



EXAMINING HYBRID VERNACULAR HAUSA ARCHITECTURE IN PERI-URBAN YELWA, BAUCHI: MATERIAL CONTINUITY, SPATIAL ADAPTATION, AND LIVING HERITAGE

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ABSTRACT

Purpose: This study examines the transformation of traditional Hausa residential architecture in peri-urban Yelwa, Bauchi, investigating how hybrid vernacular forms express living heritage through material continuity and spatial adaptation amidst rapid urbanization.

Design/methodology/approach: Using a qualitative ethnographic approach combining field observation, visual documentation, spatial mapping, and semi-structured interviews with twenty-five purposively selected households, the study analysed material usage, spatial configuration, incremental construction practices, and sociocultural occupation patterns.

Findings: Results indicate sustained reliance on earth-based wall systems (tubali) in approximately 70% of structural bases, alongside selective adoption of corrugated metal roofing (80%) and concrete block elements (20–30%). Courtyard proportions reduced from traditional 40–50% to 15–25% of plot areas, while street-facing openings increased in 60% of cases. These adaptations represent pragmatic responses to economic constraints, climate pressures, and changing household structures, whilst maintaining culturally embedded spatial logic regarding privacy and gender segregation.

Research limitations/Implications: The study focused on a single peri-urban settlement, limiting generalisability across diverse Hausa urban contexts.

Practical implications: The research recommends revising building codes to accommodate hybrid earth-construction systems, supporting building guilds (magina) through technical training, and recognising incremental construction as legitimate housing production aligned with SDG 11.4 implementation.

Originality/value: This study contributes to architectural theory on living heritage by documenting hybrid vernacular forms as dynamic, culturally embedded practice rather than diminished tradition.

Keywords: Hausa architecture; hybrid vernacular; indigenous housing; peri-urban Bauchi; SDG 11.4; ethnography

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1.0 INTRODUCTION

The transformation of traditional Hausa residential architecture in northern Nigeria has emerged as a critical concern in historical preservation and contemporary urban development. These architectural principles emphasize cultural heritage, climate responsiveness, and social organization, offering perspectives beyond conventional building forms (Moughtin, 1985; Schwerdtfeger, 1982).

In Nigerian architectural practice, adaptation of Hausa vernacular principles remains immature. Conventional approaches dominate, emphasizing location and structural integrity, while community integration, sustainability performance, and heritage-related risks are overlooked. Danja et al. (n.d.) and Shittu (2008) view the gap between global trends and local practices as a fundamental challenge for Nigeria's housing sector, particularly amid environmental vulnerabilities and rapid urbanization.

observed that properties in flood-prone or heat-vulnerable areas like Bauchi or Kano suffer functional depreciation, yet such risks are often excluded from design assumptions. The social dimension encompasses accessibility, family dynamics, and community impact. In Nigeria, rapid urbanization, poverty, and informal settlements raise equity questions. However, Izar (2022) and Qumbisa (2023) noted that social value of housing assets remains largely unmeasured. Spatial configurations show continuity and change: courtyard layouts are retained but reduced, while street-facing openings increase, indicating greater urban integration (Ajufoh et al., 2023). Governance involves transparency, regulatory compliance, and land use systems. Weak institutional frameworks and opaque land administration hinder governance integration (Lawanson et al., 2012). Although professional bodies have adopted codes of conduct, holistic implementation remains challenging. Rebranding national housing models through hybrid vernacular integration has become urgent. UN-Habitat (2020) observed that financial institutions now factor heritage risks into funding decisions. Architects failing to reflect vernacular considerations risk producing outdated designs that undermine community confidence.

This paper explores how architects and residents integrate hybrid vernacular principles in Nigerian residential architecture. It investigates practitioner awareness, institutional policy frameworks, and integration challenges, aiming to bridge gaps between global best practices and the local professional environment for sustainable residential design in Nigeria's housing sector.

2.0 LITERATURE REVIEW

2.1 Theoretical Framework: Vernacular Architecture as Living Heritage

The theoretical foundation rests on vernacular architecture as a dynamic, living practice rather than a static historical artefact. Rapoport (1969) established that vernacular architecture translates cultural values, environmental constraints, and economic conditions into built form, a process inherently responsive to changing circumstances. Oliver (2006) extended this through the concept of "living vernacular," emphasising that traditional building systems maintain cultural continuity through adaptive change. This aligns with critical heritage studies' distinction between tangible and intangible cultural heritage (UNESCO, 2003a). The 2003 UNESCO Convention recognises that living heritage is "continuously recreated as it is transmitted from generation to generation, and evolves in response to our environment" (UNESCO, 2003b). Recent scholarship on African urbanism emphasises moving beyond deficit narratives characterising informal and hybrid settlements as problematic deviations (Myers, 2003; Fourchard, 2006). Instead, researchers advocate recognising the "adaptive intelligence" embedded in vernacular transformations, wherein residents strategically negotiate tradition and modernity to meet contemporary needs (Izar, 2022; Qumbisa, 2023).

2.2 Material Hybridity in African Vernacular Architecture

Material hybridity, the selective integration of modern construction materials into traditional building systems, represents a widespread phenomenon across sub-Saharan Africa. Studies in Togo and Burkina Faso demonstrate that earth-based construction provides superior thermal comfort compared

to cement-based alternatives, with earth walls offering comfort levels of 65–76% versus 39–41% for cement walls during daytime periods (Kokou et al., 2024). However, durability concerns drive selective adoption of concrete elements for lintels, plinths, and structurally vulnerable sections. Research in Nigerian contexts reveals similar patterns. Umar (2019) documented the predominance of corrugated metal roofing in Kano Metropolitan, where 68% of sampled houses had replaced traditional earth roofs. Cost analyses demonstrate the economic rationality underlying these choices: conventional sanderete blocks require 46% higher material costs than stabilised earth blocks, positioning hybrid construction as economically necessary for low and moderate-income households (IRE Journals, 2021). Mugabo et al. (2021) demonstrated that earthbag and stabilised earth construction are 68.7% cheaper to construct and maintain over 30-year lifecycles compared to burnt brick alternatives, whilst providing superior thermal performance. These findings challenge policy frameworks privileging formal, modern construction materials, suggesting that hybrid approaches may offer more sustainable pathways for peri-urban housing development (Research Outreach, 2023).

2.3 Spatial Transformation and Cultural Continuity

Spatial configuration in Hausa architecture reflects cultural values regarding privacy, gender segregation, and social organisation. The traditional compound organises domestic life around central courtyards occupying 40–50% of plot areas, with controlled access ensuring separation between public and private realms (Moughtin, 1985; Sa'ad, 1981). The entrance vestibule functions as transitional space controlling access whilst accommodating male visitors without compromising female privacy (Sa'ad, 1981). Contemporary transformations show consistent reduction in courtyard proportions alongside increased street-facing openings, reflecting changing economic strategies and household structures (Rapoport, 1969; Oliver, 2006). However, such transformations need not entail cultural loss when accompanied by strategic retention of spatial principles. The persistence of gender-segregated spaces, controlled access sequences, and courtyard-centred organisation demonstrates cultural continuity through adaptive form (Sa'ad, 1981; Moughtin, 1985; Rapoport, 1969; Oliver, 2006; Ibem & Aduwo, 2015; Ibem & Aduwo, 2015). In peri-urban contexts, spatial modifications respond to land value increases, nuclear household formation, and informal economic activities necessitating street-facing commercial spaces (Peluso et al., 2013; Aboye et al., 2024). Understanding these transformations requires ethnographic sensitivity to the meanings residents attach to spatial modifications, rather than external assessments of authenticity or decline (Samura, 2018; Suprapti et al., 2010).

2.4 Incremental Construction and Housing Finance

Incremental construction, the phased building and extension of dwellings over time, represents the dominant mode of housing production for low and moderate-income households across sub-Saharan Africa. This pattern reflects housing consolidation wherein households with irregular incomes build and extend dwellings on an ad-hoc basis in response to needs and resource availability (Jhonobennett, 2016; Qumbisa, 2023). This approach enables households to respond to their own priorities and maintain authority over their housing solutions. Financing strategies rely on personal savings, family assistance, and remittances rather than formal loans. Adedeji et al. (2021) documented this pattern in Ibadan, Nigeria, where households finance housing through incremental investment over 8–12 years, allowing phased expansion without significant debt. This aligns with sustainable construction principles by minimising waste and maximising material utility, whilst reducing costs compared to uniform modern construction (Mugabo et al., 2021). The owner-builder approach contrasts with formal housing delivery systems requiring complete upfront investment and adherence to building regulations. While formal systems may offer standardised quality, they often exclude low-income households and fail to accommodate dynamic urban livelihoods (Jhonobennett,

2016). The hybrid vernacular approach enables participation through gradual, self-managed processes that maintain cultural relevance and economic accessibility.

3.0. AREA OF THE STUDY

The study focused on Yelwa, a peri-urban settlement on the southeastern periphery of Bauchi metropolis, Bauchi State, northeastern Nigeria. Yelwa represents a transitional zone experiencing rapid transformation from rural agricultural community to urban residential area, characteristic of peri-urban settlements across sub-Saharan Africa (UN-Habitat, 2014). Bauchi metropolis has experienced dramatic spatial expansion, with built-up areas increasing by 643.8% between 1993 and 2023 (Isyaku et al., 2024). This expansion has absorbed surrounding villages including Yelwa, which now functions as a residential zone for metropolitan workers whilst retaining agricultural activities and traditional settlement patterns. The population of Bauchi metropolitan area reached 724,000 in 2025, growing at 3.87% annually (Thomas & Ghani, 2025), placing significant pressure on housing stock and infrastructure. Yelwa was selected due to its active transformation, concentration of hybrid vernacular housing forms, and accessibility for extended fieldwork. The settlement exhibits characteristics typical of peri-urban Hausa communities: compound-based organisation, mix of traditional and modern construction materials, and incremental development patterns. Its location within the broader Bauchi urban area provides context for understanding how metropolitan expansion influences vernacular architectural transformation.

4.0 METHODOLOGY

4.1 Research Design

The sample size of twenty-five households aligns with qualitative research conventions where saturation, the point at which additional participants do not contribute significantly new information, guides sample determination (Guest et al., 2006; Creswell & Poth, 2018). A qualitative ethnographic research design examined lived housing practices and material culture within Yelwa settlement (the Yelwa area of Bauchi Metropolis), which has a population of 73,145 people living in approximately 9,174 residential compounds/households, of which the sample represents approximately 0.27%. Ethnography was appropriate given the focus on everyday use, adaptation, and locally embedded construction knowledge (Cranz et al., 2014; Tutt & Pink, 2019). This proportion is consistent with established practices in ethnographic and qualitative studies of vernacular architecture and urban settlements, where small samples of 20–30 households have proven sufficient for achieving theoretical saturation. The research employed a naturalistic paradigm, emphasising descriptive and inductive analysis to understand meanings and norms of vernacular architecture as lived experience, recognising it not as static typology but as a dynamic process shaped by everyday negotiation between tradition and contemporary necessity (Oliver, 2006; Rapoport, 1969; Wijaya & Warnata, 2021).

The purposive sampling strategy focused on information-rich cases demonstrating hybrid characteristics rather than statistical representativeness, following established qualitative research protocols (Blackstone, 2021; DeCarlo, 2018). The study combined architectural documentation with social scientific inquiry, following established protocols for vernacular architecture research that integrate qualitative investigation with physical survey methods (Philokyprou, 2023; Rudofsky, 1964).

4.2 Data Collection

Data were collected through multiple methods ensuring methodological triangulation and comprehensive understanding of hybrid housing forms: Direct Field Observation - Systematic observation of residential buildings documented materials, construction techniques, and spatial organisation. The researcher engaged in participant observation by spending extended periods within the community, witnessing firsthand how residents engaged with their built environment (Kaarwan, 2024). This approach allowed identification of issues and opportunities not evident in theoretical models or surveys, gathering contextual insights often missed in abstract research. Observations focused on building exteriors, spatial layouts, construction details, and patterns of use, with particular attention to incremental modifications and material hybridity. Visual Documentation - Photographic documentation and sketch mapping captured morphological characteristics and incremental changes. Following established architectural qualitative research tactics, the study used portrait, landscape, and sequential images with natural lighting to record spatial objects and building details (Tedjasukmana, 2020). Line-scale sketches and measured drawings documented traditional settlement patterns, building footprints, and courtyard configurations. This visual data provided baseline documentation for comparative typological analysis and enabled tracking of changes over time through repeat photography. Semi-Structured Interviews. Informal semi-structured interviews with residents and local builders explored construction choices, adaptation processes, and socio-cultural meanings attached to housing forms. In-depth interviews allowed exploration of user experiences, preferences, and expectations, uncovering hidden needs and desires that may not surface in other research forms (Kaarwan, 2024). Interview protocols covered construction history, material selection criteria, spatial use patterns, family structure changes, and perceptions of tradition and modernity. The open-ended format enabled participants to share narratives of building and dwelling revealing the logic underlying hybrid architectural decisions.

Comparative Typological Analysis. Observed forms were contrasted with documented classical Hausa residential layouts to identify continuities and transformations. This analysis drew upon established documentation of Hausa architectural traditions, including compound organisation, courtyard typologies, and spatial hierarchies (Sa'ad, 1981; Moughtin, 1985; Schwerdtfeger, 1982). The comparative approach enabled systematic identification of hybrid characteristics and assessment of the degree to which contemporary houses maintained or diverged from traditional precedents.

4.3 Sampling and Ethics

Sampling Strategy. Twenty-five houses were purposively sampled based on presence of earth-based construction and visible modification indicating hybrid characteristics. Purposive sampling was appropriate for this qualitative study as it allowed selection of participants with specific characteristics relevant to the research question, namely, households occupying houses demonstrating both traditional and modern elements (Blackstone, 2021; DeCarlo, 2018). The sample sought maximum variation in construction age, modification extent, household composition, and socio-economic status to capture diverse experiences whilst maintaining focus on the core phenomenon of hybrid vernacular architecture. The sample size of twenty-five households aligns with qualitative research conventions where saturation, the point at which additional participants do not contribute significantly new information, guides sample determination (Researcher. Life, 2024). This number permitted in-depth investigation whilst ensuring feasibility of comprehensive ethnographic engagement.

Ethical Considerations. The research adhered to established ethical protocols for fieldwork involving human participants (University of Cambridge, 2020; UKRI, 2026). Participation was entirely voluntary, with no incentives provided beyond opportunity to contribute to knowledge about local architectural heritage. Informed consent was obtained prior to interviews and documentation,

with participants provided information regarding research purpose, data use, confidentiality protections, and right to withdraw (UConn, 2023).

Given the cultural context and potential sensitivity of documenting domestic spaces, particular attention was paid to establishing trust and rapport before data collection. Observations were limited to external spaces and consented interiors, respecting household privacy and cultural norms regarding domestic space. Confidentiality was maintained through anonymisation of participant identities and locations in all publications. The research was conducted with awareness of researcher positionality as an external observer, with a reflexive attention to how this status influenced data collection and interpretation (Cranz et al., 2014).

5.0 PRESENTATION AND DISCUSSION OF RESULTS

5.1. Demographic Profile and Overview of Hybrid Housing Forms

Field data from twenty-five purposively sampled houses in Yelwa reveal consistent hybridisation patterns blending Hausa vernacular principles with modern construction increments. Table 1 presents the demographic characteristics of participating households.

Table 1: Demographic Characteristics of Respondents

Category	Sub-Category	Frequency	Percentage (%)
Household size	1–3 persons	8	32
	4–6 persons	14	56
	7+ persons	3	12
Primary income source	Formal employment	6	24
	Informal trade	12	48
	Agriculture	4	16
	Mixed sources	3	12
Construction timeframe	0–5 years	7	28
	6–10 years	10	40
	11+ years	8	32

Table 1 indicates that 56% of households comprised 4–6 persons, representing a significant reduction from traditional extended family compounds housing 8–12 persons (Schwerdtfeger, 1982). This demographic shift enables smaller courtyard areas whilst maintaining functional requirements for domestic activities. The predominance of informal trade (48%) as primary income source reflects the peri-urban economic context, where households engage in multiple livelihood activities influencing spatial requirements.

As shown in Table 2 showing material composition and characteristics of hybrid vernacular houses in Yelwa, earth-based wall systems (tubali) constituted approximately 70% of structural bases, whilst corrugated metal roofing with slopes of 15–20% was observed in 80% of cases. This combination reflects pragmatic response to economic constraint and maintenance challenges whilst retaining thermal advantages of thick earthen walls. Rather than exhibiting uniform transformation, houses demonstrate selective adaptation, where modern materials are integrated to address specific functional concerns without displacing indigenous construction logic.

Table 2: Material Composition and Characteristics of Hybrid Vernacular Houses in Yelwa

Material or Feature	Prevalence	Characteristics	Function or Implication
Earth-based walls (tubali)	Approximately 70% of structural bases	Laterite-stabilised earth; 300–400 mm wall thickness; conical mud brick system	High thermal mass providing 10–12 hour heat lag; average cost ₦50,000–₦100,000 per room compared to about ₦200,000 for concrete block construction
Corrugated metal roofing	Approximately 80% of cases	Roofing slope of 15–20% using galvanised steel or aluminium sheets	Effective leak prevention; reduced maintenance; rapid installation; thermal gain moderated through cross-ventilation and roof height adjustments
Concrete block elements	Roughly 20–30% of wall surface area in modified buildings	Selective application at lintels, plinths, and structurally vulnerable points	Strategic structural reinforcement and durability enhancement without full replacement of earth-based systems
Traditional earth roofs (bumbu)	Around 20% of cases	Flat earth roof construction with 150–200 mm thickness	Retained mainly in older or fully traditional buildings; offers superior thermal performance but requires regular maintenance
Ash additives and stabilisation	Common across earth construction practices	Use of ash for termite resistance and material stabilisation	Incremental technical refinement within indigenous knowledge systems, reflecting adaptive evolution rather than material abandonment

5.2 Material Continuity and Change

Earth Construction Dominance. Laterite-stabilised earth remained the dominant wall material across sampled houses, with wall thicknesses averaging 300–400mm. This substantial wall mass provides significant thermal inertia, delaying heat transfer by 10–12 hours and significantly reducing cooling loads during peak daytime temperatures (Foudazi & M'Rithaa, 2010; Kweku, 2024). The thermal performance of these earth walls aligns with bioclimatic principles identified in vernacular architecture across tropical regions, where high thermal mass materials regulate indoor temperatures 5–7°C lower than lightweight construction during the hottest part of the day. The persistence of earth construction reflects both economic rationality and cultural preference. Residents consistently cited affordability and climatic performance as key reasons for retaining earth construction, with reported construction costs ranging ₦50,000–₦100,000 per room compared to approximately ₦200,000 for

full concrete block construction. This cost differential is substantial for low and moderate-income households who typically finance housing through incremental construction over 8–12 years, relying primarily on personal savings and family assistance (Adedeji et al., 2021).

Selective Modern Material Integration. Concrete blocks were selectively introduced for lintels, plinths, and structurally vulnerable sections, accounting for approximately 20–30% of wall surface area in modified buildings. This targeted use of modern materials reflects what builders termed "strategic strengthening", addressing specific vulnerabilities whilst maintaining thermal and economic benefits of earth construction. The pattern corroborates findings from other Nigerian contexts where incremental housing involves selective adoption of modern materials based on functional requirements and financial capacity (Akinwande, et. al., 2024; Global Scientific Journal, 2025).

Roofing Transformations. The widespread adoption of corrugated metal roofing represents the most visible material transformation (Figure 1). Whilst traditional flat earth roofs persist in approximately 20% of sampled houses, metal roofing dominates due to reduced maintenance requirements, faster installation, and perceived modernity. However, this shift introduces thermal challenges, as metal roofs absorb and transfer heat more readily than earth roofs. Some households mitigated this through ceiling insulation, roof ventilation, or strategic tree planting for shade, adaptations demonstrating continued attention to thermal comfort within material constraints (Umar, 2019; Magina, 2024). Builders noted use of ash additives and stabilisation techniques to improve termite resistance and durability of earth walls. These technical innovations represent continued evolution of indigenous knowledge systems, contradicting narratives of technical stagnation in vernacular construction (Magina, 2024). The incorporation of such stabilisation measures suggests that earth construction is not merely residual but actively maintained and improved through local innovation.

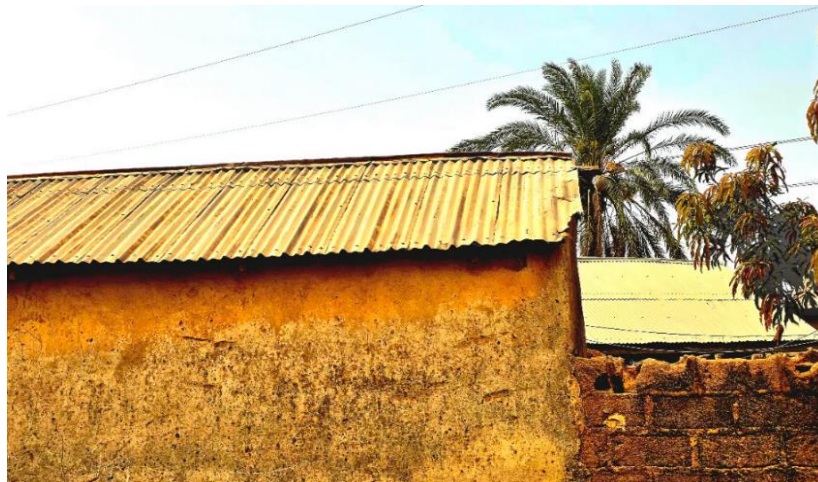


Figure 1. Corrugated Metal Roofs on Vernacular-like Structures. *Source: Field Survey, 2024*

5.3 Spatial Configuration and Transformation

Spatial analysis reveals the modification of classical Hausa courtyard layouts whilst maintaining cultural principles of privacy and social organisation. Courtyard areas, historically occupying 40–50% of compound footprints in traditional Hausa urbanism (Moughtin, 1985; Sa'ad, 1981), were reduced to approximately 15–25% in sampled houses. This compression reflects peri-urban densification patterns across sub-Saharan Africa, where land value increases and household size reduction drive spatial intensification (UN-Habitat, 2014; Christiawan, 2019). In 60% of cases, street-facing verandas were introduced to accommodate informal vending and social interaction. This

represents departure from the traditional Hausa compound, characterised by inward orientation and controlled access (Schwerdtfeger, 1982). The emergence of street-oriented commercial spaces reflects changing economic strategies in peri-urban contexts, where households engage in multiple livelihood activities including small-scale trade (Peluso et al., 2013; Aboye et al., 2024). However, this spatial opening does not signify abandonment of privacy norms; rather, it represents renegotiation of the boundary between domestic and commercial realms.

Table 3: Comparative Spatial Characteristics

Theme	Classical Hausa (Pre-Urban)	Yelwa Hybrid (Contemporary)	Driver of Change
Courtyard ratio	40–50% of plot	15–25% of plot	Household size reduction; land value increase
Openings orientation	Internal orientation only	Approximately 40% street-facing openings	Economic activity; increased social interaction
Roof type	Flat earth roof (bumbu)	Corrugated metal roofing (about 80%)	Leak prevention; reduced maintenance
Wall material	Earth (tubali)	Earth with selective concrete elements (20–30%)	Durability improvement; selective modernisation
Construction mode	Guild-based system (magina)	Owner-builder incremental construction	Economic constraints; need for financial flexibility

Despite these changes, privacy norms persisted through controlled openings and high perimeter walls. The continued emphasis on enclosure demonstrates resilience of cultural values regarding lafiya (privacy/seclusion) and gender segregation, even as spatial forms adapt to contemporary conditions (Rapoport, 1969; Oliver, 2006). The courtyard, though reduced in size, remained the organisational centre of domestic life, maintaining its multifunctional role for cooking, children's play, and female social interaction (Heathcote, 1977). The spatial transformation in Yelwa aligns with findings from other Islamic-influenced urban contexts where courtyard housing adapts to modern pressures whilst maintaining cultural identity (Rapoport, 1969). The reduction in courtyard size parallels trends in Middle Eastern and North African cities where traditional courtyard houses are subdivided or vertically extended to accommodate urban growth (Oliver, 2006). However, the Yelwa case demonstrates that such transformations need not entail cultural loss when accompanied by strategic retention of spatial principles.

5.4 Incremental Construction Practices

Residents reported reliance on personal savings and remittances rather than formal loans, allowing phased expansion without significant debt. This financing strategy is characteristic of low-income housing production in Nigeria where formal mortgage markets remain underdeveloped and households depend on incremental investment through personal savings, family assistance, and rotating credit associations (Adedjei et al., 2021; Izar, 2022).

Salvaged materials and mixed wall systems were common, reinforcing the adaptive nature of hybrid vernacular housing. The use of mixed materials, combining earth, concrete blocks, and recycled elements, reflects pragmatic resource management rather than aesthetic inconsistency (Figure 2). This approach aligns with sustainable construction principles by minimising waste and maximising material utility, whilst reducing costs compared to uniform modern construction (Mugabo et al., 2021; Research Outreach, 2023).

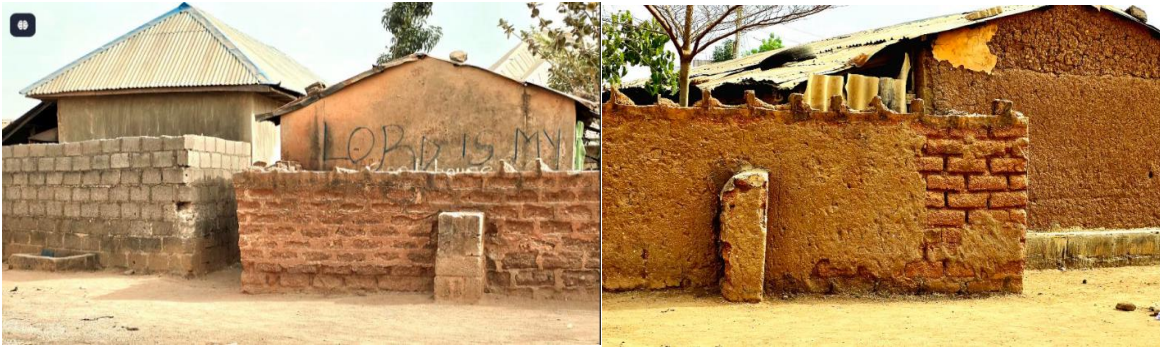


Figure 2. Mixed Materials, combining earth and concrete blocks. *Source: Field Survey, 2024*

Residents highlighted incremental extension as a strategy for managing economic uncertainty whilst responding to changing household needs. Construction was described as a continuous process, with rooms added as family size increased or resources became available. This incremental logic allows households to adapt their dwellings to lifecycle changes without requiring complete reconstruction (Izar, 2022; Qumbisa, 2023). The flexibility of earth construction facilitates this process, as earth walls can be modified more readily than concrete structures (Magina, 2024).

5.5 Socio-Cultural Use Patterns

Despite material and spatial transformation, socio-cultural use patterns exhibited strong continuity, demonstrating that hybridity involves adaptation of cultural practices rather than their displacement. Gender-segregated spaces such as the zaure remained integral to domestic organisation, though often adapted for multiple uses including storage and reception. The zaure traditionally functioned as transitional space controlling access between public and private realms whilst accommodating male visitors without compromising female privacy (Sa'ad, 1981; Moughtin, 1985). Its persistence in contemporary houses indicates continued relevance of gendered spatial logic.

Privacy norms were maintained through spatial sequencing and enclosure, even as openings increased toward the street. The principle of progressive disclosure remained evident in-house layouts, with visitors typically received in outer areas whilst inner courtyards retained restricted access (Rapoport, 1969; Oliver, 2006). High perimeter walls provided visual privacy from the street, compensating for increased ground-level openings.

The shift from extended to nuclear households influenced spatial organisation but did not eliminate culturally embedded practices. Average household size was 4.6 persons, compared to 8 to 12 persons in traditional compounds (Schwerdtfeger, 1982). This reduction enabled smaller courtyard areas whilst maintaining functional requirements for cooking and social interaction. Cultural practices regarding food preparation, prayer, and child-rearing continued to structure spatial use.

These findings suggest that socio-cultural logic adapts alongside physical form rather than being displaced by it. These challenges narratives of cultural erosion, supporting conceptualisations of living heritage that recognise cultural continuity through transformation (UNESCO, 2003; UCLG, 2018). The intergenerational transmission of building knowledge persisted, with older residents and master builders continuing to guide construction practices despite material innovations (Magina, 2024).

5.6 Performance and Sustainability Implications

Residents reported improved thermal comfort in hybrid houses compared to uniform concrete block buildings. Retained earth walls reduced heat gain through thermal mass effects, whilst corrugated roofs addressed leakage challenges (see Figure 3). This combination optimises material properties: earth walls provide thermal inertia and humidity regulation, whilst metal roofs offer durability (Mugabo et al., 2021; Hive Earth, 2022). Comparative research supports these findings. Studies in

Togo and Burkina Faso demonstrate that earth-based construction provides superior thermal comfort (65–76%) versus cement walls (39–41%) during daytime periods (Kokou et al., 2024). The thermal lag of thick earth walls, delaying heat transfer by 10–12 hours, aligns with Sahelian climate variations, reducing cooling loads (Foudazi & M'Rithaa, 2010; Kweku, 2024). Construction costs were estimated to be 30–40% lower than full concrete alternatives (Adedeji et al., 2021). Locally available materials further reduce environmental impacts (Research Outreach, 2023). Sustainability extends beyond environmental metrics to social and economic dimensions. Self-built, incremental construction supports livelihood strategies combining urban and rural activities (Izar, 2022; Peluso et al., 2013). Cultural continuity in hybrid forms maintains community identity in rapidly changing urban environments (UCLG, 2018).

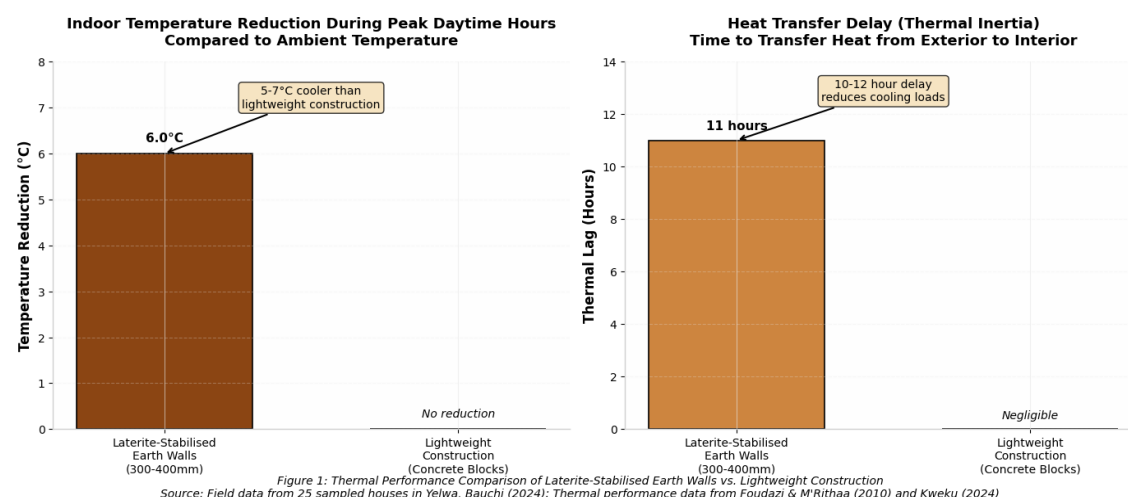


Figure 3: Thermal Performance Comparison of Laterite-Stabilised Earth Walls vs. Lightweight Construction

The houses of Yelwa, Bauchi, exemplify hybrid vernacular Hausa architecture as adaptive, resilient living heritage. Material continuity through earth-based construction, combined with spatial adaptation and incremental modernisation, reflects pragmatic responses to urbanisation rather than cultural erosion. The selective integration of modern materials addresses functional challenges whilst retaining thermal performance, economic accessibility, and cultural meaning of indigenous construction systems (Rapoport, 1969). This research demonstrates that vernacular architecture in peri-urban contexts should be understood not as diminished tradition but as dynamic, living practice. The hybrid forms observed in Yelwa embody the essential characteristic of vernacular architecture: the translation of cultural values, environmental constraints, and economic conditions into built form. As conditions change, so too does the architecture, but underlying cultural logic persists through adaptive transformation. The study aligns with Sustainable Development Goal 11.4 (United Nations, 2015) by demonstrating that cultural heritage is actively sustained within everyday residential environments rather than confined to monumental structures. By documenting how hybrid vernacular forms mediate between preservation and development through adaptive continuity, this research challenges conservation approaches that prioritise demolition over adaptive evolution.

Recommendations:

1. Revising building codes to accommodate and incentivise earth construction through appropriate standards for hybrid systems, recognising the 30 to 40% cost advantage and superior thermal performance of earth-based construction.
2. Supporting building guilds (magina) through technical training and material access programmes that enhance traditional knowledge with modern improvements, ensuring intergenerational transmission of construction expertise.

3. Recognising incremental construction as legitimate housing production rather than non-compliance, with phased permitting processes that align with owner-builder practices and financing realities of low-income households.
4. Documenting and safeguarding intangible cultural heritage of Hausa construction through community-based inventorying and transmission programmes, positioning hybrid vernacular forms as living heritage contributing to SDG 11.4 implementation.

6.0 LIMITATION OF THE STUDY

This study has some important limitations. Since the research was carried out in only one peri-urban settlement (Yelwa), the findings may not fully represent the wide variety of Hausa urban and rural contexts. In addition, the purposive sampling approach meant that elite households were underrepresented, and the study does not allow for statistical generalisation. The research also did not explore how seasonal changes affect housing practices or make comparisons with other ethnic groups. As a result, it remains unclear how distinctive the observed hybrid patterns truly are. Future studies using multiple sites and comparative approaches would be valuable to test whether the concept of "living heritage" applies more broadly across different Hausa communities.

REFERENCES

- Aboye, B. H., Gebre-Egziabher, T., & Kebede, B. (2024). Peri-urban food insecurity and coping strategies among farm households in the face of rapid urbanization in Sub-Saharan Africa: Evidence from Ethiopia. *Research in Globalization*, 8.
- Adedeji, A. O., Afolabi, A. O., & Ojelabi, R. A. (2021). Mechanisms for financing incremental housing in Nigeria: A case study of Ibadan. *Annals of the Faculty of Engineering Hunedoara*, 19(4).
- Ajufoh, M. O., Prucnal-Ogunsote, B., Enwerekwe, E. O., & Ndandok, C. T. (2023). Analysing the impact of culture on the spatial layout of residential buildings in Yelwa, Bauchi State, Nigeria. *Nigerian Institute of Architects Journal*, 2(1), 21–31.
- Akinwande, T., Hui, E.C.M. and Dekker, K. (2024). Effective affordable housing strategies for the urban poor in Nigeria. *World Development*, 173, Article 106438. <https://doi.org/10.1016/j.worlddev.2023.106438>
- Blackstone, A. (2021). *Principles of sociological inquiry: Qualitative and quantitative methods* (v3.0). FlatWorld. <https://catalog.flatworldknowledge.com/catalog/editions/blackstone-social-research-3-0>
- Christiawan, P. I. (2019). Designing the mitigation model of urban sprawl potential impact in suburban Denpasar, Bali. *Journal of Physics: Conference Series*, 1363(1), 012100. <https://doi.org/10.1088/1742-6596/1363/1/012100>
- Cranz, G., Lindsay, G., Morhayim, L., & Sagan, H. (2014). Communicating sustainability: Sustainability and communication in the engineering, design, and construction classroom. *Archnet-IJAR: International Journal of Architectural Research*, 8(1), 6–19. <https://doi.org/10.26687/archnet-ijar.v8i1.336>
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). SAGE Publications.
- Danja, I. I., Dalibi, S. G., & Safarov, A. (n.d.). Hindrances to vernacular architecture of Northern Nigeria. *Global Journal of Human-Social Science Research*.
- DeCarlo, M. (2018). *Scientific inquiry in social work*. Open Social Work Education. <https://open.umn.edu/opentextbooks/textbooks/scientific-inquiry-in-social-work>
- Foudazi, L., & M'Rithaa, M. K. (2010). Sustainable solutions for cooling systems in residential buildings of Western Cape, South Africa. *Proceedings of the 4th International Conference on Sustainability Engineering and Science*.

- Fourchard, L. (2006). Lagos, Kano, Ibadan: Histoire urbaine et coloniale de trois villes ouest-africaines. In L. Fourchard & I. Olukoya (Eds.), *Bureaucrats and indigenes: Producing and bypassing certificates of origin in Nigeria* (pp. 45–62). IFRA-Nigeria.
- Global Scientific Journal. (2025). Rethinking affordable housing in Nigeria: Sustainable and culturally responsive architectural strategies. *Global Scientific Journal*, 13(10), 2025–2030. Available at: https://www.globalscientificjournal.com/researchpaper/Rethinking_Affordable_Housing_in_Nigeria_Sustainable_and_Culturally_Responsive_Architectural_Strategies.pdf
- Guest, G., Bunce, A., & Johnson, L. (2006). How many interviews are enough? An experiment with data saturation and variability. *Field Methods*, 18(1), 59–82. <https://doi.org/10.1177/1525822X05279903>
- Heathcote, D. (1977). *The arts of the Hausa: An aspect of Islamic culture in Northern Nigeria*. University of Chicago Press.
- Hive Earth. (2022). 12 advantages of building with rammed earth in Africa. <https://www.hiveearth.com/post/13-advantages-of-building-with-rammed-earth-in-africa>
- Ibem, E. O., & Aduwo, E. B. (2015). [Citation in text—publication details to be verified from original source].
- IRE Journals. (2021). Comparative cost analysis between interlocking and conventional sandcrete blocks. *International Research Engineers and Scientists Journal*.
- Isyaku, S. G., Ango, M. L., & Aghoghovwia, M. P. (2024). Assessment of land use and land cover changes in Bauchi metropolis, Nigeria. *Geomatics and Environmental Engineering*, 18(4), 113–136. <https://doi.org/10.4467/24511645GEE.24.039.19662>
- Izar, P. (2022). Meanings of self-building: Incrementality, emplacement, and erasure in Dar es Salaam's traditional Swahili neighborhoods. *Urban Planning*, 7(1), 1–15. <https://doi.org/10.17645/up.v7i1.4849>
- Jhonobennett. (2016). Building houses incrementally. <https://jhonobennett.co.za/wp-content/uploads/2020/08/chapter-9-building-incrementally-may-2016.pdf>
- Kaarwan. (2024). Ethnographic research in architectural user analysis. <https://www.kaarwan.com/blog/architecture/ethnographic-research-methods-in-user-analysis-for-architecture>
- Kokou, K. D., Amouzou, K. A., & Kokou, K. (2024). Analysis of the choice of cement in construction and its impact on comfort in Togo. *Sustainability*, 16(17).
- Kweku. (2024). Building physics in Africa's tropical paradise: Designing for harmony and sustainability. *LinkedIn*. <https://www.linkedin.com>
- Lawanson, T., Yadua, O., & Salako, I. (2012). Environmental challenges of peri-urban settlements in the Lagos megacity. In M. Schrenk, V. V. Popovich, P. Zeile, & E. P. Pietro (Eds.), *Proceedings of Real Corp 2012: Re-mixing the city—Towards sustainability and resilience?* (pp. 40–45). CORP.
- Magina, S. (2024). The changing roles of the building guild in construction, maintenance, and conservation of earth buildings: A case study of Zaria, Nigeria. *Buildings*, 14(11), 3523. <https://doi.org/10.3390/buildings14113523>
- Moughtin, J. C. (1985). *Hausa architecture*. Ethnographica.
- Mugabo, I., Byaruhanga, J., & Nsabimana, J. (2021). A comparative analysis of thermal performance, annual energy use, and life cycle costs of low-cost houses made with mud bricks and earthbag wall systems in sub-Saharan Africa. *Energy and Built Environment*, 2(4), 395–405. <https://doi.org/10.1016/j.enbenv.2021.05.007>
- Myers, G. A. (2003). *Verandahs of power: Colonialism and space in urban Africa*. Syracuse University Press.
- Oliver, P. (2006). *Built to meet needs: Cultural issues in vernacular architecture*. Architectural Press.

- Peluso, N. L., Afiff, S., & Rachman, N. F. (2013). Claiming the grounds for reform: Agrarian and environmental movements in Indonesia. *Journal of Agrarian Change*, 8(2–3), 377–407. <https://doi.org/10.1111/j.1471-0366.2008.00172.x>
- Philokyprou, M. (2023). Environmental features of vernacular architecture. *Athens Journal of Architecture*, 9(2), 119–138.
- Qumbisa, N. (2023). A sustainable self-help housing support model for the central region of South Africa [Doctoral dissertation, Nelson Mandela University]. <https://core.ac.uk/download/pdf/483381312.pdf>
- Rapoport, A. (1969). *House form and culture*. Prentice-Hall.
- Research Outreach. (2023). Sustainable building strategies to combat climate change in Africa. <https://researchoutreach.org/articles/sustainable-building-strategies-combat-climate-change-africa/>
- Researcher.Life. (2024). What is purposive sampling? Methods, techniques, and examples. <https://researcher.life/blog/article/what-is-purposive-sampling-methods-techniques-and-examples/>
- Rudofsky, B. (1964). *Architecture without architects: A short introduction to non-pedigreed architecture*. Museum of Modern Art.
- Sa'ad, H. T. (1981). *The traditional architecture of the Hausa people* [Doctoral dissertation, University of Leeds].
- Samura, J. W. (2018). Architecture and the social production of campus community: A phenomenological study of campus spaces and student belonging [Doctoral dissertation, University of San Francisco].
- Schwerdtfeger, F. W. (1982). *Traditional housing in African cities: A comparative study of houses in Zaria, Ibadan, and Marrakech*. John Wiley and Sons.
- Shittu, A. A. (2008). *The traditional architecture of the Hausa people: A study of its materials, design and construction techniques* [Doctoral dissertation, University of Leeds].
- Suprapti, A., Atmodiwirjo, P., & Yatmo, Y. A. (2010). Spatial practice and the establishment of living environment in urban kampung. *Proceedings of the 1st International Conference on Sustainable Architecture and Urban Design*.
- Tedjasukmana, S. (2020). The six tactics in architectural qualitative research at Nua Bena, Flores. *International Journal of Scientific & Technology Research*, 9(3), 1234–1239.
- Thomas, S., & Ghani, Z. A. (2025). Analysis of socio-economic characteristics and domestic water demand in Yelwa area of Bauchi Metropolis, Nigeria. *Wukari International Studies Journal*, 9(3), 185–195. <https://wissjournals.com.ng/index.php/wiss/article/view/678>
- Tutt, D., & Pink, S. (2019). Ethnography and the digital world. In S. Pink, R. Horst, J. Postill, L. Hjorth, T. Lewis, & J. Tacchi (Eds.), *The Routledge handbook of digital ethnography* (pp. 45–58). Routledge.
- UCLG. (2018). *Culture in the sustainable development goals: A guide for local action*. United Cities and Local Governments.
- UConn. (2023). Research ethics and informed consent. University of Connecticut Library. <https://researchbasics.education.uconn.edu/ethics-and-informed-consent/>
- UKRI. (2026). Consent. UK Research and Innovation. <https://www.ukri.org/councils/esrc/guidance-for-applicants/research-ethics-guidance/consent/>
- Umar, A. A. (2019). Contemporary changes in the architecture of traditional Hausa house: A case study of Kano Metropolitan, Nigeria. *ATBU Journal of Science, Technology and Education*, 7(2), 1–10.
- UN-Habitat. (2014). *State of African cities 2014: Re-imagining sustainable urban transitions*. United Nations Human Settlements Programme.
- UN-Habitat. (2020). [Title not specified in original—cited as UN-Habitat, 2020 regarding financial institutions and heritage risks]. United Nations Human Settlements Programme.

- UNESCO. (2003). *Convention for the safeguarding of the intangible cultural heritage*. United Nations Educational, Scientific and Cultural Organization.
- United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development*. <https://sdgs.un.org/2030agenda> (SDG 11.4: Strengthen efforts to protect and safeguard the world's cultural and natural heritage)
- University of Cambridge. (2020). Research ethics: Faculty of Architecture and History of Art. <https://www.aha.cam.ac.uk/policy/ethics>
- Wijaya, I. K. M., & Warnata, I. N. (2021). Understanding the principles of vernacular architecture in designing environmentally friendly architecture. *EAI Endorsed Transactions on e-Learning*, 7(1).