ASSESSMENT OF WOOD SPECIES USED FOR FURNITURE PRODUCTION IN ADO-EKITI, EKITI STATE AND THEIR SUSTAINABILITY CHALLENGES

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Abstract

This study assessed the wood species commonly used for furniture production in Ado Ekiti metropolis, Ekiti State, focusing on usage patterns, sourcing, selection criteria, and sustainability concerns. A multistage purposive sampling technique was used to select twenty-five furniture workshops across five major routes in Ado-Ekiti metropolis. Data were collected with structured questionnaires and analyzed using descriptive statistics. Findings revealed that the sector is dominated by experienced male (92%) artisans, with the majority (56.8%) sourcing their wood from sawmills to produce a wide range of products, including chairs, tables, and beds. The species widely utilized are Gmelina arborea, Tectona grandis, Milicia excelsa, and Mansonia altissima. Availability, durability, appearance, and cost were the primary selection criteria, while customer preference also played a significant role. Most respondents (84%) acknowledged the environmental impacts of excessive logging. Several challenges faced by furniture makers include high costs (27.3%) and scarcity of preferred species (19.5%). The major types of waste generated during production include wood shavings (34.7%), sawdust (33.3%), and offcuts (32%). The study recommends aggressive plantation establishment with fast-growing species such as Gmelina and Teak, coupled with the use of lesser-known species to reduce pressure on overexploited hardwoods.

Keywords: *Furniture Production, Wood species, Gmelina arborea*, *Milicia excelsa*, *Ado Ekiti metropolis.*

Introduction

Wood remains one of the most important natural resources in the world, widely used for construction, energy, and, notably, furniture production. In many developing countries, particularly in sub-Saharan Africa, the furniture sector is predominantly reliant on timber sourced from both natural forests and plantations. Nigeria, with its diverse ecological zones and wide array of indigenous and exotic tree species, provides a rich timber base for furniture industry at both small- and large-scale levels (Adedokun *et al*., 2019).

The furniture industry plays a vital socio-economic role in Nigeria, contributing significantly to employment, income generation, and domestic trade. Small and medium-scale enterprises dominate this sector, relying heavily on wood as the primary raw material due to its availability, versatility, and aesthetic qualities (Gakenou *et al*., 2018). In urban centers such as Ado-Ekiti, which serves as the administrative and economic hub of Ekiti State, furniture production has become increasingly prominent,

driven by increasing urbanization, population growth, and consequent rising demand for residential, office, and institutional furniture.

Despite the strategic importance of wood in furniture production, there is a growing concern about the sustainability of timber supply. Over the years, deforestation, poor forest management, and the overexploitation of a few preferred species, such as *Milicia excelsa*, *Khaya senegalensis* and *Mansonia altissima,* have led to a decline in the availability of high-quality timber (Arowosoge and Fuwape, 2008; FAO, 2020; Orwa *et al*., 2021). In response, furniture producers are turning to fast-growing species like *Gmelina arborea* and *Tectona grandis*, or substituting with lower-grade or underutilized species. However, this substitution often occurs without sufficient technical knowledge of their mechanical and aesthetic properties, thereby affecting product durability and customer satisfaction (Adiji *et al*., 2022).

Understanding the types of wood used, the reasons for their selection, and their environmental implications is crucial for promoting sustainable forest management and enhancing the quality and durability of furniture products. The choice of wood species for furniture production is influenced by several factors, including mechanical properties (e.g., strength, durability, workability, cost, availability, and aesthetic characteristics (Adiji *et al*., 2022). However, when selecting species for furniture production in many parts of Nigeria, including Ekiti State, artisans often rely on personal experience, availability and cultural preferences rather than scientific evaluation. This informal decision-making can compromise product quality, economic efficiency, and sustainability goals.

The demand for quality wood furniture in Nigeria is increasing due to urbanization, population growth, and economic development. In Ado-Ekiti metropolis, where informal and small-scale workshops dominate the furniture industry, there is limited documentation on the wood species predominantly used, the factors guiding their selection, and the sustainability of their sourcing. Most artisans rely on experiential knowledge, cost considerations, and immediate availability rather than standardized criteria or sustainability principles (Gakenou *et al.*, 2018). This informal approach creates challenges in quality assurance, forest conservation, and long-term resource planning. This research, therefore, seeks to assess the wood species commonly used for furniture production in Ado-Ekiti metropolis, evaluate the rationale behind species selection, and examine the associated supply and sustainability challenges.

Methodology

Study Area

The research was conducted in Ado-Ekiti metropolis, the capital of Ekiti State, Nigeria. Ado-Ekiti metropolis is a rapidly growing urban center renowned for its diverse range of developmental activities, making it an ideal location for studying furniture

industry enterprises. Ado Ekiti is one of the most populous cities in Ekiti State, with an estimated population of over 400,000 people. The population is diverse, comprising different ethnic groups, predominantly the Yoruba. The city has experienced rapid population growth over the years due to urbanization and the influx of people from surrounding towns and villages.

Ado-Ekiti is located in the southwestern region of Nigeria and situated at an elevation of about 455 meters (1,493 feet) above sea level and is positioned between latitudes 7° 18' N and 7° 30' N and longitudes 5° 05' E and 5° 20' E. The climate of the study area is of the West African monsoon type with dry and wet seasons. The wet or rainy season normally starts from late March to October with occasional strong winds and thunderstorms, usually at the onset and the end of the season. The dry season normally starts from November to March, and the Harmattan's cold wind characterizes it. The topography is hilly, with a large number of hills of various sizes surrounding the town. The annual rainfall ranged from 1,200 mm to 1,500 mm. The temperature ranges from 21 °C to 32 °C throughout the year. The annual average relative humidity is about 90 % at 7.00 am and 65 % at 4.00 pm.

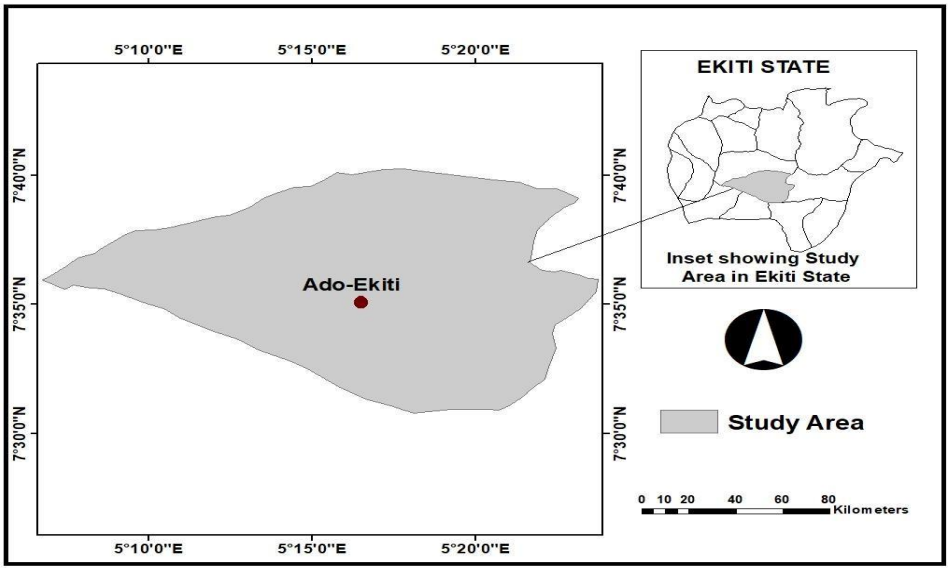

Figure 1: Map of Ekiti State showing Ado-Ekiti

Sampling techniques, data collection and analysis

The study used a multistage purposive sampling technique. The first stage involved delineating the Ado-Ekiti metropolis into five zones along the major roads, which include Ajilosun-Ikere Road, Odo-Ado-Ijan Road, Secretariat-Ilawe Road, Basiri-Iyin Road, and Adebayo-Iworoko Road. The second stage involved purposively selecting five (5) furniture workshops from each zone, and the furniture workshop owners were interviewed. Consequently, 25 respondents were sampled and used for

the study. Data were collected from the field using a pre-tested structured questionnaire and personal observations. The data collected were analyzed using descriptive statistics, including frequency tables and percentage distributions.

Results

Socioeconomic Characteristics of the Respondents

The socioeconomic characteristics of the respondents revealed a workforce predominantly of middle-aged and experienced furniture makers. The age distribution shows that 44% of the respondents were 31-40 years, followed by 32% who were 41-50 years, while 16% were 30 years and below. Only 8% were above 51 years (Table 1). The respondents' gender distribution in Table 1 shows that the furniture industry is highly male-dominated, with 92% male respondents and only 8% female. With respect to educational background, 48% of the respondents had vocational education, 32% secondary education, 12% tertiary education, while 8% had only primary education. In terms of experience, nearly half (48%) of the respondents had over 15 years of experience in furniture making, 28% had 11–15 years, 16% had 6–10 years, and 8% had less than 5 years (Table 1).

Table 1: Demographic Information of the Respondents

Variables	Frequency (n=25)	Percentage (%)
Age		
≤ 30 years	4	16
31-40 years	11	44
41-50 years	8	32
≥ 51 years	2	8
Gender		
Male	23	92
Female	2	8
Education		
Primary	2	8
Secondary	8	32
Vocational	12	48
Tertiary	3	12
Year of Experience		
≤ 5 years	2	8
6-10 years	4	16
11-15 years	7	28
>15 years	12	48

Wood Species Utilization

The results in Table 2 show diverse ways of sourcing for wood among furniture makers in Ado-Ekiti metropolis. Most respondents (56.8%) sourced their wood from sawmills, followed by 22.7% from plank markets, 11.4% from private plantations, and 9.1% from forest reserves. Table 3 revealed that furniture makers also produced a wide

range of products, which include, among others, chairs, tables, and beds, with each having a frequency of 25 (10.8%). Other prominent products include stools (8.6%), bookshelves (8.8%), dining tables (8.1%), and doors (7.8%). Less commonly produced items include coffins (2.6%) and standing hangers (6.0%). The results on the wood species mostly used show that Gmelina, Teak, Iroko, and Mansonia were used by 100% of the respondents (Table 4). Other frequently used species include Oganwo (*Khaya ivorensis*) (80%), Omo (*Cordia millenii*) (76%), and Opepe (*Nauclea diderrichii*) (60%). Less frequently used species include Idigbo and Afara (32%), and Ayere (24%) (Table 4). The results on ranking (Table 4) confirm that indigenous hardwoods remain highly relevant in the local furniture industry.

Table 2: Sources of Wood

Source	Frequency	Percentage (%)
Plank market	10	22.7
Sawn mill	25	56.8
Forest reserve	4	9.1
Private plantation	5	11.4
Total	**44***	**100**

Multiple Responses

Table 3: Types of Products Made

Products Made	Frequency	Percentage (%)
Chair	25	10.8
Table	25	10.8
Cabinet	15	6.4
Wardrobe	12	5.2
Bed	25	10.8
Coffin	6	2.6
Standing Hanger	14	6.0
Stool	20	8.6
Shoe Rack	10	4.3
Book Shelf	16	8.8
Dining Table	19	8.1
Show Glass	12	5.2
Door	18	7.8
Others	15	6.4
Total	**232***	**100**

*Multiple Responses

Table 4: Wood Species Commonly Used

Local Name	Scientific Name	Frequency (n=25)	Percentage (%)	Ranking
Gmelina	*Gmelina arborea*	25[25]	100.0	1st
Teak	*Tectona grandis*	25[25]	100.0	1st
Iroko	*Milicia excelsa*	25[25]	100.0	1st
Ofun/Orodo	*Mansonia altissima*	25[25]	100.0	1st
Oganwo	*Khaya ivorensis*	20[25]	80.0	2nd
Omo	*Cordia millenii*	19[25]	76.0	3rd
Odofin-ugbo	*Trichilia prieureana*	15[25]	60.0	4th
Opepe	*Nauclea diderrichii*	15[25]	60.0	5th
Olee	*Nesogordonia papaverifera*	13[25]	52.0	6th
Agbonyin	*Piptadeniastrum Africana*	12[25]	48.0	7th
Apa	*Afzelia Africana*	11[25]	44.0	8th
Ijebo	*Entadrophragma cylindricum*	10[25]	40.0	9th
Idigbo	*Terminalia ivoresis*	8[25]	32.0	10th
Afara	*Terminalia superba*	8[25]	32.0	11th
Ayere	*Albizia glaberrima*	6[25]	24.0	12th

Criteria for Wood Species Selection

The results in Table 5 showed the criteria considered by furniture makers when selecting wood species. The study revealed that durability, cost, and appearance were the most important factors, each rated by 100% of the respondents. This was followed by customer preference (80%), ranked second, availability (60%) and workability (56%). Resistance to termite attack had 48%, environmental concern had 40%, and drying time had 24%.

Table 5: Selection Factor

Selection Factor	Frequency (n=25)	Percentage (%)	Ranking
Durability	25 [25]	100.0	1st
Cost	25 [25]	100.0	1st
Appearance	25 [25]	100.0	1st
Customer Preference	20 [25]	80.0	2nd
Availability	15 [25]	60.0	3rd
Workability	14 [25]	56.0	4th
Resistance to Termites	12 [25]	48.0	5th
Environmental Concern	10 [25]	40.0	6th
Drying Time	6 [25]	24.0	7th

Sustainability and Challenges

Table 6 shows that the awareness of sustainability issues among furniture makers was relatively high, with 84% acknowledging the environmental impacts of excessive logging. All respondents (100%) agreed that there have been noticeable changes in wood availability in recent years. reflecting the increasing scarcity of preferred species. Regarding sustainable practices, 48% of the respondents reported that they "always"

consider sustainability when choosing wood species, 40% "sometimes," 8% "rarely" and 4% "never." (Table 7). Table 8 revealed that furniture makers face several challenges in sourcing good-quality wood. High cost (27.3%) and scarcity of preferred species (19.5%) were the major challenges. Other issues include immature wood (20.8%), transportation difficulties (12.9%), and unreliable supply (10.4%). Poor drying was the least reported challenge (1.3%). The major types of waste generated during production include wood shavings (34.7%), sawdust (33.3%), and offcuts (32%) (Table 9).

Table 6: Awareness of the Impact of Excessive Logging

Awareness	Frequency	Percentage (%)
Yes	21	84.0
No	4	16.0
Total	**25**	**100**

Table 7: Considerations for Sustainable Use

Consideration for Sustainable Use	Frequency	Percentage (%)
Always	12	48.0
Sometimes	10	40.0
Rarely	2	8.0
Never	1	4.0
Total	**25**	**100**

Table 8: Challenges to Good Quality Wood

Challenges	Frequency	Percentage (%)
High Cost	21	27.3
Scarcity	15	19.5
Poor drying	1	1.3
Transportation	10	12.9
Immature Wood	16	20.8
Distance to Timber Market	6	7.8
Unreliable Supply	8	10.4
Total	**77***	**100.**

*Multiple Responses

Table 9: Types of Waste Generated

Waste Generated	Frequency	Percentage (%)
Sawdust	24	33.3
Wood Shavings	25	34.7
Offcuts	23	32.0
Total	**72***	**100.**

*Multiple Responses

Discussion

The findings of this study provide key insights into wood utilization trends, selection criteria, sustainability awareness, and constraints among furniture makers in

Ado Ekiti. The observed demographic profile of the respondents in the study area revealed an industry dominated by middle-aged and experienced artisans. Indicating that the majority of furniture makers in Ado-Ekiti are in their economically active years, which may contribute positively to their productivity and skill level. This assertion aligns with the apprenticeship-driven workforce structure earlier reported by Gakenou *et al.* (2018). The high proportion of the male respondents with more than fifteen years of experience in furniture making in the study area suggests that furniture making is a male-dominated occupation with highly experienced artisans. The observed high proportion of respondents with vocational education implies that a substantial number of artisans are professionals who acquire skills through vocational training. This could have probably influenced the observed high quality of products displayed in the workshops visited.

Observations from the study revealed that sawmills were the primary source of processed timber for the furniture industry in the study area. This pattern is consistent with timber supply structures across southwestern Nigeria. This has similarly been reported by Adebayo *et al.* (2022). The observation of all furniture makers in the production of items such as chairs, tables, and beds suggests a high market demand for these items, as they are used in every household. Species utilization patterns showed universal use of Gmelina, Teak, Iroko, and Mansonia. The preference for these species could probably be due to their availability, durability, and favourable workability characteristics. It is also an indication that artisans prioritize wood that is long-lasting, visually appealing, and affordable. These assertions corroborate the report that species are widely recognized in national studies for durability and market preference (Adegbite *et al.*, 2023). Similarly, Okoro *et al.* (2023) and Umaru *et al.* (2021) in their studies opined that durability, appearance, cost and customer preference were the strongest determinants of species choice in the furniture industry. Observations on ranking confirmed that indigenous hardwoods remain highly relevant in the local furniture industry.

The high level of awareness of sustainable exploitation among the respondents could be attributed to their educational background. Furthermore, the acknowledgment of the environmental impacts of excessive logging indicates the levels of commitment to sustainable wood use by the furniture makers. This assertion contradicts the submission of Ogunwusi and Jolaoso (2021), who reported low adoption of sustainable wood utilization practices among artisanal wood industries. The challenges, such as scarcity, high costs, immature wood, transportation issues, and unstable supply observed in this study, could hinder the production of durable furniture and contribute

to increased operational costs. This assertion is consistent with the findings of Ibrahim *et al.* (2021). The significant amount of wood waste generated (sawdust, shavings, offcuts) reflects inefficient processing methods, likely due to the use of obsolete machinery typical of informal workshops (Lawal and Omisore, 2021).

Conclusion And Recommendations

This study examined the wood species used for furniture production in Ado Ekiti metropolis, focusing on usage patterns, sourcing, selection criteria, and sustainability concerns. The study revealed a strong reliance on a mix of indigenous hardwoods and plantation-grown species, particularly Gmelina, Teak, Iroko, and Mansonia. Durability, cost, and aesthetic appeal largely influenced species choice. Sawmills served as the main source of raw material, reflecting local supply chain structures. The study revealed high awareness of sustainability issues among the furniture makers in the study area. Challenges such as the scarcity of preferred species, rising timber prices, immature wood, and inefficient wood-processing methods pose threats to long-term viability. The study recommends aggressive establishment of plantations, particularly fast-growing species such as Gmelina and Teak. Also, the use of lesser-known species to reduce pressure on overexploited hardwoods should be encouraged.

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