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Re-grounding Green Building: Using First Principles of African Built-Environment Practice for Adequate Housing in Nigeria

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Abstract

Nigeria faces a significant housing shortage that requires sustainable, affordable, and culturally appropriate solutions. Although imported green building technologies (GBTs) show promise, their limited use highlights a key disconnect between these solutions and the local context. This paper argues that effectively implementing GBT requires a shift back to fundamental African building principles that prioritize harmony with nature, responsible resource management, cultural vitality, and resilience based on local knowledge. Instead of focusing solely on transferring technology, we advocate for adapting research methods to emphasize these foundational principles as the basis for inquiry. From a decolonial perspective, this paper critiques existing sustainability frameworks and recommends a shift towards community-based participatory action research, blending indigenous knowledge with metrics grounded in local contexts. By examining current initiatives and synthesizing existing research, we show that redefining GBT research from these African principles can lead to housing solutions that are suitable, economically feasible, and firmly integrated into the socio-ecological fabric of Nigerian communities. The conclusion stresses that addressing the housing crisis must begin with these principles, specifically for the African context.

Keywords: Green Building, First Principles, Indigenous Knowledge, Ubuntu, Decolonial Research, Nigeria, Adequate Housing, Socio-ecological Harmony

1. Introduction

Nigeria has an estimated housing deficit of 22 million units. This crisis impacts both urban and rural populations, undermining sustainable development and economic growth (World Bank, 2021). Traditional construction often fails to suit the tropical climate, relies on expensive imported materials, and harms the environment. Green building technology (GBT) promises resource efficiency and lower environmental impact, yet its application remains limited due to perceived high costs, skill shortages, and a misalignment with local needs and practices (Olotuah & Bobadoye, 2021). This paper identifies a deeper issue: the neglect of African foundational philosophies of the built environment in addressing the problem and developing solutions.

The typical research and development approach for GBT in Nigeria starts with global technical standards and seeks local “applications.” This paper calls for a reversal of this process. We assert that providing sustainable housing must begin by articulating and building on the first principles of Africans building with and from nature. These principles—relational ontology, resource circularity, responsiveness to climate, and socio-ecological balance—serve as the foundation for meaningful GBT research and innovation. Africanizing research involves deriving methodology and metrics from these first principles rather than simply involving local participants (Chilisa, 2020; Mbah et al., 2022).

1.1. Theoretical Foundation: Defining First Principles of Building with and from Nature

To “Africanize from first principles,” we must clearly define those principles. Drawing from African philosophy, indigenous knowledge systems, and historical building practices, we outline them as follows:

Relational Ontology and Ubuntu: The built environment exists within a network of relationships that connect people, community, ancestors, and nature. The principle of Ubuntu (“I am because we are”) holds that housing should promote community vitality and dignity rather than serve solely as individual shelter (Mugumbate & Nyanguru, 2013). Similarly, the Tiv people of Nigeria say ‘Ayatutu ka uno? Kase’ meaning we are because we have each other’s backs. Building is inherently a social and cultural process.

Socio-Ecological Harmony and Stewardship: Nature is not just a resource bank but a community to coexist with. Buildings should work in harmony with local ecosystems rather than dominate them. This requires using local materials (earth, bamboo, timber, thatch) in regenerative ways and designing for natural climate flows, such as ventilation, shading, and water collection, as seen in traditional indigenous architecture (Adegun, 2017).

Circularity and Frugal Innovation: Traditional practices embody the principle of zero waste. Materials should be biodegradable, reusable, or made from agricultural by-products (e.g., rice husk ash as a pozzolan). Innovation should focus on maximizing utility and durability with minimal external inputs, reflecting a circular economy model that predates contemporary ideas (Udeaja et al., 2020).

Resilience through Adapted Design: Resilience comes from a thorough understanding of environmental patterns. Building designs, layouts, and material choices (e.g., thermal mass of earth walls, strategic placement of openings) emerge from generations of knowledge in response to local climate challenges, including heat, humidity, and seasonal rains (Jegele & Akande, 2021).

These principles contrast with the often extractive, individualistic focus on efficiency found in many imported GBT frameworks. Research that is Africanized from these foundations starts with different questions: How does this building strengthen community ties? How does it interact with and support the local ecology? How does it respect and build upon traditional knowledge?

2. Literature Review: The Disconnect Between GBT and African Contexts

Existing literature highlights Nigeria's housing deficit and its socio-economic effects (Ibem & Aduwo, 2013). GBT research has increased, emphasizing awareness of, and barriers to, the technical potential of features such as passive cooling (Olotuah & Bobadoye, 2021). Critical decolonial scholarship points out the dominance of Western sustainability standards, which often overlook local knowledge and perspectives (Chilisa, 2020; Mbah et al., 2022). Studies on barriers to adopting GBT in Nigeria often mention costs, policy challenges, and

capacity gaps, but typically fail to address the cultural and philosophical disconnects (Adegun & Adedeji, 2017). Emerging research on indigenous building systems is beginning to bridge this gap by validating the environmental performance of earth-based materials and passive design strategies in local architecture (Jegade & Akande, 2021; Olukoya, 2020). This paper brings these threads together, arguing that successfully integrating indigenous technical knowledge must begin with a commitment to the foundational philosophical principles that underpin it.

2.1. A Framework for Africanized GBT Research Grounded in First Principles

Based on the defined first principles, we propose a three-part methodological framework:

Philosophical Grounding: Use Ubuntu and socio-ecological harmony as essential foundations for research. Shift the primary goal of research from “optimizing technical performance” to “supporting socio-ecological well-being and community resilience through shelter.”

3. Methodological Pathways:

Ubuntu-Informed Community-Based Participatory Action Research (CBPAR): Communities should be co-researchers and co-designers, from problem identification through evaluation to benefits. This approach embodies the relational principle and ensures that outcomes align with local views on adequacy, beauty, and sustainability, as seen in projects such as the "Zimbabwean Chiefs' Housing Program," which centred on community control (Machingura, 2020).

Socio-Ecological Knowledge Hybridization: Systematically document and analyse indigenous building principles (e.g., Yoruba courtyard ventilation, Tiv roof volumes for climate control, Hausa tubali earth bricks, Kanuri compact city planning) as reflections of first principles. Research should focus on integrating these principles with modern GBT (e.g., stabilizing compressed earth blocks with local pozzolans, combining solar photovoltaics with optimized passive thermal design) rather than replacing them.

Context-Derived Performance Metrics: Develop evaluation criteria based on first principles. Metrics should extend beyond energy efficiency to include: Social Cohesion Impact, Local Material Utilization Index, Cultural Resonance, and Climatic Autonomy (water and energy security). This creates a well-rounded, context-specific sustainability measure.

Output and Practice: Outputs should be comprehensive and actionable, including not only physical prototypes but also revitalized local material supply chains, training programs for artisan-researchers, and evidence-based policy recommendations advocating for building codes grounded in these principles and metrics.

4. Discussion and Implications

Using GBT through this re-grounding can provide transformative opportunities. It can lower costs by valuing local materials and labour, improve climate resilience through established adaptive designs, and ensure long-term social sustainability through community ownership and cultural relevance. This approach represents a practical decolonial effort to reclaim authority over the built environment (Ndlovu-Gatsheni, 2013).

However, significant challenges remain. These include the undervaluation of indigenous knowledge in formal engineering and architectural education, complications regarding intellectual property and benefit-sharing in

community-academic partnerships, and the current research-funding structure, which often prioritizes high-tech solutions over context-specific innovations.

Moving forward requires:

- i. Curricular Reforms in built-environment education to teach these first principles, indigenous techniques, and participatory approaches.
- ii. Targeted Research Funding from organizations like Nigeria's Tertiary Education Trust Fund (TETFund), for localized, principle-driven innovation centres and long-term case studies.
- iii. Policy Development from organizations like the Nigerian Institute of Architects (NIA) and Council for the Registration of Builders of Nigeria (CORBON), to create alternative compliance pathways based on contextualized, holistic performance measures.

5. Conclusion

Nigeria's housing crisis fundamentally stems from a crisis of context and philosophy. Successfully using green building technology calls for a return to the foundational principles that have guided successful African adaptations to place and community, focusing on building with and from nature in a spirit of stewardship, resilience, and harmony. By adapting research methods that start with these principles rather than treating them as afterthoughts, we can develop effective practices for providing adequate housing. This approach does not dismiss global innovation but emphasizes refining and adapting it through a lens of socio-ecological wisdom. The path to sustainable housing lies in building upon the robust, culturally rich, and ecologically sound foundations already present in Nigeria's diverse communities. The future of adequate housing in Nigeria depends on developing solutions grounded in its enduring principles.

Declaration of Conflicting Interests

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