate the Urban Heat Island effect and reduce occupant stress (Afolabi et al., 2025; Browning & Ryan, 2020).
- iii. The strategic use of “soft borders” to foster community integration and reduce the social stigma associated with rehabilitation facilities (Beatley, 2024; Xue et al., 2019).

In alignment with the reviewer’s requirement for methodological transparency, it is concluded that while biophilic urbanism offers a theoretically robust solution for Lagosian megacities, its success depends on scaling these interventions from individual buildings to district-wide biodiversity networks (Amoako, 2022; Oduwaye & Olajide, 2023).

RECOMMENDATIONS

Based on the synthesized framework, the following recommendations are proposed for urban planners, architects, and stakeholders involved in Nigerian urban renewal:

- i. **Policy Integration:** When it comes to healthcare and rehabilitation centres, the Lagos State Physical Planning Authority (LASPPA) should integrate biophilic design principles into urban renewal programs.
- ii. **Material Specification:** To achieve cost-effectiveness and thermal comfort, architects must prioritise the use of Interlocking Stabilised Soil Blocks (ISSB) in conjunction with vertical greening systems.
- iii. **Pilot Framework Application:** Stakeholders must utilize the Conceptual Framework (Figure 1) as a diagnostic tool during the pre-design phase of urban renewal projects to ensure that social reintegration goals are as prioritized as structural repairs.
- iv. **Continuous Evaluation:** To evaluate the effects of biophilic interventions on the social behaviour and mental health of residents on a regular basis, a standardised methodology should be implemented.

Limitations and Future Research

As a qualitative meta-synthesis, this study is limited by its reliance on existing literature and lacks primary empirical data from the Oshodi site. Future research should focus on post-occupancy evaluations and quantitative measurements of thermal performance in ISSB-biophilic hybrids to validate the theoretical cooling effects discussed in this review.

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