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EFFECT OF INDIGENOUS MATERIALS IN RE-SETTLEMENT HOUSING CONSTRUCTION IN INSURGENCY-AFFECTED AREAS OF ADAMAWA STATE

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Abstract

This study investigates the utilization of locally sourced indigenous materials in constructing affordable residential buildings in insurgency-affected regions, specifically in Adamawa North senatorial district encompassing Madagali, Michika, Mubi North, Mubi South, and Maiha local government areas. The objectives were to identify commonly used indigenous materials, assess their contribution to sustainable housing in terms of energy efficiency, environmental impact, and resource conservation, and examine challenges faced by indigenous contractors. Data from 100 purposively selected respondents, collected through research questionnaires, were analyzed using mean and standard deviation. Findings revealed prevalent use of materials like clay/mud, timber/bamboo, stone, and composites, positively impacting energy efficiency, sustainability, and resource conservation. Challenges included limited material availability, knowledge gaps, resistance from clients/communities, and

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financial constraints. Recommendations involve promoting local material availability, providing technical training, fostering community engagement, and enhancing collaboration among contractors to optimize indigenous materials in affordable housing for resettlement.

Introduction

Adamawa State, located in Northeastern Nigeria, has been severely affected by persistent insurgency, particularly in areas such as Mubi North, Mubi South, Maiha, Michika, and Madagali local government areas. This insurgency has profound and far-reaching consequences on the lives of its inhabitants (Olanrewaju *et al.*, 2019). The insurgency, characterized by violence and displacement, has created significant challenges, including the urgent need for re-settlement housing for affected populations.

The effects of insurgency extend beyond just the immediate security concerns; they encompass broader socio-economic and infrastructural issues. Housing, as a fundamental human need, is among the most critically impacted aspects of life in insurgency-affected areas (Milgroom & Ribot, 2020).

In these insurgency-affected regions, the challenges related to housing are exacerbated. The construction sector faces unique difficulties in addressing the housing needs of displaced populations and rebuilding damaged infrastructure (Olanrewaju *et al.*, 2019). The demand for re-settlement housing has surged, further complicating an already complex housing situation.

LITERATURE REVIEW

Studies conducted in various conflict and insurgency-affected regions around the world shed light on the severe housing challenges faced by the affected populations. For instance, research by Nikuze *et al.* (2019) in Rwanda highlights the livelihood impacts of displacement and resettlement on informal households. Similarly, studies in Angola by Gastrow (2017) and in the Philippines by Carrasco *et al.* (2017) emphasize the critical role of housing in post-conflict contexts, addressing not only shelter but also the broader process of rebuilding communities.

One avenue that holds promise for addressing these housing challenges is the utilization of indigenous materials in re-settlement housing construction, particularly in regions like Mubi North, Mubi South, Maiha, Michika, and Madagali. Indigenous materials, which are locally available and culturally relevant, offer

several advantages in conflict and post-conflict settings (Denny-Smith & Loosemore, 2017; Heard *et al.*, 2017).

Incorporating indigenous materials into housing construction aligns with sustainability goals, as evidenced by research conducted by Riva *et al.* (2020) in Northern Canada and Tsai *et al.* (2021) in Taiwan, who emphasize the importance of culture and livelihood in housing development. Furthermore, the economic benefits of utilizing indigenous materials have been demonstrated in studies by Somiah *et al.* (2020) in Ghana and Zhao *et al.* (2022) in Sichuan, China.

Thus, this study aimed to investigate the effect of utilizing locally sourced indigenous materials in the construction of affordable residential buildings within insurgency-affected areas of Adamawa North senatorial district encompassing Madagali, Michika, Mubi North, Mubi South, and Maiha local government areas. The objectives included identifying the types of indigenous materials commonly employed; factors affecting the choice of the indigenous materials; assessing their contribution to sustainable housing delivery in terms of energy efficiency, environmental impact, and resource conservation; and examining the challenges faced by indigenous contractors in adopting these materials for affordable housing projects.

METHODOLOGY

In this study, a survey research design was adopted to investigate the impact of utilizing locally sourced materials in the construction of re-settlement housing in the insurgency-affected areas of the Adamawa North senatorial district, which included Madagali, Michika, Mubi North, Mubi South, and Maiha. A total of 100 knowledgeable respondents, including indigenous contractors, community leaders, and government officials, were purposively selected for the study. Data was collected through structured research questionnaires administered personally and by research assistants to ensure clarity and ethical compliance in this security-sensitive region.

For data analysis, mean values were calculated to assess responses related to the types of locally sourced materials used and their contribution to sustainability. Standard deviation was also computed to measure response variability. The methodology prioritized ethical considerations, including informed consent and confidentiality, to protect the safety and privacy of participants. This research approach provided insights into the role of indigenous building materials in re-

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settlement housing construction within the specified areas, enhancing our understanding of housing practices in insurgency-affected regions.

RESULTS

Research Question 1: What are the types of locally sourced indigenous materials used in the construction of affordable resettlement residential buildings in Adamawa North senatorial zone?

Table 1: Mean Ratings and Standard Deviation of respondents on the type of locally sourced indigenous materials used in the construction of affordable resettlement residential buildings in Adamawa North senatorial zone.

S/n	Item Statement	N	Mean	SD	Remarks
1	Clay or Mud	100	1.6200	.77564	Commonly Used
2	Timber or Bamboo	100	2.2300	.80221	Occasionally Used
3	Stone	100	1.6600	.72780	Commonly Used
4	Composite	100	1.7200	.81749	Commonly Used
	Grand Mean		$\mathbf{XG = 1.81}$	$\mathbf{\delta G = 0.78}$	**Agreed**

KEY: N= No of respondents; SD= Standard Deviation; XG = Grand Mean score
δG = Grand Standard Deviation
Source: Authors' survey, 2023.

Table 1 presents the mean ratings and standard deviation of respondents regarding the types of locally sourced materials used in the construction of affordable residential buildings in Adamawa North senatorial district. The table includes four item statements, each assessed by 100 respondents. The findings reveal that respondents generally agreed on the use of various locally sourced materials in construction. Clay or mud was rated as commonly used (mean = 1.620), indicating its prevalence in construction. Timber or bamboo received a slightly higher mean score (2.230), suggesting that it is occasionally used. Stone and composite materials were also commonly used, with mean scores of 1.660 and 1.720, respectively.

The grand mean score of 1.81 signifies an overall agreement among respondents regarding the types of locally sourced materials used in affordable residential building construction in study Area. The standard deviation (0.78) indicates a moderate level of consensus among respondents. In summary, the study highlights that a variety of locally sourced materials are employed in the

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construction of affordable residential buildings in the area, with clay or mud being the most commonly used material as depicted in the figure below.

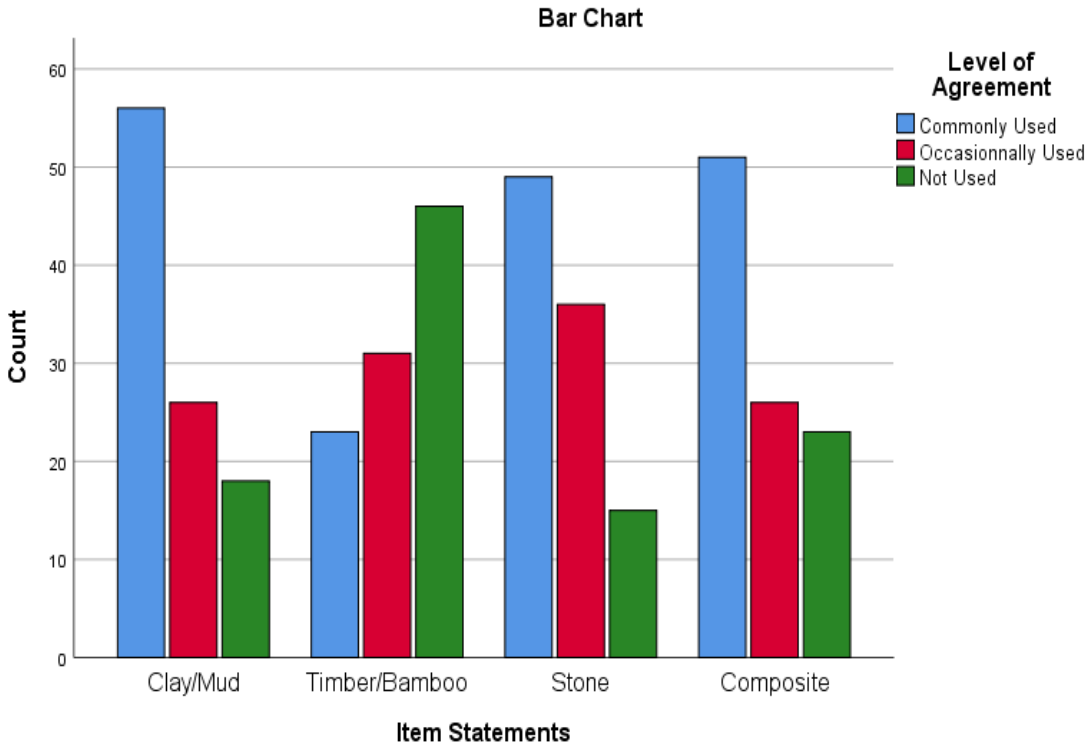

Fig. 1: Types of locally sourced indigenous materials in the Study Area.

Research question 2: What are the factors affecting the choice of the locally sourced indigenous materials?

Table 2: Factors that affect the choice of locally sourced indigenous materials.

S/n	Factors Affecting choice of Materials	N	%
1	Availability of materials	82	25.4%
2	Cost-effectiveness	67	20.7%
3	Cultural traditions	58	18.0%
4	Environmental considerations	62	19.2%
5	Climate adaptability	54	16.7%

Source: Authors' Survey, 2023.

Table 2 depicts the factors that influence the choice of indigenous materials. The highest percentage of respondents, 25.4%, cited the availability of materials as a

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key factor influencing the choice of indigenous materials. This finding aligns with the practicality of using locally available materials to reduce construction costs and ensure a steady supply (Onyegiri & Ugochukwu, 2016). Approximately 20.7% of respondents considered cost-effectiveness as a significant factor. This corresponds with the economic advantages associated with using indigenous materials, which are often more affordable than imported alternatives (Fadairo & Olotuah, 2013). Cultural traditions were cited by 18.0% of respondents. Indigenous materials often have strong ties to cultural practices and traditions, making them an integral part of local architecture and construction (Atolagbe & Fadamiro, 2014). Environmental considerations were mentioned by 19.2% of respondents. This reflects a growing awareness of sustainability and the environmental benefits associated with the use of indigenous and eco-friendly building materials (Drozd & Leśniak, 2018). About 16.7% of respondents emphasized climate adaptability as a factor. Indigenous materials are often well-suited to local climate conditions, providing natural insulation and resilience to extreme weather, a significant consideration in construction (Egbum *et al.*, 2023).

These findings demonstrate that the choice of indigenous materials in construction is influenced by a combination of practical, cultural, economic, and environmental factors. This aligns with the multifaceted nature of construction decisions in the study Area, and reflects the considerations that contractors and builders must take into account when selecting materials for their projects.

Research question 3: How do locally sourced indigenous building materials contribute to sustainable housing delivery in Nigeria, specifically in terms of energy efficiency, environmental impact, and resource conservation?

Table 3: Mean and Standard Deviation of respondents on How do locally sourced indigenous building materials contribute to sustainable housing delivery in Nigeria, specifically in terms of energy efficiency, environmental impact, and resource conservation.

S/n	Item Statement	N	Mean	SD	Remarks
1	This material is commonly used in construction.	100	3.100	.77198	Agreed
2	This material has positive effects on energy efficiency.	100	2.800	.82878	Agreed

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3	This material contributes to environmental sustainability.	100	2.790	.70058	Agreed
4	This material helps in conserving natural resources.	100	2.760	1.09286	Agreed
5	This material is a viable option for sustainable housing.	100	2.750	.95743	Agreed
	Grand Mean		**XG = 2.84**	**δG =0.87**	**Agreed**

KEY: N**=** No of respondents; S D= Standard Deviation; XG = Grand Mean score
δG = Grand Standard Deviation
Source: Authors' survey, 2023.

Table 3 depicted a grand mean score of 2.84 and a grand standard deviation of 0.87. The standard deviation with less than 1.00 point indicates a closer variation in the interests of the respondents on the items. In this survey-based study, several key findings emerged regarding the use of indigenous building materials in housing construction in Nigeria's insurgency-affected areas. Firstly, the respondents strongly agreed that indigenous building materials are commonly used in construction, reflecting the widespread adoption of these materials in the region, consistent with prior research. Secondly, these materials were perceived to have positive effects on energy efficiency, contributing to natural insulation and energy savings in housing. Thirdly, respondents believed that indigenous materials played a role in environmental sustainability, aligning with eco-friendly characteristics often associated with locally sourced materials. Additionally, it was noted that these materials help conserve natural resources, reducing the demand for non-renewable resources and supporting sustainable construction practices. Finally, respondents considered indigenous materials a viable option for sustainable housing, emphasizing their role in achieving sustainability goals in housing construction. The study found a high level of agreement among respondents regarding the positive contribution of indigenous building materials to sustainable housing delivery. The relatively low standard deviation indicated a moderate level of consensus among respondents. These findings reinforce the perception that indigenous materials are valuable assets in achieving sustainability goals in housing construction in Nigeria, encompassing energy efficiency, environmental sustainability, and resource conservation.

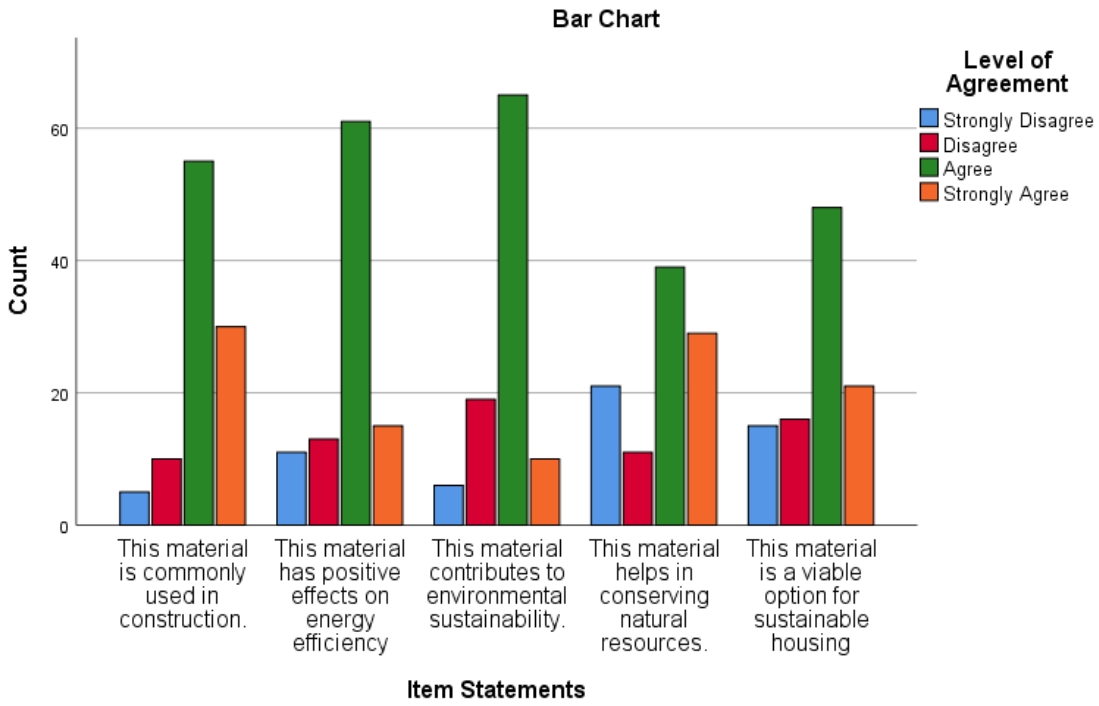

Fig. 2: How indigenous building materials contribute to sustainable housing delivery in Nigeria

Research question 4: What are the challenges faced by indigenous contractors in adopting locally sourced materials for affordable housing projects?

Table 4: Mean and Standard Deviation of respondents on the challenges faced by indigenous contractors in adopting locally sourced materials for affordable housing projects

S/n	Item Statement	N	Mean	SD	Remarks
1	Limited availability of indigenous materials is a significant challenge.	100	3.100	.77198	Agreed
2	Lack of technical knowledge hinders the use of indigenous materials.	100	2.800	.82878	Agreed
3	Resistance from clients or community affects the adoption of indigenous materials.	100	2.790	.70058	Agreed
4	Financial constraints pose challenges in utilizing indigenous materials.	100	2.760	1.09286	Agreed
5	Collaboration with other contractors can help overcome challenges.	100	2.750	.95743	Agreed
	Grand Mean		**XG = 2.84**	**δG =0.87**	**Agreed**

KEY: N= No of respondents; S D= Standard Deviation; $\bar{X}G$ = Grand Mean score
δG = Grand Standard Deviation
Source: Authors' survey, 2023.

Table 4 presents the mean and standard deviation of respondents' opinions regarding the challenges faced by indigenous contractors when adopting locally sourced materials for affordable housing projects. The table contains five item statements, each assessed by 100 respondents. The findings reveal that respondents widely agreed on several challenges faced by indigenous contractors in utilizing indigenous materials for affordable housing projects. These challenges include limited availability of indigenous materials, lack of technical knowledge hindering their use, resistance from clients or communities affecting adoption, financial constraints posing hurdles, and the potential benefit of collaboration with other contractors in overcoming these challenges.

The grand mean score of 2.84 signifies a strong overall agreement among respondents regarding the impact of these challenges on indigenous contractors' efforts to adopt locally sourced materials for affordable housing projects. The relatively low standard deviation (0.87) indicates a moderate level of consensus among respondents. The study highlights that these challenges are acknowledged by the respondents and may influence customer satisfaction in the context of affordable housing projects utilizing indigenous materials.

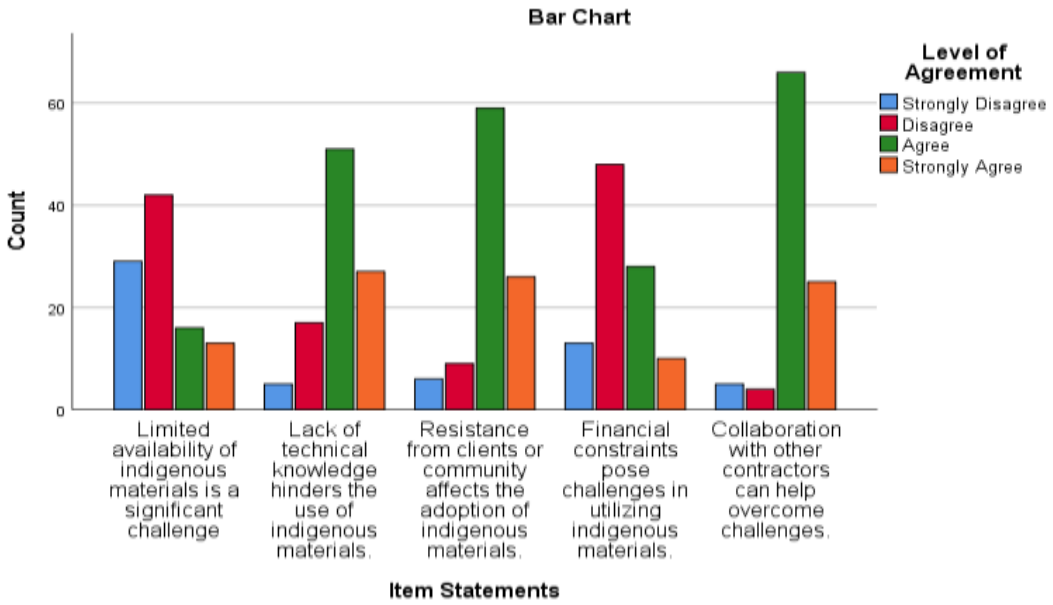

Fig. 3: The challenges faced by indigenous contractors in adopting locally sourced materials for affordable housing projects.

Summary of Major Findings

I. There are different types of indigenous materials in the study area including clay or mud, bamboo or timber, stone and composite materials.
II. Some Factors influences the choice of indigenous materials in the area including availability, cost as well as cultural and environmental factors.
III. That indigenous building materials contribute to sustainable housing delivery in Nigeria, specifically in terms of energy efficiency, environmental impact, and resource conservation.
IV. That there are challenges faced by indigenous contractors in adopting locally sourced materials for affordable housing projects, the challenges involving limited availability of materials, lack of technical expertise and poor viable options for collaborations.

DISCUSSION OF FINDINGS

Variety of Indigenous Materials

The study findings affirm the presence of diverse indigenous materials commonly employed in the construction of affordable residential buildings within insurgency-affected areas of Adamawa State. These materials include clay or mud, timber or bamboo, stone, and composite materials. This aligns with previous research by Akinwumi, Awoyera, and Bello (2015), which documented the extensive use of locally sourced materials in Nigeria's construction industry.

Influential Factors

The research findings underline the significance of various factors in influencing the selection of locally sourced indigenous materials. Key factors include the availability of materials, cost-effectiveness, adherence to cultural traditions, consideration of environmental aspects, and climate adaptability. These factors align with previous studies (Shamoon *et al*., 2022; Drozd & Leśniak, 2018) that have emphasized the importance of cultural, economic, and environmental factors in shaping material choices for sustainable construction practices.

Contribution to Sustainable Housing

The finding that indigenous building materials contribute to sustainable housing resonates with the broader sustainable construction movement (Kibert, 2007). The study's findings corroborate the positive contributions of indigenous building materials to sustainable housing delivery. Indigenous materials are recognized for

their role in enhancing energy efficiency, minimizing environmental impact, and conserving valuable resources. This is consistent with sustainability objectives emphasized in research by Kibert (2007) and Drozd & Leśniak (2018), emphasizing the crucial role of locally sourced materials in achieving sustainability goals. This aligns with the global push for sustainable construction practices and highlights the role of indigenous materials in achieving these goals (Miyatake, 1996).

Challenges for Indigenous Contractors

Indigenous contractors facing challenges related to material availability, lack of technical knowledge, resistance from clients or communities, financial constraints, and the importance of collaboration is a recurring theme in the literature (Umar *et al.*, 2017; Stanley, Ogbuagu, & Okechukwu, 2014). These challenges underscore the practical barriers that indigenous contractors often encounter in adopting locally sourced materials. The literature emphasizes the need for capacity building, community engagement, and financial support to overcome these obstacles (Riley, Thatcher, & Workman, 2006; Al-Roubaie, 2010). The research reveals several challenges encountered by indigenous contractors when adopting locally sourced materials for affordable housing. These challenges encompass limited material availability, technical knowledge gaps, client or community resistance, and financial constraints. Such challenges have been identified in previous studies (Adedire & Adegbile, 2018; Zhang *et al.*, 2019) as barriers that hinder the seamless adoption of indigenous materials in construction projects. The study's major findings underscore the significance of indigenous materials in addressing housing challenges in insurgency-affected regions. These materials are essential for sustainable and resilient housing delivery. However, they also highlight the need to address challenges and promote the use of indigenous materials through various strategies, including technical training and community engagement, to fully realize their potential in affordable housing construction in conflict-prone areas.

CONCLUSION

In this study, we have delved into the use of locally sourced indigenous materials in the construction of affordable residential buildings within the insurgency-affected areas of Adamawa North senatorial district, encompassing Madagali, Michika, Mubi North, Mubi South, and Maiha local government areas. The research objectives were framed in line with existing literature and aimed to uncover the

types of indigenous materials used, assess their contributions to sustainable housing delivery, and explore the challenges faced by indigenous contractors in adopting these materials.

Our findings align with existing research that showcases the widespread adoption of indigenous building materials, such as clay or mud, timber or bamboo, stone, and composite materials, in the construction of affordable housing (Akinwumi *et al.*, 2015). These materials, deeply rooted in local traditions and culture, are vital in addressing housing challenges resulting from insurgency in the region.

Moreover, our study reaffirms the positive effects of indigenous materials on various facets of sustainable housing delivery, including energy efficiency, environmental sustainability, and resource conservation, echoing the findings of Drozd and Leśniak (2018) and Shamoon *et al.* (2022). These locally sourced materials contribute to natural insulation, energy savings, and reduced environmental impact, making them integral to achieving sustainability goals.

Additionally, the challenges identified by indigenous contractors resonate with existing literature (Afolabi *et al.*, 2019; Asgary, 2019). Factors such as limited material availability, lack of technical knowledge, client or community resistance, and financial constraints have been reported as common hindrances. Our study highlights the potential benefits of collaboration among contractors, echoing the findings of Denny-Smith and Loosemore (2017) and Tsai *et al.* (2021).

In conclusion, our research underscores the paramount importance of indigenous building materials in realizing sustainable housing delivery in insurgency-affected regions. These materials, deeply intertwined with local traditions and environment, offer an eco-friendly and cost-effective option for constructing affordable residential buildings. Nevertheless, addressing the identified challenges faced by indigenous contractors, as suggested by previous studies, is imperative for fully capitalizing on the benefits of these materials.

Recommendations

i. Promote Material Availability: Efforts should be made to ensure the consistent availability of indigenous materials in conflict-affected regions. Government agencies and NGOs can support sustainable material harvesting or production to establish a reliable supply chain for contractors.
ii. Provide Technical Training: Indigenous contractors should receive comprehensive technical training, focusing on the effective use of local

materials. Training programs should cover construction techniques, quality control, and innovative material applications to improve energy efficiency and sustainability.

iii. Engage Communities**:** To address client and community resistance to indigenous materials, community engagement initiatives should be implemented. These programs should educate and involve local residents in the construction process, highlighting the advantages of sustainable housing. Such engagement can foster greater acceptance and support for these projects.

REFERENCES

Adedire, F., & Adegbile, M. (2018). Assessment of housing quality in Ibeju-Lekki peri-urban settlement, Lagos State, Nigeria. *Journal of Environmental and Architectural Research, 25*, 126-151. https://doi.org/10.18820/24150487/AS25I1.5.

Afolabi, A., Ojelabi, R., Omuh, I., & Tunji-Olayeni, P. (2019). 3D House Printing: A sustainable housing solution for Nigeria's housing needs. *Journal of Physics: Conference Series, 1299.* https://doi.org/10.1088/1742-6596/1299/1/012012.

Akinwumi, I. I., Awoyera, P. O., & Bello, O. O. (2015). Indigenous earth building construction technology in Ota, Nigeria.

Al-Roubaie, A. (2010). Building indigenous knowledge capacity for development. World Journal of Science, Technology and Sustainable Development, 7(2), 113-129.

Asgary, A. (2019). Resettlement Challenges for Displaced Populations and Refugees. *Resettlement Challenges for Displaced Populations and Refugees.* https://doi.org/10.1007/978-3-319-92498-4.

Atolagbe, A. M. O., & Fadamiro, J. A. (2014). Indigenous African building techniques and the prospects for sustainable housing and environmental development. Environment, development and sustainability, 16, 1041-1051.

Carrasco, S., Ochiai, C., & Okazaki, K. (2017). Residential satisfaction and housing modifications: A study in disaster-induced resettlement sites in Cagayan de Oro, Philippines. *International Journal of Disaster Resilience in The Built Environment, 8*, 175-189. https://doi.org/10.1108/IJDRBE-09-2015-0043.

Denny-Smith, G., & Loosemore, M. (2017). Integrating Indigenous enterprises into the Australian construction industry. *Engineering, Construction and Architectural Management, 24*, 788-808. https://doi.org/10.1108/ECAM-01-2016-0001.

Drozd, W., & Leśniak, A. (2018). Ecological wall systems as an element of sustainable development—cost issues. Sustainability, 10(7), 2234.

Egbum, P. S., Anaebo, C., David, C., & Barnaby, J. (2023). Exploring the use of indigenous building materials to achieve thermal comfort in a hot, humid climate: the case of South Eastern Nigeria. African Journal of Educational Management, Teaching and Entrepreneurship Studies, 9(1), 151-162.

Fadairo, G., & Olotuah, A. O. (2013). Low-cost housing for the urban poor in Akure, Nigeria: Materials and techniques of construction. Journal of Environment and Earth Science, 3(9), 135-143.

Gastrow, C. (2017). Cement citizens: housing, demolition and political belonging in Luanda, Angola. *Citizenship Studies, 21*, 224 - 239. https://doi.org/10.1080/13621025.2017.1279795.

Heard, I., Love, P., Sing, M., & Goerke, V. (2017). Learning to build relationships for a better Australia Indigenous reconciliation in action in the construction and resource sectors. *Construction Innovation: Information, Process, Management, 17*, 4-24. https://doi.org/10.1108/CI-06-2015-0032.

Kibert, C. J. (2007). The next generation of sustainable construction. Building Research & Information, 35(6), 595-601.

Leśniak, A., & Zima, K. (2018). Cost calculation of construction projects including sustainability factors using the Case Based Reasoning (CBR) method. Sustainability, 10(5), 1608.

Milgroom, J., & Ribot, J. (2020). Children of Another Land: Social Disarticulation, Access to Natural Resources, and the Reconfiguration of Authority in Post-Resettlement. *Society & Natural Resources, 33*, 184 - 204. https://doi.org/10.1080/08941920.2019.1590668.

Miyatake, Y. (1996). Technology development and sustainable construction. Journal of Management in Engineering, 12(4), 23-27.

Nikuze, A., Sliuzas, R., Flacke, J., & Maarseveen, M. (2019). Livelihood impacts of displacement and resettlement on informal households - A case study from Kigali, Rwanda. *Habitat International.* https://doi.org/10.1016/J.HABITATINT.2019.02.006.

Olanrewaju, F., Olanrewaju, A., Omotoso, F., Alabi, J., Amoo, E., Loromeke, E., & Ajayi, L. (2019). Insurgency and the Invisible Displaced Population in Nigeria: A Situational Analysis. *SAGE Open, 9*. https://doi.org/10.1177/2158244019846207.

Onyegiri, I., & Ugochukwu, I. B. (2016). Traditional building materials as a sustainable resource and material for low-cost housing in Nigeria: Advantages, challenges, and the way forward. International Journal of Research in Chemical, Metallurgical, and Civil Engineering, 3(2), 247-252.

Riva, M., Perreault, K., Dufresne, P., Fletcher, C., Muckle, G., Potvin, L., Bailie, R., & Baron, M. (2020). Social housing construction and improvements in housing outcomes for Inuit in Northern Canada. *Housing Studies, 36*, 973 - 993. https://doi.org/10.1080/02673037.2020.1739233.

Riley, D. R., Thatcher, C. E., & Workman, E. A. (2006). Developing and applying green building technology in an indigenous community: An engaged approach to sustainability education. International Journal of Sustainability in Higher Education, 7(2), 142-157.

Shamoon, A., Haleem, A., Bahl, S., Javaid, M., Garg, S. B., Sharma, R. C., & Garg, J. (2022). Environmental impact of energy production and extraction of materials-a review. Materials Today: Proceedings, 57, 936-941.

Somiah, M., Aigbavboa, C., & Thwala, W. (2020). Critical Success Strategies for Competitive Advantage of Indigenous Construction Firms in Developing Countries: A Ghana Study. *Global Business Review, 23*, 1188 - 1199. https://doi.org/10.1177/0972150920907258.

Stanley, C. U., Ogbuagu, G. O., & Okechukwu, F. E. (2014). An appraisal of the sources, quantities, and prices of imported building materials in Nigeria. International Journal, 2(9), 871-889.

Tsai, S., Ochiai, C., Deng, C., & Tseng, M. (2021). A sustainable post-disaster housing development framework for an indigenous Hao-Cha community in Taiwan: considering culture and livelihood in housing extensions. *International Journal of Disaster Resilience in the Built Environment.* [DOI not available].

Umar, T. I., Olatunde, O. M., & UI, O. M. (2017). Enhancing housing availability through effective utilization of indigenous building materials in Lapai local government area of Niger state, Nigeria. International Journal in Commerce, IT & Social Sciences, 4(10), 19-33.

Zhang, Y., Yu, Y., Xu, W., & Hu, J. (2019). Differentiation and integration: off-site resettlement planning practice in New Beichuan after 5.12 Wenchuan Earthquake. *Natural Hazards, 104*, 77 - 99. https://doi.org/10.1007/s11069-019-03649-6.

Zhao, L., Zhou, S., Zhong, J., Ao, Y., Wang, Y., Wang, T., & Chen, Y. (2022). Rural Post-Earthquake Resettlement Mode Choices: Empirical Case Studies of Sichuan, China. *Frontiers in Public Health, 10*. https://doi.org/10.3389/fpubh.2022.861497.