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AVAILABILITY AND UTILIZATION OF INDIGENOUS MATERIALS FOR SUSTAINABLE BUILDING CONSTRUCTION IN AKURE, ONDO STATE, NIGERIA

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ABSTRACT

Purpose: *This study examined the availability and utilization of local material resources for sustainable building construction project in Akure, Ondo State, Nigeria. It analysed how locally sourced materials contribute to sustainable building construction practices by identifying commonly available material resources, evaluating their reliability, and comparing findings with global standards.*

Design/Methodology/approach: *A descriptive survey research design was adopted. Primary data were collected using 195 structured questionnaires administered to construction professionals across contracting firms, consultancy firms, and government agencies in Akure. Out of 195 questionnaires distributed, 170 valid responses were retrieved and analysed using descriptive statistics including mean ranking, frequencies, and percentages.*

Findings: *The findings revealed that timber (Mean=3.85), bamboo (Mean=3.82), laterite (Mean=3.80), and recycled plastic bottles (Mean=3.77) were the most readily available local materials for sustainable building construction in Akure. Materials such as thatch (Mean=2.82), palm kernel shell (Mean=2.61), and coconut shell (Mean=2.56) were found to be moderately available. Agricultural residues such as groundnut shell (Mean=2.14), maize stalk (Mean=2.12), and cotton stalk (Mean=2.01) were reported to be rarely available due to poor supply chains and low production.*

Research limitations/implications: *The research was geographically limited to Akure, which may restrict the generalizability of the findings to other regions with different material availability, construction practices, and socio-economic conditions. In addition, the study relied primarily on available empirical data and stakeholder responses, which may not fully capture seasonal variations in indigenous material availability or the technical performance characteristics of some agricultural residues.*

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Originality/value: *The study provided valuable empirical insight into the availability of local materials for sustainable construction in Akure. It offered a unique ranking of local materials and exposes the gaps in material utilization, especially regarding agricultural residues. By comparing local findings with global literature, the study contributed significantly to understanding how Nigeria can strengthen its sustainable construction practices through local material innovation. The results are valuable to policymakers, construction firms, researchers, and sustainability practitioners seeking to enhance local material integration in the built environment.*

Keywords: Akure, Indigenous materials, Innovation, Survey studies, Material availability, Sustainable construction

1.0 INTRODUCTION

Sustainable construction has become a global imperative as the building industry grapples with the dual challenge of rapid urbanization and environmental degradation. The sector accounts for nearly 40% of global energy use and greenhouse gas emissions (World Green Building Council, 2022). Construction activities contribute significantly to resource depletion, energy consumption, and environmental degradation, thereby prompting the need for building practices that emphasize ecological balance, resilience, and social well-being (UNEP, 2020). Consequently, researchers and practitioners are emphasizing the use of indigenous and locally available materials to minimize environmental footprints and reduce dependency on imported resources (Oke & Aghimien, 2020). Across Africa, the growing emphasis on sustainability has renewed interest in natural, traditional, and locally sourced materials, many of which possess favourable environmental and structural qualities. Timber, earth-based products, bamboo, and a range of bio-derived materials continue to gain recognition for their relatively low embodied energy, adaptability, and potential for circular construction systems (World bank, 2020). Local material adoption varies widely across African regions due to differences in availability, supply chain efficiency, technological processing, and stakeholder awareness.

The study aimed to examine the availability of local materials for sustainable construction in Akure, Ondo State, Nigeria. The study contributes to the global discourse on sustainable building by providing empirical evidence on the types, sources, and utilization gaps of indigenous construction materials in a developing economy, thereby offering context-specific insights that can inform sustainable building practices in Nigeria and comparable regions worldwide.

In Nigeria, the construction industry stands at a critical juncture where rising urbanization, housing needs, and infrastructure demands intersect with environmental concerns and economic constraints. The quest for sustainable construction aligns with the national objectives of reducing cost, conserving resources, and promoting cultural identity through the use of local materials. Akure, the capital of Ondo State, presents a unique case for studying indigenous material resources because of its abundant natural resources such as laterite, timber, and bamboo, as well as its growing construction industry. However, despite the availability of these materials, the adoption rate remains low due to factors such as limited awareness, inadequate standardization, and lack of technological innovation (Adewuyi & Ogunsemi, 2021).

2.0 LITERATURE REVIEW 2.1 Concept of Indigenous and Local Construction Materials

Indigenous or local construction materials are resources that occur naturally or are produced within a specific region and have traditionally been used in building construction (Fadamiro & Ogunsemi, 2019). Common examples include timber, bamboo, laterite, clay, palm kernel shells, and recycled waste materials. Interest in these materials has increased due to sustainability concerns, particularly their low embodied energy, environmental friendliness, and suitability for local climatic conditions (Abdulkadir & Oyediran, 2020).

Studies across Asia and Latin America has shown that indigenous materials can achieve performance levels comparable to conventional materials when properly treated. Treated bamboo and laterite have shown adequate strength and durability in India and Thailand, while stabilized earth materials such as adobe and rammed earth have been successfully adapted for modern applications in Latin America (Sharma *et al*., 2021; González *et al*., 2020). These findings suggest that technical performance is not the primary constraint to adoption.

Indigenous materials support sustainable and culturally responsive architecture by reducing reliance on imported materials, preserving local identity, and stimulating local economies (Oluwunmi *et al*., 2021; Kumar & Singh, 2020). In African contexts, including Ghana, Kenya, and Nigeria, materials such as stabilized soil blocks, laterite, and timber are widely available and cost-effective, particularly for low and middle-income housing (Mensah *et al*., 2021; Fadamiro & Ogunsemi, 2019). Laterite, in particular, offers favourable thermal properties that enhance energy efficiency in tropical buildings (Ede *et al*., 2020).

Recent technological innovations such as polymer and lime stabilization, preservation treatments for bamboo and timber, and the integration of recycled materials have further improved the applicability of indigenous materials and aligned their use with circular economy and green building principles (Adebayo *et al*., 2021; UN-Habitat, 2020). Similarly, treatments such as boron preservation and heat modification have increased the durability and resistance of bamboo and timber against pests and decay (Sharma *et al*., 2021). In Latin America and parts of Europe, recycled materials such as plastic bottles, glass aggregates, and agricultural residues are being incorporated into wall panels and pavements, creating hybrid materials that combine traditional aesthetics with modern functionality (González *et al*., 2020).

The sustainability benefits of indigenous materials extend beyond environmental impact. Their use strengthens local economies by creating jobs for artisans, builders, and suppliers within the community (Ofori & Addy, 2022). The localization of the construction value chain reduces import dependency and foreign exchange expenditure while enhancing national resilience in times of economic fluctuation. Moreover, these materials align with the principle of circular economy and green building certification systems such as LEED and BREEAM, which emphasize the use of renewable, recyclable, and low-impact materials (UN-Habitat, 2020).

2.2 Innovation in the Use of Local Materials

Innovation in the construction industry has redefined the perception and utilization of local materials, playing a critical role in repositioning them for modern construction applications. Technological advancements have enabled locally available materials, which were previously regarded as inferior, to be enhanced in terms of strength, durability, and functionality, thereby increasing their acceptance and utilization in contemporary construction practices. Studies conducted in Europe and Asia demonstrate that technological interventions such as composite processing, chemical stabilization, and biotreatment significantly improve the performance characteristics of local materials, allowing them to compete with conventional construction materials (Li *et al*., 2022). For example, the incorporation of nanomaterials and polymer binders in bamboo-based composites has been shown to improve structural stability, water resistance, and load bearing capacity, making bamboo a viable alternative for structural applications (Kim & Lee, 2019). Such innovations directly influence material availability by transforming abundant local resources into high performance construction materials thereby reducing dependence on imported alternatives.

In Africa, similar innovative trends are gradually emerging, although their adoption remains limited. In Nigeria, Olagunji and Olorunfemi (2020) observed that innovations in laterite brick production through mechanical compaction and stabilization techniques improved compressive strength by over 50%, enhancing their suitability for structural and non-structural applications. These advancements highlight the potential of innovation to improve the utilization of locally available materials. However, the absence of large-scale research facilities, limited funding, and low investment in technology transfer continue to hinder the widespread integration of these innovations into mainstream construction practice.

2.3 Sustainability Benefits of indigenous Materials

The sustainability benefits of indigenous construction materials are largely derived from their low embodied energy, recyclability, and adaptability to local climatic and environmental conditions. In Nigerian context, particularly in Southwestern cities such as Akure, the use of locally available materials such as timber, bamboo, laterite, and clay significantly reduces reliance on imported, energy intensive construction materials. This localized approach to material utilization contributes to environmental sustainability by minimizing transportation related emissions and reducing overall construction costs. Timber remains one of the most widely used indigenous materials in southwestern Nigeria due to its availability and renewability. When sustainably harvested from managed forest reserves, timber stores throughout its lifespan, thereby contributing to carbon sequestration and reduced greenhouse gas emissions (Díaz *et al*., 2022). In Akure, where timber is commonly sourced from nearby forested regions, its use in roofing, flooring, and structural components demonstrates its adaptability to local construction practices and climatic conditions.

Similarly, bamboo is increasingly recognized in southwestern Nigeria as a fast-growing and sustainable construction material. With a maturity period of three to five years, bamboo offers high tensile strength and flexibility, making it suitable for scaffolding, lightweight structures, and nonload bearing applications as an alternative to steel in specific contexts (Asdrubali *et al*., 2020). Its availability within Nigeria enhances material accessibility and promotes sustainable utilization of indigenous resources. The use of indigenous materials supports the circular economy by encouraging local production, reuse, and recycling within communities. Although empirical studies in Nigeria remain limited, evidence from comparable developing contexts such as Kenya and Indonesia indicate that localized material sourcing can reduce project costs by 15-25% while simultaneously stimulating rural employment (Mutiso & Mwaura, 2019; Nurzaman *et al*., 2021). These outcomes are particularly relevant to Nigeria's economic diversification agenda and align with Sustainable Development Goal (SDG 12), which emphasizes responsible consumption and production. When applied within Akure metropolis, the increased use of indigenous materials presents an opportunity to achieve environmentally sustainable construction while supporting local economic development.

2.4 Challenges in the Adoption of Local Materials

Despite their sustainability and economic potential, the adoption of indigenous construction materials in Nigeria remains constrained by several interrelated challenges. They include; inconsistent material quality, poor standardization, and persistent cultural perceptions that associate local materials with low performance or inferiority (Oke *et al*., 2021). In many Nigerian construction projects, particularly in urban centres, clients and developers often equate imported materials with prestige, durability, and modernity, which significantly undermines the acceptance and market competitiveness of locally sourced alternatives.

Weak regulatory and institutional frameworks limit the effective integration of indigenous materials into mainstream construction practice. Existing building codes and material standards in Nigeria provide limited guidance on the performance requirements, testing procedures, and approved applications of local materials. This regulatory gap, coupled with limited technical knowledge and training among construction professionals, reduces confidence in the use of indigenous materials and restricts their application to low-cost or informal housing (Adewuyi & Odesola, 2018).

Internationally, weak regulatory and institutional frameworks limit the effective integration of indigenous materials into mainstream construction practice. Existing building codes and material standards in Nigeria provide limited guidance on the performance requirements, testing procedures, and approved applications of local materials. This regulatory gap, coupled with limited technical knowledge and training among construction professionals, reduces confidence in the use of indigenous materials and restricts their application to low-cost or informal housing (Adewuyi & Odesola, 2018). Internationally, similar challenges have been addressed through deliberate policy interventions that link research, regulation, and market incentives. For example, Japan's Wood First Initiative, promotes the use of locally sourced timber through government-led procurement policies, research funding, and public awareness campaigns. Likewise, Ghana's Timber Utilization Policy encourages domestic timber use by combining regulatory enforcement with fiscal incentives and industry support (OwusuManu *et al*., 2022). These strategies offer relevant lessons for Nigeria.
Adapting such approaches to the Nigerian context would require the development of clear national standards for indigenous materials, increased investment in local material research and testing facilities, and policy-driven incentives for their use in public construction projects. Government led pilot projects, professional training programs, and public sensitization campaigns could further enhance confidence in local materials. When contextualized appropriately, global policy models demonstrate that strategic regulation, capacity building, and awareness initiatives can significantly improve the feasibility and adoption of indigenous construction materials in Nigeria.

3.0 METHODOLOGY 3.1 Research Design and Population of Study

The study adopted a descriptive survey design to examine the availability and utilization of indigenous construction materials in Akure, Ondo State. The design is appropriate for capturing professional perceptions across a wide range of construction stakeholders and for identifying prevailing trends in material availability and innovation practices. The target population comprised registered professionals operating within Akure, including registered Civil Engineers, registered Architects, registered Builders, registered Project Managers, registered Estate Surveyors, and registered Quantity Surveyors across construction contracting firms, consultancy firms, and government agencies. Based on records obtained from professional registration boards and local professional associations, the accessible population of active registered professionals in Akure was estimated at 195.

A purposive sampling technique was employed to select respondents, as the study required informed opinions from professionals with direct experience in material specification, procurement, and project execution. This approach ensured that respondents possessed the requisite technical knowledge to provide valid insights, although it limits statistical generalization beyond the study area.

A total of 195 questionnaires were distributed across the identified professional categories. Of these, 170 questionnaires were duly completed and returned, representing a response rate of 87.18%. While high response rates are not in themselves a guarantee of methodological rigor, this level of participation strengthens the credibility of the findings and reduces the risk of non-response bias.

Table 1: Distribution of Active Registered Professional Subscribers in Akure

S/N	Active Registered Professional Subscribers	Size	Percentage
1.	Registered Architects	40	20.51

2.	Registered Builders	40	20.51
3.	Registered Civil Engineers	40	20.51
4.	Registered Estate Surveyors	30	15.38
5.	Registered Project Managers	30	15.38
6.	Registered Quantity Surveyors	15	7.69
	Total	195	100.0

Source: Registration board of construction professionals, Akure (2025)

3.2 Instrumentation of Data Collection Procedure

Data were collected using a structured questionnaire designed to capture professional perceptions regarding the availability, utilization, and innovation potential of indigenous construction materials.
The questionnaire consisted of closed ended items measured on a five-point likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Variables relating to material availability were operationalized using clearly defined response categories reflecting perceived market presence and accessibility. The instrument focused on professional judgement rather than direct material inventories; therefore, the findings represent perception-based assessments, not empirical market measurements. Prior to the main survey, a pilot study was conducted with 20 construction professionals outside the main sample. Feedback from the pilot study informed refinements to question wording, scale clarity, and item sequencing, thereby improving the instrument's clarity and internal consistency. Content validity was established through expert review by academic and industry practitioners, who assessed the questionnaire for relevance, clarity, and alignment with the study objectives. While this process supports content validity, the study acknowledges that construct validity could be further strengthened through empirical triangulation.

3.3 Reliability and Response Rate

Reliability analysis was conducted using Cronbach's alpha yielding a coefficient of 0.88, which indicates a high level of internal consistency and reliability of the measurement scale (Hair *et al*., 2019). A structured questionnaire was used to collect data on stakeholder perceptions of strategies for promoting innovation in the utilization of local materials. A total of 170 valid responses were analysed using descriptive statistics and mean score ranking. The instrument employed a five-point likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), to assess the level of agreement with various statements relating to innovation and sustainability practices. Data were presented in frequency tables and interpreted based on the mean scores. Content validity was established through expert review by academics and industry professionals.
Prior to the main survey, a pilot test was conducted among 20 construction professionals who were not included in the main study. The pilot test assessed the clarity, structure, and comprehensibility, and structural validity of the questionnaire. Reliability analysis using Cronbach's alpha yielded a coefficient of 0.88, indicating a high level of internal consistency and reliability (Hair *et al*., 2019). Out of the 195 questionnaires distributed, 170 valid responses were analysed. The response rate of 87.18% is considered adequate for descriptive survey research. Rather than relying on outdated benchmarks, this study interprets the response rate as an indicator of strong professional engagement and data completeness, without overstating its methodological implications.

Table 2: Response Rate of Questionnaire

Copies of Questionnaire	**Frequency**	**Percent**

Quantity Distributed	**195**	**100.0**
Quantity Retrieved	**170**	**87.18**
Quantity Analyzed (completely and duly filled)	**170**	**87.18**

Source: Researcher's Field Report (2025)

3.3 Data Analysis Techniques

Data were analysed using descriptive statistical tools, including frequencies, percentages, mean scores, and mean ranking with SPSS version 26. Mean score ranking was used to compare responses across variables based on professional consensus. Although likert-scale data are ordinal in nature, mean score analysis was adopted due to its widespread application in construction management and perceptionbased studies. To improve interpretive clarity, explicit mean cut-off points were defined as follows:

- 4.50-5.00: Very High Availability
- 3.50-4.49: High Availability
- 2.50-3.49: Moderate Availability
- 1.50-2.49: Low Availability 1.00-1.49: Very Low Availability

The study acknowledges that reliance on descriptive statistics limits explanatory depth. No subgroup or inferential analysis was conducted, which is identified as a limitation and an opportunity for future research.

3.4 Ethical Considerations

Ethical standards were strictly observed throughout the research process. Participation was entirely voluntary, and all respondents were informed of the study's purpose and assured of confidentiality and anonymity. No personal identifiers were recorded, and data collected were used solely for academic purposes, in accordance with the ethical principles of responsible research conduct.

4.0 Data Presentation, Analysis and Interpretation of Results

This section presents the results obtained from the field survey in a clear and systematic manner. Emphasis is placed on factual reporting of data, while extensive interpretation and comparison with literature are minimized and reserved for the discussion section.

4.1 Respondents' Demographic Information

Table 3 presents the frequency and percentage distribution of the respondents' demographic information. Out of the 170 valid responses analysed, 79.4% of respondents were male, while 20.6% were female. This distribution reflects the gender composition of the construction industry in Akure, Ondo State. With respect to age distribution, 49.4% of the respondents were between the ages of 31 and 40, 24.1% were between 20 and 30 years old, 18.8% were between 41 and 50 years old, 5.3% were above 60 years old, and 2.4% were between 51 and 60 years old. Resulting in a cumulative 68.2% between 31-50 years age bracket, indicating that the data largely represent mid-career professionals actively involved in construction practice. In terms of educational qualification, the majority of the respondents possessed advanced academic credentials, with 61.8% holding MSc degree and 24.7% holding Ph.D degree, while only 13.6% had qualifications at Bachelor's level and below. This indicates high level of academic attainment among respondents.

The Professional distribution shows that Civil Engineers (23.5%), Architects (20.6%), and Builders (17.6%), constituted the majority of respondents, followed by Estate Surveyors (17.6%), Project Managers (14.7%), and Quantity Surveyors (5.8%). This distribution reflects the multidisciplinary nature of construction activities in the study area. Regarding professional experience, 45.6% of respondents had between 6-10 years of experience, 19.4% had 11-15 years, and 8.2% had over 15 years of experience. In total, 74.1% of respondents had more than six years of professional experience. Professional affiliation data indicate that respondents were members of recognized professional bodies such as the Nigerian Society of Engineers (NSE), Nigerian Institute of Building (NIOB), and Nigerian Institute of Architects (NIA) (17.6%), Project Management Institute (PMI) (14.7%), and Nigerian Institute of Quantity Surveyors (NIQS) (11.8%), among others. This suggests that the respondents possess formal professional standing within the construction industry. Respondents were almost evenly distributed between management level (51.2%) and supervisory level (48.8) positions, ensuring representation of both strategic and operational perspectives.

Table 3: Respondents' Demographic Information

Variables	Frequency	Percentage (%)
Gender		
Male	135	79.4
Female	35	20.6
Age		
20-30 years	41	24.1
31-40 years	84	49.4
41-50 years	32	18.8
51-60 years	4	2.4
>60 years	9	5.3
Highest Education Qualification		
HND	1	0.6
PGD	3	1.8
B.SC	19	11.2
MSc	105	61.8
Ph.D	42	24.7
Current Profession		
Project Manager	25	14.7

Civil Engineer	40	23.5
Architect	35	20.6
Builder	30	17.6
Quantity Surveyor	10	5.9
Estate Surveyor	30	17.6
Years of Experience		
1-5 years	44	25.9
6-10 years	79	46.5
11-15 years	33	19.4
>15 years	14	8.2
Professional Membership/Certification		
PMI	25	14.7 NSE
30	17.6	
NIOB	30	17.6
NIA	30	17.6
NIQS	20	11.8
NIA;PMI	13	7.6
NIQS;PMI	12	7.1
NSE;PMI	10	5.9
Position in the Organization	**Frequency**	**Percentage (%)**
Management position	87	51.2
Supervisory position	83	48.8

Source: Researcher's Field Report (2025)

4.2 Organization Status

The respondents are primarily from three types of organizations: Construction contracting firms (36.4%), Construction consultancy firms (33.3%), and Government agencies (30.2%). This indicates that the survey gathered insights from a diverse range of stakeholders involved in different aspects of the construction sector in Akure, Ondo State, including those involved in executing projects, providing consulting services, and working within government bodies related to construction.

Table 4: Organization Status

Organization Status	Frequency	Percentage (%)
Construction contracting Firm	59	36.4
Construction consultancy Firm	54	33.3
Government agency	57	33.5

Source: Researcher's Field Report (2025)

4.3 Availability of Local Materials Available for Sustainable Building Construction in Akure

Table 5 presents the frequency distribution of respondents' assessment on the availability of local materials for sustainable building construction in Akure, Ondo State. The result showed varying levels of availability across the different material categories examined.

The findings showed that timber, bamboo, laterite, and recycled plastic bottles are perceived by construction professionals in Akure as the most readily available local materials for sustainable construction. This aligns with Akadiri (2018), who stated that timber and bamboo remain the most viable indigenous construction materials in developing countries due to their renewable nature, ease of processing, and adaptability to diverse building applications. Alade, Oyebade, and Nzewi (2018) noted that laterite is widely utilized in southwestern Nigeria owing to its natural abundance, costeffectiveness, and favourable thermal performance. The consistency between these studies and the availability of these materials provides a strong foundation for sustainable building practices in the study area.

At the global level increasing attention to bio-based and renewable construction materials mirrors the local trends observed in Akure. Haboubi *et al*. (2024) reported that bamboo and timber are gaining prominence in Asia and parts of Africa as sustainable alternatives to high-carbon materials such as cement and steel. In the same vein, Ofori (2019) emphasized that the widespread adoption of locally sourced materials plays a critical role in reducing carbon emissions while enhancing regional economic resilience. The convergence of these international perspectives with the present findings underscores that the availability of indigenous and recycled materials constitutes a cornerstone of sustainable construction practices worldwide. The study highlights a notable limitation in the availability of agricultural by-products such as groundnut shell, maize stalk, and 2.20. This indicates that although these materials have been identified in the literature as potential eco-friendly substitutes for conventional building materials (Oluwafemi & Adebayo, 2020), their practical application in Akure remains constrained by inconsistent supply chains and limited processing facilities. Similar challenges have been reported globally. For instance, sharma and Bansal (2021) found that the seasonal nature, perishability, and absence of standardized treatment methods for agricultural residues hinder their widespread adoption in India and sub-saharan Africa.

The moderate availability of materials such as thatch, palm kernel shell, and coconut shell suggest a transitional phase in the local construction industry. While these materials have historically played a significant role in indigenous building practices, their use has declined due to urbanization, evolving architectural preferences, and concerns regarding durability and maintenance (Haboubi *et al.,* 2024). Nevertheless, they remain relevant in rural settlements and low-income housing projects, where affordability and environmental sustainability are prioritized (UNEP, 2021). This highlights the need for balanced policies that preserve indigenous material knowledge while fostering innovation to enhance their performance for contemporary applications.

Table 5: Availability of Local Materials

(AA=Always Available, ANS=Available Nearby State, RA=Rarely Available, NA=Not Available)

	AA	**ANS**	**RA**	**NA**	**MEAN**	**RANK**
Materials	**Freq. (%)**	**Freq. (%)**	**Freq. (%)**	**Freq. (%)**		
Timber	153 (90.0)	9 (5.3)	7 (4.1)	1 (0.6)	3.85	1
Laterite	148 (87.1)	12 (7.1)	8 (4.7)	2 (1.2)	3.80	3
Bamboo	147 (86.5)	15 (8.8)	8 (4.7)	0 (0.0)	3.82	2
Recycled bottles	147 (86.5)	9 (5.3)	12 (7.1)	2 (1.2)	3.77	4 Plastic
Coconut Shell	40 (23.5)	23 (13.5)	100 (58.8)	7 (4.1)	2.56	7
Thatch	51 (30.0)	43 (25.3)	70 (41.2)	6 (3.5)	2.82	5
Palm Kernel Shell	53 (31.2)	13 (7.6)	88 (51.8)	16 (9.4)	2.61	6
Groundnut Shell	15 (8.8)	11 (6.5)	127 (74.7)	17 (10.0)	2.14	8
Maize Stalk	15 (8.8)	7 (4.1)	132 (77.6)	16 (9.4)	2.12	9

Cotton Stalk	6 (3.5)	13 (7.6)	127 (74.7)	17 (10.0)	2.01	10

Source: Researcher's Field Survey (2025)

4.4 Discussion of Findings

The findings of the study provided empirical evidence on the availability of indigenous materials for sustainable building construction in Akure, Ondo State, Nigeria. The results showed that timber, laterite, bamboo, laterite, and recycled plastic bottles are the most readily available local materials, as perceived by construction professionals. This dominance reflects both the natural endowment of the study area and long-standing construction practices that favour materials that are easily sourced, familiar, and adaptable to local climatic conditions. The high availability of timber and bamboo aligns with earlier studies which identify these materials as key renewable resources for sustainable construction in developing economies (Akadiri, 2018; Haboubi *et al.*, 2024). Their popularity can be attributed to their ease of processing, structural versatility, and relatively low embodied energy when compared to conventional materials such as cement and steel. In the context of Akure, their availability is further enhanced by proximity to forested areas and established informal supply networks. Similarly, the prominence of laterite corroborates findings by Alade, Oyebade, and Nzewi (2018), who stated that laterite remains widely used in southwestern Nigeria due to its abundance, affordability, and favourable thermal properties. These attributes make laterite particularly suitable for energy-efficient building designs in tropical climates.

The availability of recycled plastic bottles as a sustainable material reflects a growing awareness of waste-to-resource initiatives within the construction sector. Although still emerging, their perceived availability suggests increasing engagement with alternative and recycled materials, consistent with global trends advocating circular economy practices in construction (González *et al.*, 2020). This finding showed a gradual shift in professional perception towards embracing innovative and environmentally responsible material options.

Conversely, the low availability of agricultural residues such as groundnut shell, maize stalk, and cotton stalk highlights significant gaps between theoretical potential and practical application. While literature identifies these materials as viable eco-friendly substitutes in composite panels and insulation systems (Oluwafemi & Adebayo, 2020), their limited availability in Akure is largely attributed to weak supply chains, seasonal production patterns, and inadequate processing infrastructure. Similar challenges have been reported in other developing regions, where lack of standardization and preservation techniques constrains the utilization of agricultural by-products (Sharma & Bansal, 2021). This finding underscores the need for targeted technological and institutional interventions to unlock the sustainability potential of these materials. The moderate availability of thatch, palm kernel shell, and coconut shell suggests a transitional phase in local construction practices. Although these materials have historically played a vital role in indigenous architecture, their declining usage reflects urbanization, modernization, and changing aesthetic preferences (Haboubi *et al.*, 2024). Nevertheless, their continued relevance in rural and low-income housing contexts highlights their affordability and environmental advantages (UNEP, 2021). This dual reality emphasizes the importance of integrating traditional material knowledge with modern innovation to enhance durability, acceptance, and performance.

5.0 CONCLUSION AND RECOMMENDATION

This study assessed the availability of indigenous materials for sustainable building construction in Akure, Ondo State, Nigeria. The findings showed that timber, bamboo, laterite, and recycled plastic bottles are perceived by construction professionals as the most readily available local materials. These materials therefore represent the most viable options for promoting sustainable construction practices within the study area. Agricultural residues such as groundnut shell, maize stalk, and cotton stalk were perceived as having limited availability, while materials like thatch, palm kernel shell, and coconut shell were assessed as moderately available. These results suggest that although Akure possesses a diverse range of indigenous materials, their availability varies considerably.

The study contributes empirical evidence on the perceived availability of indigenous construction materials in Akure and provides a bias for policy formulation, material selection, and future research aimed at advancing sustainable construction practices within similar urban contexts in Nigeria.

5.1 Recommendations

Based on the findings of this study, the following recommendations are proposed:

1. Government agencies and private sector stakeholders should strengthen supply chains for readily available materials such as timber, bamboo, and laterite by supporting sustainable sourcing and regulated extraction practices.
2. Investment should be directed toward improving the processing, treatment, and storage of agricultural residues to enhance their availability and usability in construction projects.
3. Policy makers should introduce incentives, such as tax reliefs and procurement preferences to encourage the use of indigenous materials in public and private construction projects.
4. Professional bodies should organize continuous professional development programmes to improve awareness of the technical and environmental potential of lesser used indigenous materials.
5. Awareness initiatives should be implemented to improve acceptance of indigenous materials by showcasing successful applications in contemporary construction.
6. Future studies should move beyond perception-based assessment by incorporating empirical supply chain analysis, material performance testing, and cost benefit evaluation to support wider adoption of indigenous materials in sustainable construction.

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