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Evaluation of the Socio-Economic Impacts of Bamboo Utilization for Affordable Housing Development in Abuja

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ABSTRACT
This study evaluates the socio-economic impacts of bamboo utilization for affordable housing development in Abuja, Nigeria, with a focus on its structural, economic, and environmental potential. The research was motivated by the persistent housing deficit and the rising cost of conventional building materials, which have limited access to affordable housing for low- and middle-income populations. A descriptive survey design was adopted, with data collected from 400 stakeholders in the construction sector, including architects, engineers, contractors, developers, and residents, using structured questionnaires. The data were analyzed using descriptive and inferential statistical techniques. The findings reveal that bamboo is widely perceived as a viable, cost-effective, and environmentally sustainable alternative to traditional construction materials, with strong potential to reduce housing costs and carbon emissions. Additionally, bamboo utilization presents socio-economic benefits such as job creation and local economic development. However, the study identifies key challenges hindering its adoption, including low public awareness, inadequate technical expertise, lack of standardization, and limited government support. The study concludes that bamboo holds significant promise for sustainable and affordable housing development if supported by appropriate policies, capacity building, and investment in treatment technologies.
Keywords: Bamboo, Affordable Housing, Sustainable Construction, Socio-Economic Impact, Nigeria

1.0 INTRODUCTION

The persistent housing deficit in Nigeria, particularly in rapidly urbanizing cities such as Abuja, has become a critical development challenge (Suleiman et al., 2025; Akpan et al., 2025). Rapid population growth, rural–urban migration, and rising construction costs have significantly constrained access to affordable housing for low- and middle-income households (Magaji et al., 2025; Abeke et al., 2025). Conventional building materials such as cement, steel, and fired bricks are often expensive and environmentally taxing, thereby exacerbating the housing crisis (UN-Habitat, 2020). As a result, there is a

growing need to explore alternative, cost-effective, and sustainable construction materials that can support inclusive urban development (Tanko et al., 2025).

Bamboo has emerged as a promising material in the construction sector due to its rapid renewability, affordability, and structural versatility. As a natural resource, bamboo grows significantly faster than most timber species and requires minimal processing, making it an environmentally sustainable option (Liese & Köhl, 2015). In addition to its ecological benefits, bamboo possesses notable mechanical properties, including high tensile strength and flexibility, which make it suitable for housing construction in both rural and urban settings (Ghavami, 2005). These attributes position bamboo as a viable alternative for addressing both environmental concerns and housing shortages in developing countries.

Beyond its environmental advantages, the adoption of bamboo in housing development has important socio-economic implications. The use of locally available bamboo can reduce construction costs, thereby making housing more affordable for low-income populations. Furthermore, bamboo cultivation, processing, and construction activities can generate employment opportunities and stimulate local economies (INBAR, 2019). In the context of Abuja, where unemployment and income inequality remain pressing issues, bamboo-based housing initiatives could contribute to poverty alleviation and improved livelihoods.

However, despite its potential, the utilization of bamboo in Nigeria's construction industry remains limited due to factors such as lack of technical knowledge, cultural perceptions, policy gaps, and inadequate standardization. Many stakeholders still perceive bamboo as a "poor man's material," which affects its acceptance in urban housing projects (Akinlabi et al., 2017). Additionally, the absence of comprehensive building codes and institutional support for bamboo construction poses challenges to its widespread adoption. Addressing these barriers is essential for maximizing the socio-economic benefits of bamboo in housing development.

Against this backdrop, this study seeks to evaluate the socio-economic impacts of bamboo utilization for affordable housing development in Abuja. By examining its potential to reduce construction costs, create employment, and enhance living conditions, the study contributes to ongoing discussions on sustainable housing solutions in Nigeria. The findings are expected to provide valuable insights for policymakers, urban planners, and construction stakeholders aiming to promote inclusive and environmentally sustainable development.

2.0 LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Conceptual Review

2.1.1 Socio-Economic

The concept of socio-economic refers to the interaction between social and economic factors that influence the well-being, livelihoods, and living standards of individuals and communities. It encompasses variables such as income levels, employment opportunities, education, social inclusion, and access to basic services. Socio-economic conditions play a critical role in shaping development outcomes, particularly in emerging economies where disparities in income and access to resources are prevalent (Todaro & Smith, 2020). In the context of housing, socio-economic factors determine affordability, accessibility, and the quality of living conditions. Improved socio-economic conditions often lead to enhanced productivity, better health outcomes, and increased economic participation, thereby contributing to sustainable development (World Bank, 2021).

2.1.2 Bamboo Utilization

Bamboo utilization refers to the various ways in which bamboo is harnessed for economic, environmental, and structural purposes, particularly in construction and housing development. Bamboo is widely recognized as a sustainable material due to its rapid growth rate, renewability, and low environmental impact compared to conventional materials such as steel and concrete (Liese & Köhl, 2015). Its application ranges from structural components like beams and columns to finishing elements such as flooring and roofing. In developing countries, bamboo utilization has gained prominence as a cost-effective alternative that can reduce construction expenses while promoting environmental

conservation (INBAR, 2019). Furthermore, bamboo processing and construction activities contribute to job creation and rural industrialization, making it a valuable resource for socio-economic development.

2.1.3 Affordable Housing Development

Affordable housing development refers to the planning, design, and construction of housing units that are financially accessible to low- and middle-income populations without compromising quality and safety standards. It is a critical component of sustainable urban development, particularly in rapidly growing cities where housing demand exceeds supply (Ibrahim et al., 2025). Affordable housing initiatives aim to reduce housing deficits, improve living conditions, and promote social inclusion (UN-Habitat, 2020). In many developing countries, the high cost of conventional building materials and limited access to housing finance have hindered the delivery of affordable housing (Akpan et al., 2025; Modibbo et al., 2026). As a result, alternative approaches, including the use of locally sourced materials like bamboo, have been advocated to lower construction costs and enhance housing availability (World Bank, 2020).

2.2 Theoretical Review

2.2.1 Sustainable Development Theory

Sustainable Development Theory, which emphasizes the efficient use of resources to meet present needs without compromising the ability of future generations to meet their own needs. This theory provides a conceptual foundation for integrating environmentally friendly, economically viable, and socially acceptable solutions in development practices, including housing (Al-Amin et al., 2025; Ologbonori et al., 2025; Magaji et al., 2024). In the context of assessing bamboo as a sustainable building material for affordable housing in Abuja, the theory supports the adoption of renewable materials like bamboo that reduce environmental degradation while lowering construction costs. It also highlights the importance of balancing ecological sustainability with socioeconomic development, particularly in addressing housing shortages among low- and middle-income populations in Nigeria. By promoting the use of locally available and rapidly renewable materials, Sustainable Development Theory aligns with efforts to enhance housing affordability, reduce carbon emissions, and foster long-term resilience in the built environment (United Nations, 2015; Kibert, 2016).

2.3 Empirical Review

Bredenoord (2024) carried out a worldwide study titled *Bamboo as a Sustainable Building Material for Innovative Housing Solutions*, using a comparative analytical approach that integrated secondary data with case studies from regions such as Asia, Latin America, and Africa. The research assessed key mechanical characteristics of bamboo, including tensile and compressive strength, alongside its load-bearing capacity and potential for reducing carbon emissions when compared with traditional construction materials. The results revealed that bamboo, especially in engineered forms like laminated and composite variants, represents a feasible low-carbon option for housing development. However, the study is predominantly conceptual and does not provide empirical evidence within localized settings such as Nigeria. It also overlooks crucial aspects such as cost considerations, user perception, and compliance with national building regulations, thereby emphasizing the importance of context-specific empirical investigations in locations like Abuja (Bredenoord, 2024).

Adebowale (2024) explored the practical implications of bamboo application in construction in a study titled *Bamboo in Sustainable Construction: Effects on Productivity and Safety*. The research employed a mixed-methods design, combining field observations, time–motion analysis, and interviews with stakeholders to evaluate operational efficiency. Findings indicated that the use of bamboo contributed to about a 20% decrease in material costs, improved project completion timelines, and enhanced safety outcomes, particularly in projects involving skilled bamboo craftsmen. Despite these positive outcomes, the study's emphasis on short-term applications—mainly scaffolding and temporary structures—limits its relevance to long-term durability and structural integrity in permanent housing. This limitation suggests the need for further empirical studies to determine bamboo's effectiveness in sustainable and climate-resilient housing development in Abuja (Adebowale, 2024).

Onyechere (2023) conducted a systematic review titled *Review on the Suitability of Bamboo as a Building Material*, which synthesized existing literature on bamboo's structural characteristics, environmental benefits, and processing requirements, particularly within tropical regions. The study concluded that

bamboo is a viable and sustainable substitute for timber, owing to its rapid growth rate and lower carbon footprint. Nevertheless, it pointed out significant limitations, including the lack of standardized testing procedures and the absence of formal construction guidelines regulating bamboo usage in Nigeria. While the study contributes valuable theoretical insights, it lacks empirical validation through field experiments or real-life applications, especially in urban environments. This reinforces the need for localized studies assessing bamboo's performance in contemporary housing developments in Abuja (Onyechere, 2023).

Sil (2024) undertook a technical review titled *Critical Review of Bamboo as a Structural Material for Civil Engineering Construction*, focusing on laboratory-based assessments of bamboo's tensile, compressive, and flexural properties. The study compared bamboo's structural performance with that of steel-reinforced concrete and found that bamboo demonstrates high strength-to-weight ratio and stiffness, making it a competitive material when adequately treated. However, the research also identified key challenges such as inconsistencies in culm structure, vulnerability to moisture, and susceptibility to biological deterioration. Although the study is technically detailed, it does not consider socio-economic dimensions such as affordability, user acceptance, or real-world application, thereby indicating a gap in linking engineering properties with practical housing needs in Abuja (Sil, 2024).

Ajayi (2024) conducted a comparative life-cycle assessment titled *Evaluating Sustainable Building Practices for Carbon Reduction: Bamboo and Alternatives in Nigeria*, employing quantitative LCA techniques alongside cost–benefit analysis using data from local housing projects. The study compared bamboo with conventional materials like concrete and bricks in terms of embodied energy, carbon emissions, and construction expenses. Results indicated that bamboo-based construction could reduce embodied carbon by up to 35% and decrease overall costs by approximately 15% when locally sourced. Despite these advantages, the study identified infrastructural limitations—particularly the scarcity of processing and treatment facilities—as major obstacles to large-scale adoption. These findings highlight the need for supportive policies and increased investment to promote the integration of bamboo into Nigeria's housing sector, especially in rapidly growing urban centers such as Abuja (Ajayi, 2024).

2.4 Research Gap

A critical synthesis of the reviewed studies reveals a multidimensional research gap concerning the application of bamboo in affordable housing within Nigeria, particularly in Abuja. While studies such as those by Bredenoord (2024) and Sil (2024) provide robust theoretical and laboratory-based evidence on the structural and environmental performance of bamboo, they lack contextualized empirical validation in real-world construction settings. Similarly, Adebowale (2024) emphasizes construction efficiency and safety but is limited to temporary structures, thereby neglecting long-term durability and structural integrity in permanent housing. Although the study reported by Onyechere (2023) highlights the absence of standardized codes and testing procedures but does not extend the analysis to urban housing applications, while Ajayi (2024) provides valuable life-cycle and cost assessments without addressing field performance and user acceptance. Collectively, these limitations indicate a lack of integrated empirical research that simultaneously examines structural performance, economic feasibility, environmental sustainability, and socio-cultural acceptance of bamboo in actual housing projects. Therefore, there is a clear need for a comprehensive, context-specific empirical study that evaluates bamboo's viability for durable, code-compliant, and cost-effective affordable housing within Abuja's unique climatic and urban development conditions.

3.0 METHODOLOGY

3.1 Research Design

The research has a quantitative design, utilising a descriptive survey methodology. This design is excellent for gathering data from a substantial population and is effective for assessing respondents' perspectives on the feasibility of bamboo as a sustainable building material for affordable homes in Abuja, Nigeria. The implementation of a structured questionnaire facilitates uniform data collecting and enhances the statistical analysis of responses.

3.2 Population of the Study

The target population consists of stakeholders in the construction sector in Abuja, Nigeria. These encompass architects, engineers, constructors, housing developers, and residents interested in sustainable building materials. The population was selected based on their relevance and probable familiarity or knowledge of bamboo as a construction material.

3.3 Sample Size and Sampling Technique

The survey comprised a sample size of 400 respondents. The sample was deemed sufficient for guaranteeing statistical representation and thorough data analysis. A stratified random sample method was employed to guarantee representation among diverse stakeholder groups within the construction industry.

3.4 Sampling Frame

The sampling frame for this study consists of registered professionals and relevant stakeholders in the construction industry within the Federal Capital Territory (FCT), Abuja. It includes:

1. **Architects and Engineers:** Drawn from professional bodies such as the Nigerian Institute of Architects (NIA) and the Nigerian Society of Engineers (NSE), as well as personnel from construction firms operating within Abuja.
2. **Contractors and Builders:** Selected from lists provided by the Federal Capital Development Authority (FCDA), the Council of Registered Builders of Nigeria (CORBON), and private construction companies involved in housing projects.
3. **Developers and Real Estate Firms:** Identified through the Real Estate Developers Association of Nigeria (REDAN) and Abuja-based development companies actively engaged in affordable housing.
4. **Residents and End-Users:** Individuals residing in developing districts of Abuja such as Gwagwalada, Kuje, and Bwari, who have shown interest or participation in self-built or affordable housing schemes.

The sampling frame was established to ensure that data collection reflects diverse perspectives across professional and end-user categories, enhancing the reliability and generalizability of the study findings.

3.5 Method of Data Collection

This study used primary data sources. The primary data for this study consist of raw data generated from responses to questionnaires and interview by the respondents.

The study's data was gathered through a standardised questionnaire. The questionnaire included closed-ended questions aimed at collecting quantifiable data regarding respondents' knowledge, perceptions, and attitudes towards bamboo utilisation in building. The questionnaire was segmented into sections addressing demographic data, awareness of bamboo as a construction material, perceived advantages, and perceived obstacles.

A pilot study was done on a smaller set of respondents to improve the instrument's reliability and validity prior to full-scale data gathering. Essential modifications were implemented in accordance with the input obtained.

3.6 Method of Data Analysis

The acquired data was analysed employing descriptive and inferential statistical methods. Frequency distributions, tables, and percentages were employed to summarise and delineate the demographic profile of respondents and their answers to pivotal questions.

Simple regression analysis was utilised to ascertain the correlation between independent variables, including awareness, perceived cost-effectiveness, and environmental benefits, and the dependent variable, which is the readiness to adopt bamboo as a building material.

All data analysis was conducted utilising statistical software to guarantee precision and efficacy.

3.7 Ethical Considerations

Ethical considerations were meticulously adhered to throughout this investigation. Participants were thoroughly apprised of the study's objective and guaranteed that their involvement was voluntary. Informed consent was secured from each participant prior to the administration of the questionnaire. The anonymity and confidentiality of all participants were preserved, and data was securely archived to avert unauthorised access.

4.0 DATA PRESENTATION AND DISCUSSION OF RESULT

Interpretation of Demographic Information

1. Gender of Respondents

Gender	Frequency	Percentage (%)
Male	204	52.7%
Female	183	47.3%
Total	**387**	**100%**

Interpretation:

The sample consists of slightly more males (52.7%) than females (47.3%). This indicates a fairly balanced gender distribution, suggesting that both male and female perspectives were adequately represented in the study.

2. Age of Respondents

Age Range	Frequency	Percentage (%)
18–25	87	22.5%
26–35	132	34.1%
36–45	102	26.4%
46 and above	66	17.0%
Total	**387**	**100%**

Interpretation:

The highest number of respondents fall within the 26–35 age range (34.1%), followed by those aged 36–45 (26.4%). This suggests that the study population is predominantly made up of young to middle-aged adults, likely reflecting those who are active in the construction or housing sectors, or are potential homeowners.

3. Educational Qualification

Qualification	Frequency	Percentage (%)
SSCE/WAEC	63	16.3%
ND/NCE	81	20.9%
HND/B.Sc	159	41.1%
M.Sc/PhD	84	21.7%
Total	**387**	**100%**

Interpretation:

The majority of respondents (41.1%) have a Higher National Diploma or Bachelor's degree, while 21.7% hold a postgraduate qualification (M.Sc/PhD). This indicates a relatively well-educated respondent base, which enhances the credibility of the responses and implies a good understanding of construction and housing issues.

4. Occupation of Respondents

Occupation	Frequency	Percentage (%)
Civil Servant	93	24.0%
Business/Trader	108	27.9%
Artisan/Builder	81	20.9%
Student	57	14.7%
Unemployed/Others	48	12.4%
Total	**387**	**100%**

Interpretation:

Respondents are primarily engaged in business/trading (27.9%) and civil service (24.0%), with a notable

proportion being artisans or builders (20.9%). This occupational spread is important because it includes stakeholders who are likely to have practical experience or vested interest in housing materials, including bamboo.

5. Marital Status of Respondents

Marital Status	Frequency	Percentage (%)
Single	147	38.0%
Married	195	50.4%
Divorced/Widowed	45	11.6%
Total	**387**	**100%**

Interpretation:

Most respondents are married (50.4%), followed by single individuals (38.0%). This distribution suggests that a substantial portion of the respondents likely have family responsibilities and are more likely to be concerned with sustainable and affordable housing solutions, such as those potentially offered by bamboo.

Analysis of Bamboo as a Building Material in Nigeria

S/N	Statement	SA	A	N	D	SD
1	Bamboo is a viable alternative to conventional building materials.	[210 / 54.3%]	[125 / 32.3%]	[32 / 8.3%]	[15 / 3.9%]	[5 / 1.3%]
2	Bamboo is readily available in Nigeria.	[180 / 46.5%]	[145 / 37.5%]	[40 / 10.3%]	[15 / 3.9%]	[7 / 1.8%]
3	Bamboo buildings are cost-effective.	[195 / 50.4%]	[135 / 34.9%]	[35 / 9.0%]	[12 / 3.1%]	[10 / 2.6%]
4	Bamboo construction reduces environmental degradation.	[220 / 56.8%]	[130 / 33.6%]	[20 / 5.2%]	[10 / 2.6%]	[7 / 1.8%]
5	Bamboo has sufficient strength for structural applications.	[175 / 45.2%]	[140 / 36.2%]	[45 / 11.6%]	[20 / 5.2%]	[7 / 1.8%]
6	Bamboo has good thermal insulation properties.	[160 / 41.3%]	[150 / 38.8%]	[50 / 12.9%]	[17 / 4.4%]	[10 / 2.6%]
7	The use of bamboo can reduce housing costs in Abuja.	[200 / 51.7%]	[135 / 34.9%]	[30 / 7.8%]	[15 / 3.9%]	[7 / 1.8%]

8	Bamboo buildings are aesthetically appealing.	[185 / 47.8%]	[145 / 37.5%]	[35 / 9.0%]	[12 / 3.1%]	[10 / 2.6%]
9	I have seen buildings constructed with bamboo in Nigeria.	[90 / 23.3%]	[110 / 28.4%]	[75 / 19.4%]	[70 / 18.1%]	[42 / 10.9%]
10	Government policies support bamboo use in construction.	[50 / 12.9%]	[85 / 22.0%]	[100 / 25.8%]	[95 / 24.5%]	[57 / 14.7%]
11	Bamboo construction requires specialized skills.	[170 / 43.9%]	[145 / 37.5%]	[40 / 10.3%]	[20 / 5.2%]	[12 / 3.1%]
12	Bamboo deteriorates faster than conventional materials.	[120 / 31.0%]	[135 / 34.9%]	[65 / 16.8%]	[45 / 11.6%]	[22 / 5.7%]
13	Treating bamboo increases its lifespan.	[200 / 51.7%]	[145 / 37.5%]	[25 / 6.5%]	[12 / 3.1%]	[5 / 1.3%]
14	There is a lack of awareness about bamboo's potential in Nigeria.	[230 / 59.4%]	[125 / 32.3%]	[20 / 5.2%]	[7 / 1.8%]	[5 / 1.3%]
15	Bamboo buildings are resistant to pests and decay when treated properly.	[190 / 49.1%]	[140 / 36.2%]	[35 / 9.0%]	[15 / 3.9%]	[7 / 1.8%]
16	Bamboo can be used in modern architectural designs.	[180 / 46.5%]	[150 / 38.8%]	[35 / 9.0%]	[15 / 3.9%]	[7 / 1.8%]
17	Cultural perceptions affect the use of bamboo in housing.	[160 / 41.3%]	[145 / 37.5%]	[45 / 11.6%]	[25 / 6.5%]	[12 / 3.1%]
18	Training artisans in bamboo construction can increase adoption.	[210 / 54.3%]	[140 / 36.2%]	[20 / 5.2%]	[12 / 3.1%]	[5 / 1.3%]

19	Bamboo is a sustainable building material.	[220 / 56.8%]	[130 / 33.6%]	[25 / 6.5%]	[7 / 1.8%]	[5 / 1.3%]
20	Bamboo can contribute to solving the housing deficit in Abuja.	[195 / 50.4%]	[135 / 34.9%]	[35 / 9.0%]	[15 / 3.9%]	[7 / 1.8%]
21	Public sensitization can improve bamboo adoption in construction.	[205 / 53.0%]	[140 / 36.2%]	[25 / 6.5%]	[12 / 3.1%]	[5 / 1.3%]
22	The lifespan of bamboo structures is comparable to other materials.	[150 / 38.8%]	[140 / 36.2%]	[55 / 14.2%]	[30 / 7.8%]	[12 / 3.1%]
23	Bamboo structures are safe and durable when constructed properly.	[190 / 49.1%]	[145 / 37.5%]	[30 / 7.8%]	[15 / 3.9%]	[7 / 1.8%]
24	Bamboo use can help reduce Nigeria's carbon footprint.	[200 / 51.7%]	[135 / 34.9%]	[35 / 9.0%]	[12 / 3.1%]	[5 / 1.3%]
25	I support the use of bamboo in affordable housing projects.	[210 / 54.3%]	[135 / 34.9%]	[25 / 6.5%]	[12 / 3.1%]	[5 / 1.3%]

Interpretation of Section B

Question 1: Bamboo as a viable alternative to conventional materials

An overwhelming majority of respondents (86.6% combined) believe bamboo serves as a viable alternative to traditional building materials, with 54.3% strongly agreeing and 32.3% agreeing. Only 5.2% expressed disagreement, indicating strong acceptance of bamboo's potential in construction. This suggests widespread recognition of bamboo's suitability, though a small neutral segment (8.3%) may require more information or evidence.

Question 2: Bamboo availability in Nigeria

Most respondents (84% combined) perceive bamboo as readily available in Nigeria, with 46.5% strongly affirming this view. However, 10.3% remained neutral, potentially reflecting regional availability differences, while 5.7% disagreed, pointing to possible supply chain gaps in certain areas. This indicates that while bamboo is generally accessible, its distribution may not be uniform across all regions.

Question 3: Cost-effectiveness of bamboo buildings

A significant majority (85.3%) agreed that bamboo construction is cost-effective, with half strongly endorsing this perspective. The low disagreement rate (5.7%) suggests few doubt bamboo's economic benefits, reinforcing its potential for affordable housing solutions. The 9% neutral responses may represent those needing more data on long-term cost comparisons.

Question 4: Environmental benefits of bamboo

An exceptional 90.4% consensus emerged regarding bamboo's role in reducing environmental degradation, with 56.8% strongly agreeing. The minimal opposition (4.4%) underscores bamboo's strong eco-friendly reputation. This near-unanimous agreement positions bamboo as a key material for sustainable construction initiatives.

Question 5: Structural strength of bamboo

While 81.4% believe bamboo has sufficient structural strength, the 11.6% neutral and 7% disagreement rates suggest some reservations about its load-bearing capabilities. This indicates that while most accept bamboo's strength, demonstrations of engineered bamboo structures could help convince the uncertain minority.

Question 6: Thermal insulation properties

A strong majority (80.1%) acknowledged bamboo's insulation qualities, though 12.9% remained neutral. This suggests that bamboo's climate-adaptive benefits are widely recognized, but some may need practical examples of its thermal performance in Nigerian buildings.

Question 7: Impact on Abuja's housing costs

Most respondents (86.6%) agreed bamboo could reduce housing costs in Abuja, with half strongly supporting this view. The low opposition (5.7%) indicates broad confidence in bamboo's affordability potential for the capital's housing market.

Question 8: Aesthetic appeal of bamboo buildings

An impressive 85.3% found bamboo structures aesthetically pleasing, suggesting its design potential complements its functional benefits. The minimal disagreement (5.7%) indicates few perceive bamboo constructions as unattractive.

Question 9: Visibility of bamboo buildings in Nigeria

Only 51.7% reported seeing bamboo buildings, while 28.1% disagreed with this experience. This significant divide highlights bamboo's current limited presence in Nigeria's built environment, pointing to untapped market opportunities.

Question 10: Government policy support

Just 34.9% perceived government support for bamboo construction, while 39.2% disagreed. This policy awareness gap suggests current initiatives may be insufficient or poorly communicated, representing a key area for improvement to advance bamboo adoption.

Question 11: Need for specialized skills

The strong agreement (81.4%) about required expertise underscores the necessity for training programs. This near-consensus indicates that skill development should be a priority in bamboo promotion strategies.

Question 12: Durability concerns

A significant 65.9% believed bamboo deteriorates faster than conventional materials, revealing persistent durability perceptions that proper treatment education could address. The 22.3% opposition suggests some recognize modern preservation techniques.

Question 13: Treatment extends lifespan

An overwhelming 89.2% agreed that treatment improves durability, indicating awareness of preservation methods. This knowledge base could be leveraged to address the durability concerns raised in Question 12.

Question 14: Awareness gap in Nigeria

The striking 91.7% agreement about lack of awareness clearly identifies the need for comprehensive education campaigns. This near-unanimous response suggests information dissemination should be the first step in bamboo promotion.

Question 15: Pest resistance when treated

Most (85.3%) recognized properly treated bamboo's resistance to pests, showing understanding of preservation benefits. This counters some traditional concerns about bamboo's vulnerability.

Question 16: Modern architectural applications

The 85.3% agreement on bamboo's suitability for contemporary designs indicates recognition of its versatility beyond traditional uses. This perception supports its potential in urban housing projects.

Question 17: Cultural perception barriers

The 78.8% agreement about cultural factors highlights the need to address social acceptance alongside technical and economic aspects of bamboo adoption.

Question 18: Training's role in adoption

The overwhelming 90.5% consensus on training's importance clearly identifies workforce development as critical for mainstreaming bamboo construction.

Question 19: Sustainability recognition

The 90.4% agreement on bamboo's sustainability reinforces its environmental credentials, suggesting this could be a key messaging focus for promotion campaigns.

Question 20: Addressing Abuja's housing deficit

The 85.3% agreement positions bamboo as a viable solution for the capital's housing challenges, with half strongly endorsing this view.

Question 21: Public sensitization importance

The 89.2% agreement underscores that awareness campaigns should accompany any bamboo housing initiatives to ensure public acceptance.

Question 22: Lifespan comparison

The 75% combined agreement on comparable lifespan, with 10.9% opposition, suggests most believe properly constructed bamboo buildings can match conventional materials' durability.

Question 23: Safety and durability

The strong agreement (86.6%) on properly constructed bamboo buildings' safety should help alleviate concerns about structural integrity.

Question 24: Carbon footprint reduction

The 86.6% recognition of bamboo's climate benefits indicates alignment with global sustainability goals, providing a strong argument for its adoption.

Question 25: Support for affordable housing

The 89.2% endorsement for using bamboo in affordable housing projects demonstrates strong public backing for policy initiatives in this direction.

4.3 DISCUSSION OF FINDINGS

The findings of this study reveal a strong overall acceptance of bamboo as a viable and sustainable building material for affordable housing development in Abuja. A significant majority of respondents acknowledged bamboo’s structural strength, cost-effectiveness, and environmental benefits, indicating that it is widely perceived as a credible alternative to conventional construction materials. The high level of agreement on its ability to reduce environmental degradation and carbon footprint further reinforces its relevance in promoting sustainable construction practices. Additionally, respondents expressed strong support for the use of bamboo in addressing the housing deficit in Abuja, suggesting that its adoption could play a critical role in enhancing housing affordability and accessibility, particularly for low- and middle-income households.

The study also highlights important socio-economic implications associated with bamboo utilization. Findings indicate that bamboo has the potential to significantly lower construction costs, thereby making housing more affordable while simultaneously creating employment opportunities through its cultivation, processing, and application in construction. The strong agreement on the need for artisan training suggests that capacity building is essential for maximizing these benefits. Furthermore, the results show that public sensitization and awareness campaigns are crucial, as a large proportion of respondents identified low awareness and cultural perceptions as key barriers to adoption. This underscores the importance of integrating education, skill development, and community engagement into policy strategies aimed at promoting bamboo-based housing solutions .

Despite these positive perceptions, the findings also reveal several constraints limiting the widespread adoption of bamboo in Nigeria's construction industry. Issues such as inadequate government support, lack of standardization, limited technical expertise, and concerns about durability were identified as major challenges. Notably, many respondents indicated that bamboo buildings are not yet widely visible in Nigeria, reflecting its limited practical application despite high acceptance levels. These challenges suggest that while bamboo holds significant promise, its successful integration into mainstream housing development requires coordinated efforts, including policy formulation, investment in treatment technologies, and the establishment of regulatory frameworks to ensure quality, safety, and long-term performance.

5.0 CONCLUSION AND RECOMMENDATIONS

The study concludes that bamboo possesses significant potential as a sustainable and cost-effective material for affordable housing development in Abuja. The findings demonstrate that bamboo is widely perceived as structurally reliable, environmentally friendly, and economically viable, with the capacity to reduce construction costs and contribute to addressing the housing deficit. In addition to its environmental advantages, bamboo utilization offers notable socio-economic benefits, including employment generation and stimulation of local economies. However, despite these positive attributes, its adoption remains limited due to challenges such as low public awareness, inadequate technical expertise, absence of standardized building codes, and insufficient institutional and policy support. These constraints highlight the gap between the recognized potential of bamboo and its practical application within Nigeria's construction sector.

Based on these findings, the study recommends that government agencies, professional bodies, and research institutions collaborate to develop and implement standardized guidelines and building codes for bamboo construction in Nigeria. There is also a need for increased investment in bamboo treatment and processing technologies to enhance durability and structural performance. Capacity-building initiatives, including training programs for artisans and construction professionals, should be prioritized to improve technical competence and promote wider adoption. Furthermore, public awareness campaigns should be intensified to address cultural perceptions and increase acceptance of bamboo as a modern construction material. Finally, policymakers should integrate bamboo into national housing strategies and provide incentives to encourage its use in affordable housing projects, particularly in rapidly urbanizing areas such as Abuja.

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