
THE USE OF GREEN MATERIALS IN BUILDING CONSTRUCTION: A STUDY OF THE NIGERIAN CONSTRUCTION INDUSTRY

Alhassan Galadima^{1,*}, Umar Ibrahim Kwami¹, Muazu Bello¹

¹Ahmadu Bello University

Email: sultan4haroon@gmail.com*, ibrahimkafarati@fedpolydaura.edu.ng, mbello6080@gmail.com

*Corresponding author: Alhassan Galadima

DOI: <https://doi.org/10.67203/sp.ICESID.2026>

ABSTRACT

The construction industry remains a major contributor to global carbon emissions, resource depletion, and energy consumption, with traditional materials such as cement and steel carrying significant environmental costs. Green materials derived from renewable, recycled, or low-impact sources offer a sustainable alternative to conventional building practices. This study examines the current state of green materials adoption in the Nigerian construction industry through a mixed-methods approach combining literature synthesis and questionnaire survey of construction firms operating in Kaduna, Plateau, and the Federal Capital Territory, Abuja. The research assesses awareness levels, identifies barriers to adoption, and evaluates the extent to which green building principles are integrated into current practices. Findings reveal that while green materials demonstrate significant potential to reduce embodied energy and carbon footprint—with hempcrete and bamboo composites providing excellent insulation and renewability, recycled aggregates and fly ash reducing reliance on virgin cement, and mycelium-based blocks showing promise in biodegradability—adoption in Nigeria remains critically low. Only 29.6% of respondents confirmed that green materials principles are being considered by construction firms, and 66.7% indicated that the Nigerian building industry is not progressing toward green building construction. Key barriers include inadequate awareness and education (33.3% of respondents), lack of standardised materials and technology (48.1%), absence of regulatory enforcement, high initial costs, limited large-scale production, and regulatory gaps in certification. The study concludes that achieving sustainable construction in Nigeria requires increased professional education, mandatory site waste management, strengthened regulatory frameworks, financial incentives, and enhanced cooperation among stakeholders. The findings contribute to the growing body of knowledge on sustainable construction practices in developing economies and offer practical recommendations for policymakers and industry practitioners.

Keywords: Green building materials; Sustainable construction; Bio-based composites; Nigerian construction industry; Low-carbon building technologies

1. INTRODUCTION

1.1 Background

The Inter-governmental Panel on Climate Change (IPCC) has asserted that greenhouse gases generate impacts sufficient to alter global climate patterns. The construction industry generates the greatest environmental impacts among all industries, accounting for approximately 30-40% of global energy use and significant proportions of carbon emissions worldwide. Green building practices have emerged as a key strategy for achieving sustainability in the construction industry, with green materials designs and standards developed to improve building operation energy and embodied energy efficiencies while minimizing energy consumption and waste.

Green materials encompass those which are renewable and/or cause the least impact on the environment. In design, it is the creative initial layout—both of spaces and structure—that takes full advantage of building 'green'. These materials can be considered waste products that hold no harmful effects, are considered at the end of their useful life, and can be used in conjunction with other construction materials for building construction. The concept has been adopted by many nations as the best way forward in preserving resources and sustaining the environment.

1.2 Statement of the Problem

Construction activities, while essential for infrastructural growth and economic development, generate substantial environmental impacts including large quantities of solid waste, noise pollution, air pollution, land degradation, and water pollution. These impacts threaten quality of life and environmental sustainability. Since construction activities cannot be halted due to human demand and socio-economic development requirements, there exists a critical need to balance human requirements with environmental protection. Green building materials offer a pathway to reduce or avoid the environmental impacts of construction activities while ensuring that developmental initiatives and their benefits are sustained.

1.3 Aim and Objectives

The aim of this study is to examine the different construction methods and practices and their general impact on the use of green materials in building construction. The specific objectives are:

1. To identify the most prominent sustainability issues related to site practices of building construction firms;
2. To undertake a review of the concept of green materials in building construction;
3. To evaluate the extent of application of green materials concepts in the construction of buildings in Nigeria;
4. To make appropriate recommendations towards increased adoption of green materials in the Nigerian building industry.

2. LITERATURE REVIEW

2.1 Green Materials and Environmental Sustainability

Sustainable development is a necessary condition for the continuation of the earth, while healthy and comfortable living is a necessary condition for the continuation of life. The building sector is the largest source of greenhouse gas emissions globally, including energy used for heating, lighting, and operating devices (Larsson, 2004). Environmental indicators for green materials have the potential to serve as means of making environmental impacts and possibly benefits of buildings visible to all relevant stakeholders.

Green building helps support a broader sustainable development agenda. If sustainable development goals are to be truly reached, buildings should consume minimal energy, water and materials, and produce minimal emissions, noise and waste over their lifespan. Even at a more realistic level, there is global interest in improving building performance: governments want to reduce the use of scarce resources and airborne emissions, owners want to reduce operating costs, and developers are finding that customers are demanding higher quality and performance (Zhang et al., 2011).

2.2 Examples of Green Materials

Fly Ash: A residue from coal-fired power plants used in cement making. Usage of fly ash decreases the cost of concrete and results in higher quality products (Reddy, K.M., & Patni, J.C, 2026). When cement is produced, huge quantities of carbon dioxide are released, resulting in air and water pollution. The pozzolanic and cementitious properties of fly ash make it ideal as a substitute for cement in concrete, removing the need for disposal. High-performance fly ash concrete can improve workability, ultimate strength, and durability.

Straw Bales: Used as main structural components or as soft insulation. Packed closely and made hard, they can withstand considerable load and impact. Contrary to common perception, straw bales are not a fire hazard and provide three times more fire resistance than conventional homes (Balu,2012).

Cement-bonded Composites: Value-added wood products made from particles from wood and agricultural byproducts, cement, and a catalyst. These materials are useful for ceiling, walling, roofing, flooring, claddings, partitioning, and shuttering (Ajayi, 2005). They are resistant to termites,

insects, fungi, moisture movement, and fire, with good insulating properties, durability, and excellent nailing ability.

Bamboo: Often misunderstood as a light, slender wood, bamboo is lighter than steel but five times stronger than concrete. It absorbs four times more carbon dioxide than most trees, can grow faster than any normal tree (usually several feet per day), and provides significant cooling effects. The main positive aspect is that it is a renewable source (Xu et al, 2025).

Mycelium-based Blocks: Show promise in biodegradability and low-energy production. Mycelium composites are lightweight, fire-resistant, and fully biodegradable; offering architects a versatile medium for sustainable construction (Sharma, R., and Sumbria, R. 2022).

2.3 Importance of Green Materials

Green materials offer numerous benefits including cost savings over the lifecycle, energy efficiency (reducing both embodied and operating energy consumption), water efficiency, material efficiency, temperature regulation, improved indoor air quality, enhanced indoor environmental quality, reduced maintenance requirements, higher property value, and tax benefits (Adediji, Y.M.D., 2011).

2.4 Barriers to Green Materials Adoption in Nigeria

Several factors impede the adoption of green materials in the Nigerian construction industry:

Ignorance/Illiteracy: With adult literacy rate at approximately 56.9% of the total population, the focus of most citizens on buildings tends toward quick gains without consideration of environmental sustainability (Murtala et. al., 2013).

Poverty: An estimated 54% of Nigeria's population lives below the poverty line, making the procurement of green materials financially challenging (Dinwoodie and Paxton, 1990).

Lack of Awareness: Most Nigerians are not aware that buildings can influence the environment and climate, being more concerned with aesthetic values and modern technological gadgets without understanding the negative implications.

Availability of Materials: While green materials can be found more easily in urban areas, rural areas face significant scarcity. Many eco-friendly materials are not available in Nigeria, making them hard to find and increasing transportation costs (Balu, 2012).

Cost: Many believe the cost of green materials is prohibitive, requiring significant initial investment despite long-term energy savings.

Regulatory Gaps: The absence of comprehensive green building codes, standards, and enforcement mechanisms limits widespread adoption (Al-kaabi et al, 2011).

3. RESEARCH METHODOLOGY

3.1 Research Approach

This study employed a survey research method to investigate current trends in green materials construction in the Nigerian building industry. The survey method was chosen for its suitability in studying both large and small populations by selecting and studying samples to discover the relative incidence, distribution, and interrelation of sociological and psychological variables.

3.2 Sample Size and Population

The population comprised professionals selected from building construction firms including Dantata and Sawoe, Arab Construction, Julius Berger in Abuja, Datum Construction Limited in Kaduna, and Eagle Construction, Akiorganic Partnership, and Rick Rock Building and Engineering Construction Limited in Plateau State. A total population of 50 respondents was selected for the study. Data were initially collected from all 50 respondents using the same set of research questions. Of these, twenty-seven (27) respondents provided their responses through a structured questionnaire, while twenty-three (23) respondents participated through face to face interviews.

The interviews constituted a primary source of data collection, as the information was obtained directly from the respondents based on their knowledge, experience, and opinions concerning the subject under investigation. However, although the interview responses were collected

as part of the preliminary data-gathering process, the interview data will not be used in the final analysis or interpretation of findings for this research.

This decision was made to ensure consistency and uniformity in the method of data analysis and presentation. Consequently, only the responses obtained from the 27 respondents who completed the structured questionnaire will constitute the empirical data used for the study.

The interview exercise should therefore be regarded as a supplementary or preliminary primary data collection activity, rather than a source of data for the final research analysis. The exclusion of the interview responses does not imply that the information provided by the interviewee was invalid; rather, it reflects the methodological decision to restrict the study's final analysis to questionnaire-based responses. Accordingly, all statistical analysis, tables, discussions, and conclusions arising from the empirical data will be based exclusively on the 27 valid questionnaire responses.

The study adopted a purposive sampling technique in selecting the firms and geographical locations included in the research. The selection was based primarily on the relevance of the firms to the objectives of the study, their involvement in construction activities, availability of respondents with relevant professional knowledge, and accessibility for data collection. The study focused on Plateau, Kaduna, and the Federal Capital Territory (FCT), Abuja, which were considered appropriate locations for obtaining information relevant to the research.

The choice of these locations was also informed by the researcher's prior geographical, educational, and industrial familiarity with the areas. The researcher was born in Plateau state, undertook his Bachelor of Engineering (B.Eng.) studies in Zaria, Kaduna state, and completed his Students Industrial Work Experience Scheme (SIWES) at Setraco Nigeria Limited. These experiences provided him with geographical locations, construction industry environment, and relevant firms within the selected states. Such familiarity facilitated the identification of appropriate firms, communication with potential respondents, and access to the field.

3.3 Data Collection Methods

Primary data was collected through questionnaires administered to building construction firms randomly selected in Kaduna, Plateau, and the Federal Capital Territory Abuja. Secondary data was collected from textbooks, journal articles, encyclopedias, published documents, and internet reports.

3.4 Data Analysis

The data analysis was restricted to univariate descriptive statistics, including frequencies, percentages, mean, median, and mode. Consequently, the study did not employ cross-tabulation, correlation analysis, or inferential statistical techniques to examine possible relationships between respondents' demographic characteristics and the identified barriers to adoption. Therefore, the findings should be interpreted primarily as a description of respondents' characteristics, perceptions, and reported adoption barriers rather than as evidence of statistically significant relationships or causal effects.

The decision to adopt a purely descriptive analytical approach was deliberate and consistent with the primary purpose of the study, which was to describe and summarize respondents' views and identify the most prominent adoption barriers. Frequencies and percentages were appropriate for presenting categorical responses, while mean, median, and mode provided useful summaries of responses to relevant items. The approach also enabled the researcher to present the distribution and central tendencies of the data in a straightforward and accessible manner without making statistical claims beyond what the study design and data could adequately support.

Nevertheless, the absence of cross-tabulation and inferential testing limits the study's ability to determine whether adoption barriers vary significantly according to demographic characteristics such as age, gender, educational level, occupation, or years of experience. Future studies could address this limitation by employing cross-tabulation, chi-square tests, correlation analysis, regression, or other appropriate inferential techniques to investigate relationships and predictors of adoption.

Data analysis was conducted using standard percentages and simple statistics to analyse questionnaire responses. Responses were categorised using Likert-scale rankings from Agree to Disagree, Believe to Disbelieve, and Yes/No responses.

4. RESULTS AND DISCUSSION

4.1 Respondent Demographics

The demographic analysis revealed that 92.6% of respondents were male and 7.4% female. The majority (63.0%) were aged 20-35 years, followed by 22.2% aged 36-50 years. Marital status distribution showed 51.9% married and 48.1% single. Educational qualifications indicated 51.9% held B.Sc./B.A degrees, 33.3% held HND, and the remainder held OND or SSCE qualifications. All respondent organisations (100%) had been in existence for 10 years or more.

4.2 Data Presentation and Analysis

Some members of staff of Datum construction Nigeria Limited in Kaduna state; Dantata & sawoe Construction Company Limited, Julius Berger Nigeria Plc., and Arab contractors Nigeria Limited in Federal Capital Territory (FCT) Abuja; and Rick Rock building and engineering Construction Limited, akiorganic patternship, and Eagle Construction Company in Plateau state participated in the study. A total of 50 respondents were involved in the data collection, comprising 27 respondents who completed the questionnaires and 23 respondents who were interviewed using the same set of questions contained in the questionnaire. The responses were coded and analysed using Statistical Package for the Social Sciences (SPSS). The findings were presented using frequency tables and percentages to ensure that the results were clear, concise, and easily understood.

4.3 Data Analysis and Interpretation

Statistics

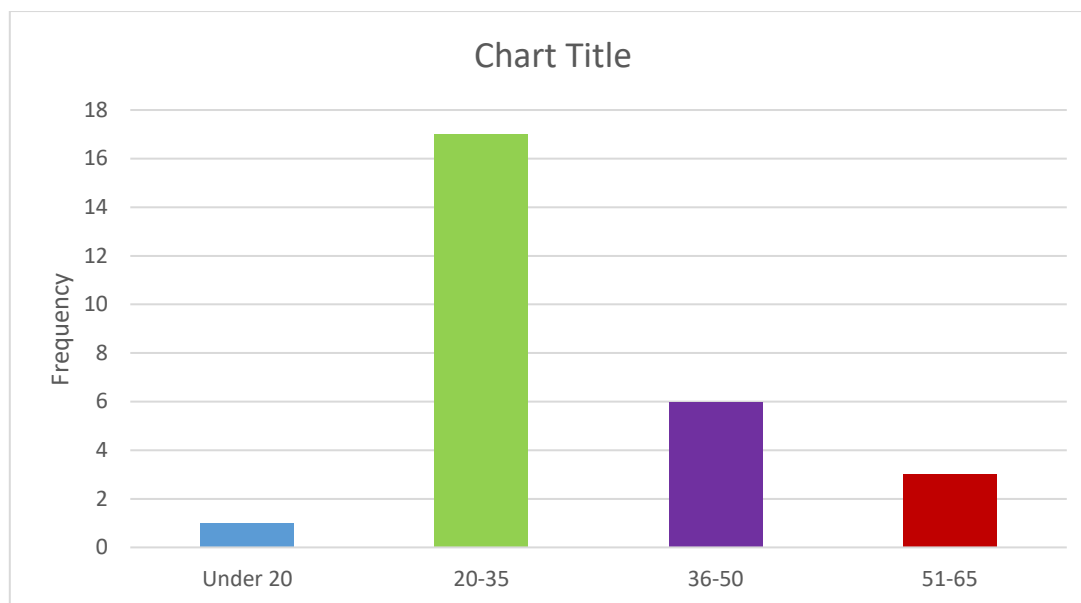
Age

Valid	27
Mean	2.4074
Median	2.0000
mode	2.00

Age

	frequency	percent	Valid percent	Cumulative percent
Under 20	1	3.7	3.7	3.7
20-35	17	63.0	63.0	66.7
36-50	6	22.2	22.2	88.9
51-65	3	11.1	11.1	100.0
Total	27	100.0	100.0	

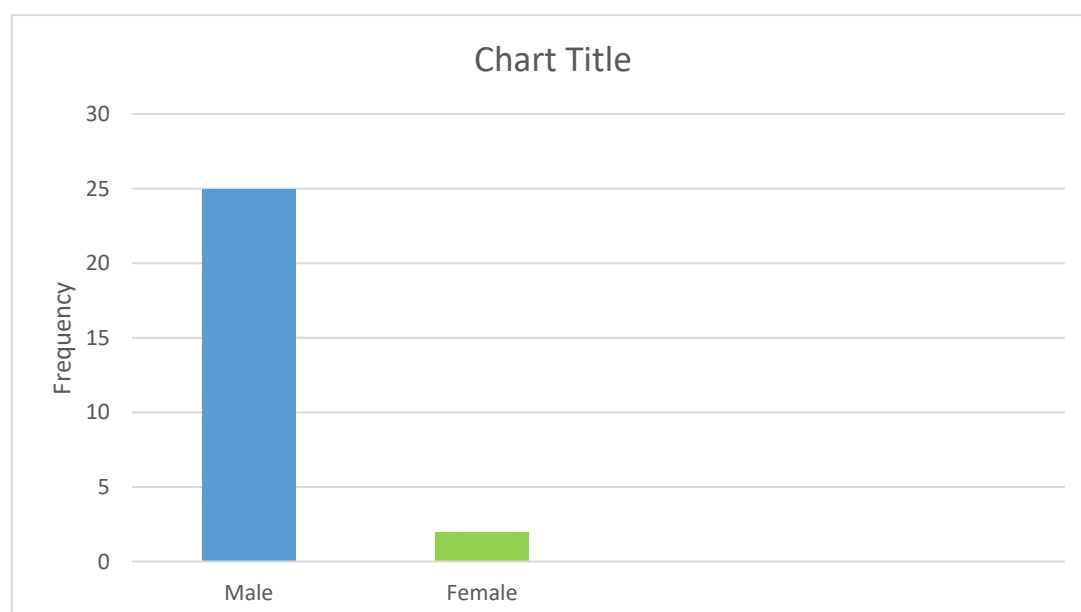
THE USE OF GREEN MATERIALS IN BUILDING CONSTRUCTION: A STUDY OF THE NIGERIAN
CONSTRUCTION INDUSTRY



Statistics

Sex			
Valid		27	
Mean		1.0741	
Median		1.0000	
mode		1.00	

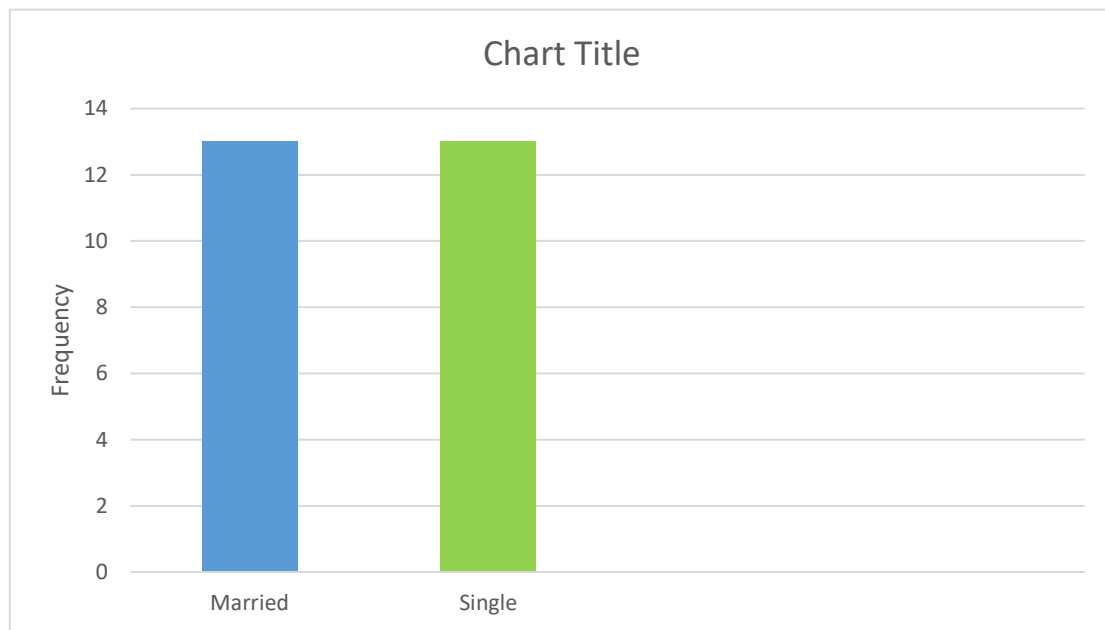
Sex				
	Frequency	Percent	Valid Percent	Cumulative percent
Male	25	92.6	92.6	92.6
Female	2	7.4	7.4	100.0
Total	27	100.0	100.0	



Marital status

Valid	27
Mean	1.4815
Median	1.0000
mode	1.00

	Frequency	Percent	Valid Percent	Cumulative Percent
Married	14	51.9	51.9	51.9
Single	13	48.1	48.1	100.0
Total	27	100.0	100.0	



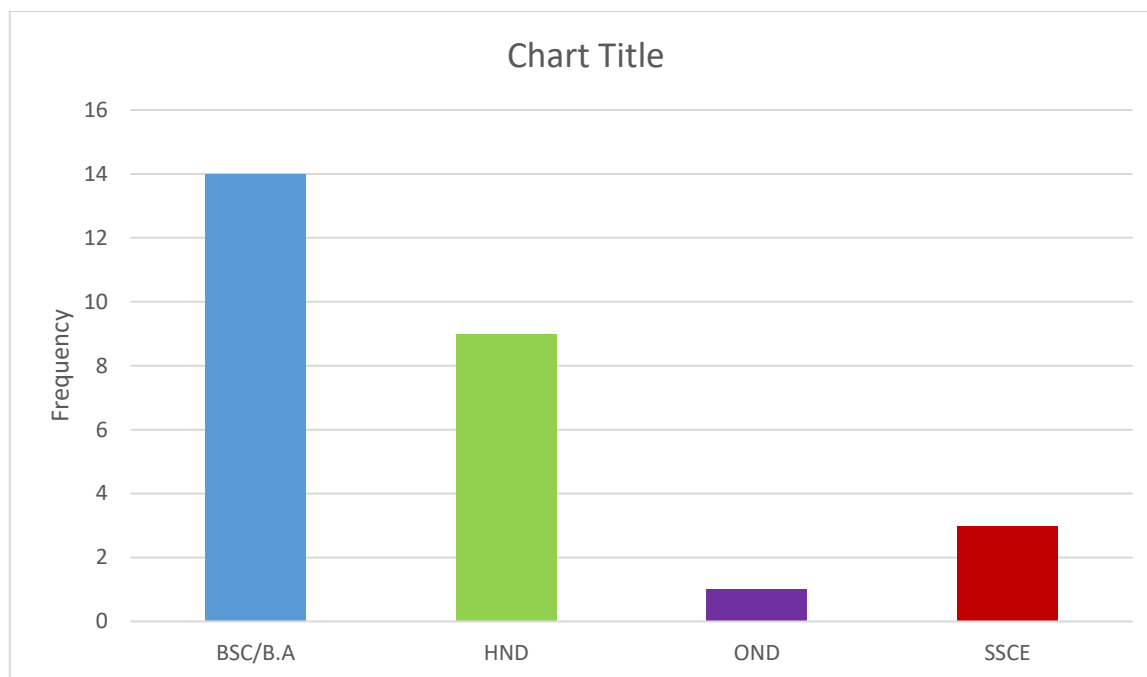
Statistics

Your highest completed level of education

Valid	27
Mean	2.7407
Median	2.0000
Mode	2.00

Your highest completed level of education

	frequency	Percent	Valid Percent	Cumulative Percent
Bsc./BA	14	51.9	51.9	51.9
HND	9	33.3	33.3	85.2
ND	1	3.7	3.7	88.9
SSCE	3	11.1	11.1	100.0
Total	2	100.0	100.0	



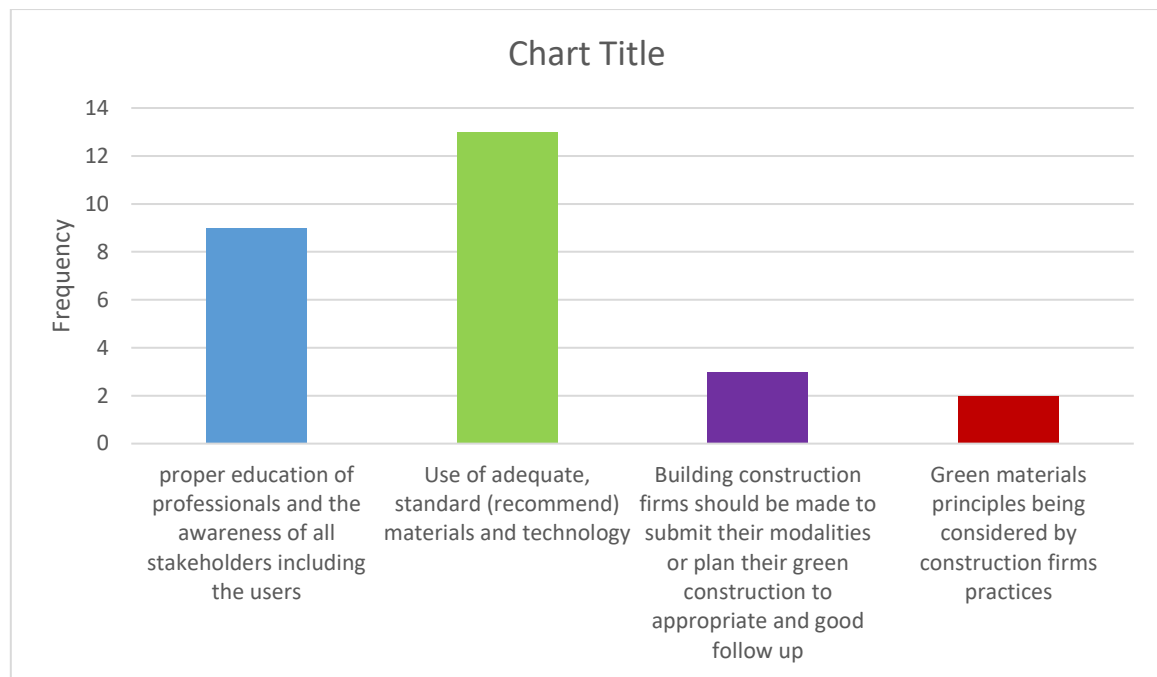
What could be done to effectively promote green materials construction by building construction firms in Nigeria?

	Valid	27
Mean		1.9259
Median		2.0000
Mode		2.00

What could be done to effectively promote green materials construction by building construction firms in Nigeria?

	Frequency	Percent	Valid Percent	Cumulative Percent
proper education of professionals and the awareness of all stakeholders including the users.	9	33.4	33.4	33.4
Use of adequate, standard (recommend) materials and technology.	13	48.1	48.1	81.5
Building construction firms should be made to submit their modalities or plan their green construction to appropriate and good follow up	3	11.1	11.1	92.6
Green materials principles being considered by construction firms practice	2	7.4	7.4	100.0
Total	27	100.0	100.0	

THE USE OF GREEN MATERIALS IN BUILDING CONSTRUCTION: A STUDY OF THE NIGERIAN CONSTRUCTION INDUSTRY



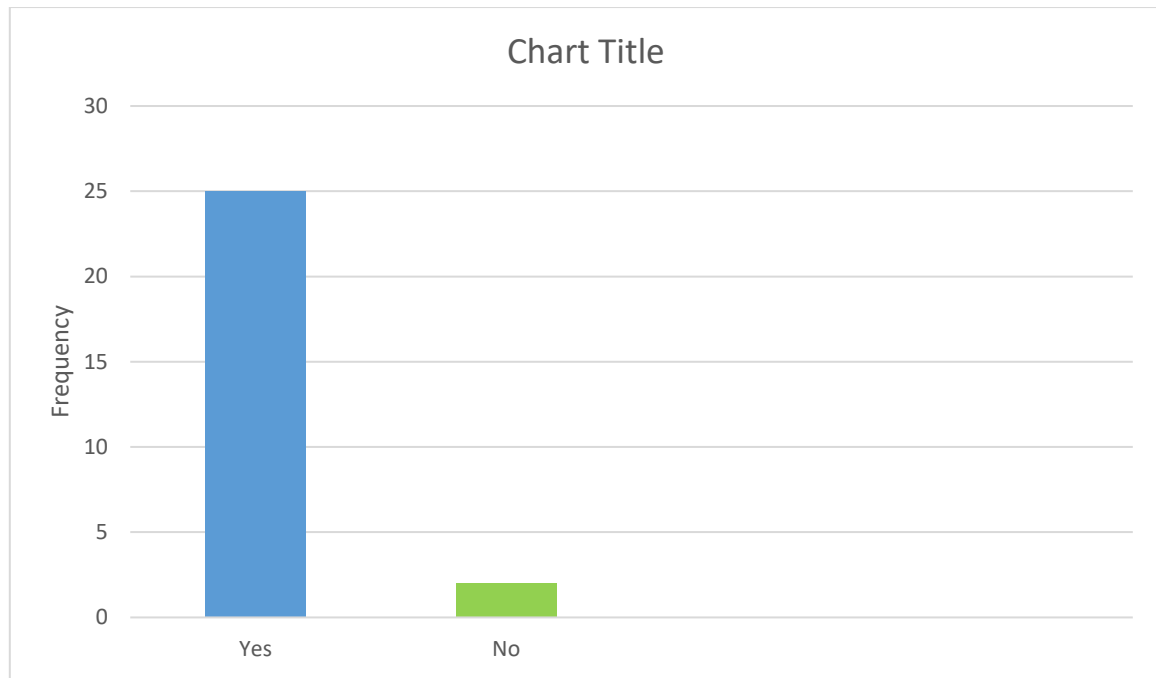
Statistics

Does Nigeria need to switch to the use of green materials?

N	valid	27
	Missing	0
Mean		1.0741
Median		1.0000
Mode		1.00

Does Nigeria need to switch to the use of green materials?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	25	92.6	92.6	92.6
	No	2	7.4	7.4	100.0
	Total	27	100.0	100.0	

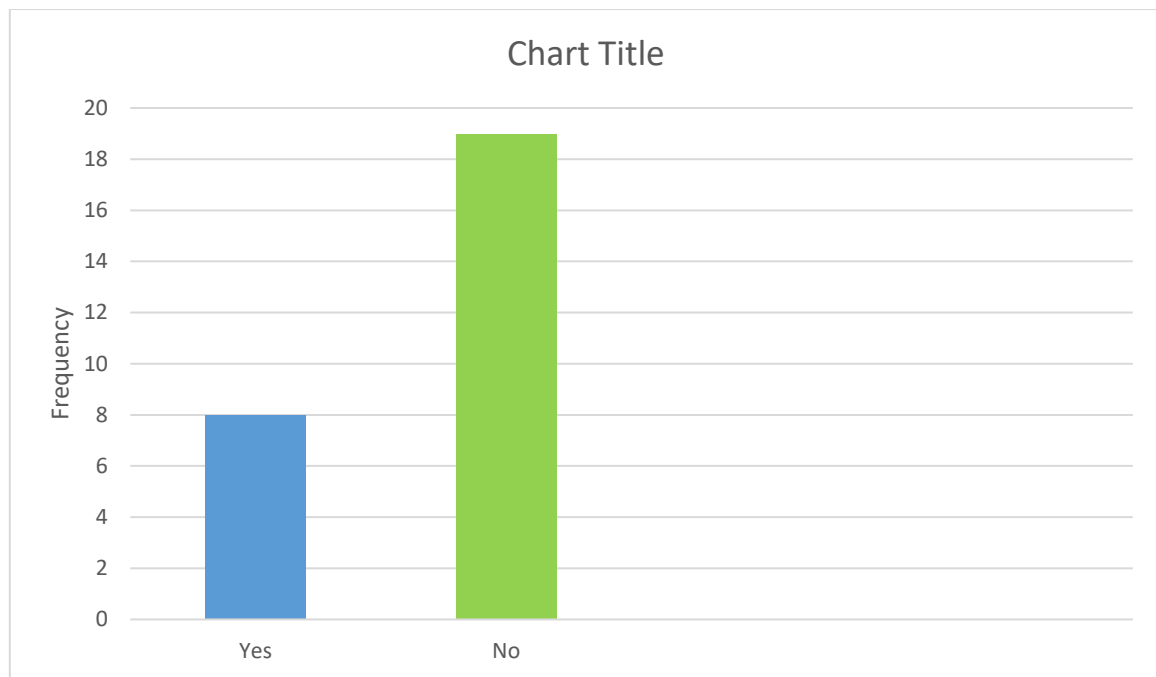


Are you of the view that many factors are promoting the rapid development of green buildings including the increasingly serious global warming from other country like Indian, Malaysia. Those Nigeria achieved that?

Valid	27
Mean	1.7037
Median	2.0000
Mode	2.00

Are you of the view that many factors are promoting the rapid development of green buildings including the increasingly serious global warming from other country like Indian, Malaysia. Those Nigeria achieved that?

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	8	29.6	29.6	29.6
No	19	70.4	70.4	100.0
Total	27	100.0	100.0	



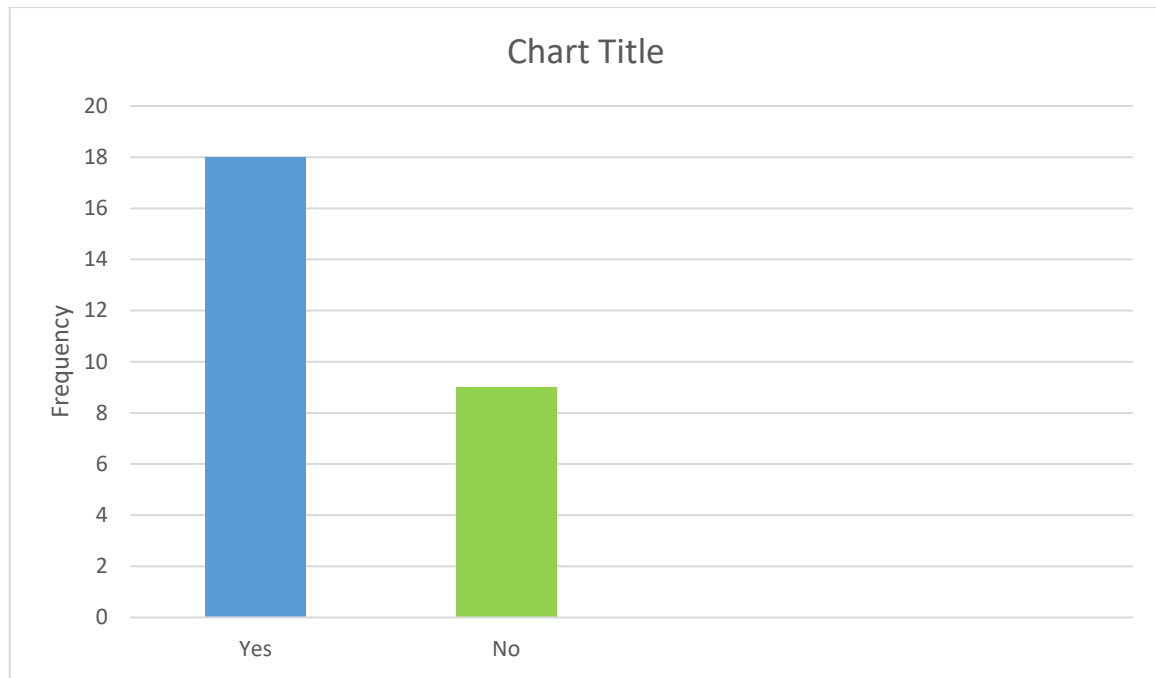
Statistics

Are you of the view that government have reduced taxes on the use of green materials in construction of building?

Valid	27
Mean	1.3333
Median	1.0000
Mode	1.00

Are you of the view that government have reduced taxes on the use of green materials in construction of building?

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	18	66.7	66.7	66.7
No	9	33.3	33.3	100.0
Total	27	100.0	100.0	



Statistics

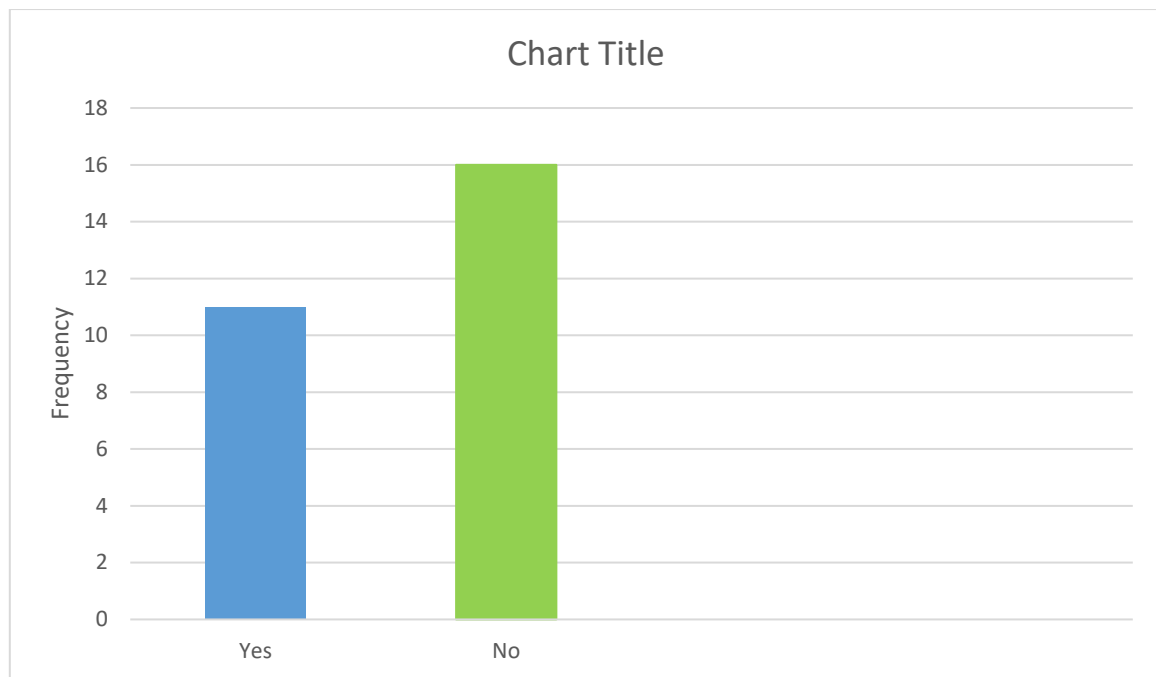
Did Nigeria adopted green building concept as the best way forward in preserving our resources and sustained our environment?

Valid	27
Mean	1.5926
Median	2.0000
Mode	2.00

Did Nigeria adopted green building concept as the best way forward in preserving our resources and sustained our environment?

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	11	40.7	40.7	40.7
No	16	59.3	59.3	100.0
Total	27	100.0	100.0	

THE USE OF GREEN MATERIALS IN BUILDING CONSTRUCTION: A STUDY OF THE NIGERIAN CONSTRUCTION INDUSTRY



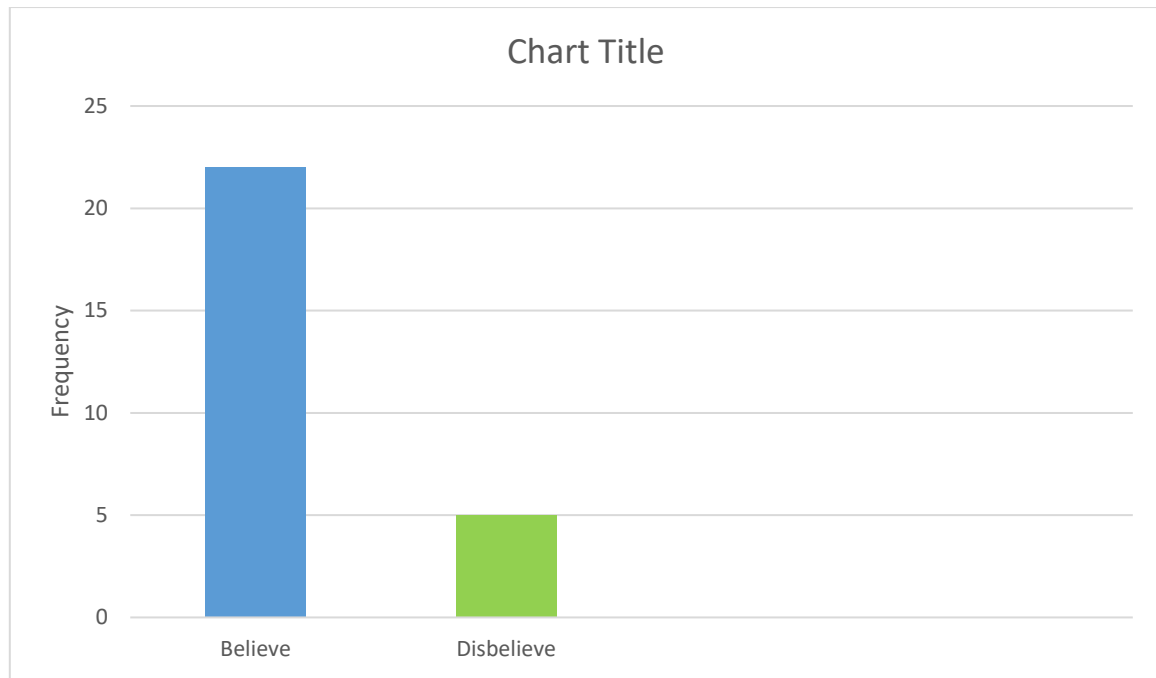
Statistics

Do you believe that green materials need less maintenance and do not destroyed so quickly?

Valid	27
Mean	1.1852
Median	1.0000
Mode	1.00

Do you believe that green materials need less maintenance and do not destroyed so quickly?

	Frequency	Percent	Valid Percent	Cumulative Percent
Believe	22	81.5	81.5	81.5
Disbelieve	5	18.5	18.5	100.0
Total	27	100.0	100.0	

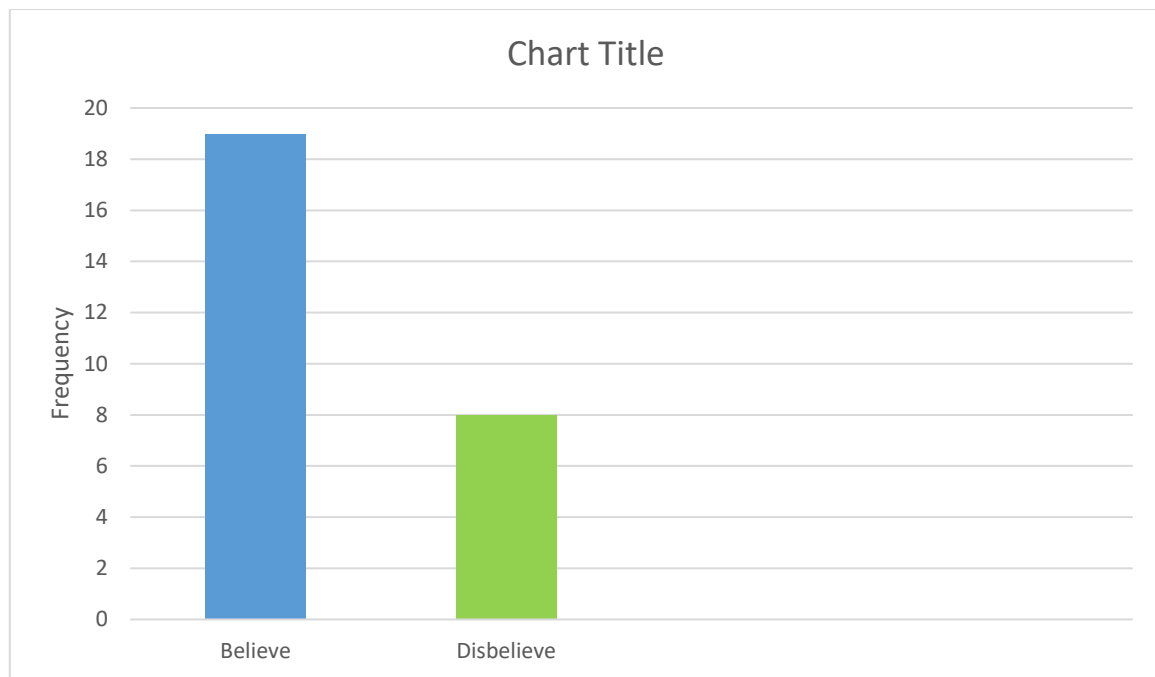


Do you believe that in the process of availability of green materials, there is scarcity of the material in the rural areas compared to the urban areas

Valid	27
Mean	1.2963
Median	1.0000
Mode	1.00

Do you believe that in the process of availability of green materials, there is scarcity of the material in the rural areas compared to the urban areas

	Frequency	Percent	Valid Percent	Cumulative Percent
Believe	19	70.4	70.4	70.4
Disbelieve	8	29.6	29.6	100.0
Total	27	100.0	100.0	



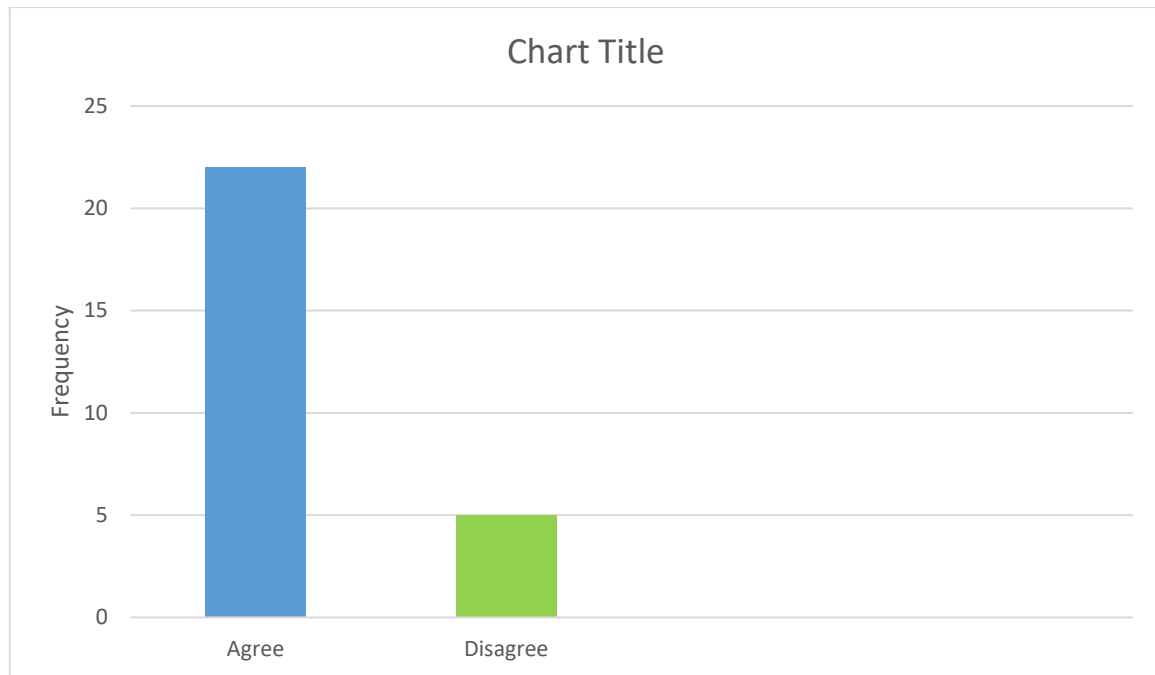
Statistics

Do you agree that the used of green materials in the construction of building protect the environment and natural resources, while achieving further advances in the structural performance?

Valid	27
Mean	1.1852
Median	1.0000
Mode	1.00

Do you agree that the used of green materials in the construction of building protect the environment and natural resources, while achieving further advances in the structural performance?

	Frequency	Percent	Valid Percent	Cumulative Percent
Agree	22	81.5	81.5	81.5
Disagree	5	18.5	18.5	100.0
Total	27	100.0	100.0	



4.5 Discussion

The findings reveal a significant gap between awareness and adoption of green materials in the Nigerian construction industry. While 92.6% of respondents acknowledged the need to switch to green materials, only 29.6% confirmed that green materials principles are being considered in current practices. This awareness-adoption gap aligns with findings from other developing economies where knowledge of sustainable practices does not necessarily translate into implementation.

The study confirms that the building sector is the largest source of greenhouse gas emissions globally, with buildings responsible for significant carbon emissions. Green materials demonstrate substantial potential to reduce embodied energy and carbon footprint. However, the Nigerian construction industry faces persistent barriers including inadequate professional education, limited availability of materials, absence of regulatory enforcement, and economic constraints.

The findings align with previous research identifying government-related barriers as primary impediments to sustainable building projects in Nigeria. The absence of comprehensive green building codes, financial incentives, and enforcement mechanisms limits widespread adoption.

5. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

Based on the research findings, the following conclusions are drawn:

1. Green materials construction is not well understood by professionals in the Nigerian building industry, with familiarity with sustainability concepts remaining critically low.
2. Very few respondents acknowledged that construction activities contribute to waste, energy consumption, and environmental pollution, indicating a significant awareness gap.
3. Economic and social aspects of sustainability are more frequently considered than environmental aspects in site practices. The comprehensive definition of green materials encompassing suitable practices in materials choice, sources, construction methodologies, and design philosophy for improved performance, reduced environmental burden, minimised waste, and ecological friendliness has not been fully achieved.
4. While the Nigerian construction industries are not on a sustainable path with some professionals possessing theoretical knowledge of green materials construction, actual practice

remains limited due to lack of incentives, absence of penalties in the code of practice, and insufficient translation of research findings into practice.

5.2 Recommendations

1. Increase Awareness and Education: The level of awareness must be increased through inclusion of environmental issues and sustainability concepts in university curricula and continuing professional development for practitioners.

2. Strengthen Regulatory Framework: Government should undertake a review of existing building regulations to identify measures and policy options to improve sustainability, particularly energy and water efficiency of both residential and non-residential structures.

3. Mandatory Site Waste Management: Site waste management should be compulsory for all construction projects to improve resource efficiency by requiring measurement of waste produced and recording whether it is reused, recycled, or disposed.

4. Financial Incentives: Tax provisions and financial incentives should be introduced to encourage green materials adoption, including building tax credit programmes and reduced taxes on green materials.

5. Stakeholder Collaboration: All interested stakeholders should pool resources in a cooperative strategy, with federal, state, and local governments, educational and research institutions, government parastatals, trade organisations, professional firms, and private individuals collaborating to create the needed synergy for achieving sustainability.

6. Research Implementation: Research findings should be translated into practice rather than serving only as library decorations. Increased cooperation among professionals, particularly joint research work between builders and traditional builders, should be encouraged.

5.3 Areas for Further Research

1. Assessment of the extent of incorporation of green materials-related issues in existing Bachelor of Building curricula in Nigerian universities.

2. Research on energy efficiency in buildings in use, as the greatest proportion of energy consumption occurs during the operational phase.

3. Zero net emission studies in existing and new buildings, including zero energy buildings, to determine energy use through annual accounting.

REFERENCES

- [1] Adedeji, Y.M.D., (2011), Housing economy: use of interlocking masonry for low-cost housing in Nigeria. *Journal of Construction Project Management and Innovation*, Vol. 1 (1), 46-62.
- [2] Ajayi, B. (2006b), Dimensional stability of cement-bonded Boards Management with coffee chaff. *Journal of the Korea Society of Wood Science and Technology*. Mokchae Konghak 34(5): 1-7
- [3] Chatterjee (2009). Sustainable Construction and Green Materials in the Foundation of Building Ecology.
- [4] Gluch (2006). Building Green Perspectives in Environmental Management in Construction.
- [5] Sinopoli, J (2008). *How do Smart Buildings make a building green *Energy Engineering*, 105(6), 17-22.
- [6] Zhang et al. (2011). Research in the Localization Strategy of Green Materials.
- [7] Hsieh et al. (2011). The Application of Green Material to Sustainable Building for Environmental Protection.
- [8] Al-Kaabi et al. (2011). An Application Model for Green Material Implementation.
- [9] Kamana and Escultura (2011). Factors Affecting Ventilation.
- [10] Wu and Low (2010). Project Management and Green Materials.
- [11] Dammann and Elle (2006). Environmental Indicators.

- [12] Olgyay and Herdt (2004). The Application of Ecosystems Services Criteria for Green Material Assessment.
- [13] Kolawole, J. and Anigbogu (2005). Impact of Construction Activities on the Environment. *Conference Proceedings of the 2nd National Conference: "Towards a Sustainable Built Environment"*, Ahmadu Bello University, Zaria, 21st-23rd September.
- [14] Larsson (2004). Green Materials Strategies.
- [15] Sun et al. (2011). Using Renewable and Recycle Materials in Planning Material.
- [16] Walker (2012). An Investigation into the Problems and Prospects of Green Building Practice in Nigeria. Unpublished B.Sc. Final Year Project, Department of Building, Ahmadu Bello University, Zaria-Nigeria.
- [17] Garder J.E. (1989). Decision Making for Sustainable Development: Selected Approach to Environmental Assessment and Management Environment Impact.
- [18] Aboyade, O. (1973). *Issue in the Development of Tropical African*. Ibadan University.
- [19] Lamidu (2015). Top Eco-friendly Building Materials, Innovative Housing Solutions Address Social Needs in Emerging Markets.
- [20] Adedeji, Y.M.D. (2011). Housing Economy: Use of Interlocking Masonry for Low-Cost Housing in Nigeria. *Journal of Construction Project Management and Innovation*, Vol. 1(1), 46-62.
- [21] Adedeji, Y.M.D., Taiwo, A.A., Fadairo, G. and Olotuah, A.O. (2011). Architectural Education and Sustainable Human Habitat. *Sustainability Today, WIT Transactions on Ecology and The Environment*, New Forest, 167(89-99).
- [22] Ajayi, B. (2005). Assessment of Board Density and Species on Dimensional Stability of Exotic Hardwood-based Cement-bonded Flakeboard. *Ghana J. Forestry*, Vol. 17 & 18: 37-44.
- [23] Ajayi, B. (2006). Properties of Maize Stalk-based Cement-Bonded Composites. *Forestry Products Journal*, 56(6): 51-55.
- [24] Arayela, O. and Taiwo, A.A. (2010). Stabilized Laterite Bricks as an Appropriate Walling Material Technology for Increasing Housing Stock in Some Selected African Countries. *Proceedings of XXXVII IAHS, World Housing Congress*, October 26-28, Santacher (Cantabria, Spain).
- [25] Akpu, I.V. (2012). Energy Future: The Role of Impact Assessment. *IAIA 12 Conference Proceedings*, 32nd Annual Meeting of the International Association for Impact Assessment, 27-June 1, 2012, Centro de Congresso de Alfândega, Portugal.
- [26] Nwofe, P.A. (2013). Comparative Analysis of Domestic Energy Use in Nigeria - A Review. *Continental Journal of Renewable Energy*, 4(1), 7.
- [27] Olotuah, A.O. (2010). Housing the Urban Poor in Nigeria. *Journal of Environment and Urbanization**, 22(1), 89-102.
- [28] Omole, F.K. (2000). Urban Renewal Process Issues and Strategies. Lagos: Concept Books and Publication Company Nig. Ltd, pp. 57-64.
- [29] Devuyst, D. (2001). How Green is the City? New York: Columbia University Press.