



# Exploring the Utilization of Lesser-Known Species for Furniture Production

## —A Case Study in the Western Region, Ghana

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### Abstract

Increased demand for traditional timber species has led to the depletion of large areas of Ghana's forest cover. Sustainable forest management requires that measures are put in place to minimize forest depletion through the utilization of lesser-known species, reforestation, setting margins for annual allowable cut, banning export of round logs, conservation of biological diversity and promotion of efficient wood-based industry. The study aimed at exploring public perception on the use of lesser-known species for making furniture to save our dwindling forest. The research methods adopted were purposive and random sampling. It is purposive because the research was targeted at furniture shops and furniture showrooms and random sampling was used to make the selection. A questionnaire was developed to acquire data for the study from experienced people in the timber industry as well as the general public. Specifically, 450 people were contacted to fill the questionnaire from 15 constituencies out of 29 in the Western Region. Personal interviews were also conducted. The research revealed that most Ghanaians prefer traditional species to the lesser-known ones. Greater part of the population prefers species like Odum, Danta, Dahoma, and Denyan etc. For roofing whiles Cedar, mahogany, Makore, Walnut, and Avodirie are used for furniture. The perception is that when the traditional species are used for either roofing or furniture they last longer. Some challenges with the use of lesser-known species are lack of ready market for products may from lesser known species, and lack of requisite machines to work with some of the lesser-known species etc. The study concluded that there is the need here in Ghana to promote the utilization of lesser known species; since ma-

jority of furniture manufacturers have little knowledge about their usage in the industry.

### **Subject Areas**

Civil Engineering

### **Keywords**

Sustainable Forest Management, Lesser-Known Species, Furniture

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## **1. Introduction**

Wood is a critical resource for many rural communities in Ghana, especially in the regions where forest products represent a key industry and a major source of income and employment. The role that the Timber Industry plays in the socio-economic development of any country needs not be emphasized. In the 1970s timber was next to cocoa as a major foreign exchange earner in Ghana with a contribution to the Gross National Products of about 11 percent [1]. The highest performance of the industry was recorded in 1973 with log production showing the highest volume of 2.6 million m<sup>3</sup>. Besides being a source of foreign exchange earnings, the industry is also a major source of employment in Ghana, currently employing a labour force of over 70,000 [2]. Notwithstanding these benefits the industry faced both operational and structural problems as time went by, to the extent its performance declined, reaching its lowest level in 1982 with a total capacity utilization falling to a meager 15% [2]. According to data on <http://www.ghanatimber.org/> [3], Ghana in May, 2012 considered importing logs from Cameroun after losing its forest cover which stood at 8.2 million hectares a little over a century ago. Ghana's primary rainforest has reduced by 90 percent over the past few years registering a loss of 1.9 million hectares or 26 percent of its forest cover. Currently, the country's forest cover stands at less than 1 million hectares and this has been aggravated by an estimated loss of 65,000 hectares of forest annually. There is an agreed limit to the total amount of timber which can be taken from the forest in support of exports. This forms part of the overall approach to sustainable forest management. Because the export industry cannot expand by extracting more trees, the development of the industry depends on making more efficient use of the wood which is harvested. There is far greater gain in minimizing waste and utilizing off-cuts, and in further processing to provide experts in shaped and machined mouldings, flooring, furniture components, dowels and similar added value items. While the demand for wood products has been projected to grow a significant rate, a major problem faced by the wood products industry is shortage of high-grade hardwood lumber. The situation has significantly increased the competition for high-grade hardwood and is contributing to the increasing pressure on the forest and the environment [4]. Although it is generally considered as country with abundant forest inventories, the available high-grade hardwood is quite limited due to a

host of physical, economic and social factors [5]. The study therefore seeks to find out the public perception of lesser-known species used for making furniture and the level of patronage.

## **2. Previous Research**

### **2.1. Ghana's Timber Industry and Prospects**

Ghana earns most of its foreign exchange by exporting timber, cocoa and gold. When it comes to timber export, the country depends mostly on the forest located in the Southwest Region. While export earns the country substantial foreign exchange, from 1990 to 2005, Ghana lost nearly 19 million hectares of forest due to deforestation. According to available statistics the annual rate of deforestation is 2 percent. However, the government has taken some steps to stem the alarming rate of deforestation by coming up with Ghana National Plantation Project which looks to plant 20,000 hectares every year. According to Okumi-Andoh, [6] the increased demand for tropical timber used in the housing industry has resulted in depletion of large areas of forest cover. In Ghana between 1900 and 2000, the forest cover over 8 million hectares reduced drastically to 1.4 million hectares. With a rate of deforestation estimated 65,000 hectares per annum. Ghana is likely to lose its forest cover by the year 2022 if deforestation persists [7]. In order to ensure sustainable forest management several countries have put in place measures including utilization of lesser-known species, reforestation, setting margins for annual allowable cut banning export of round logs, conservation of biological diversity and promotion of efficient wood-based industries [8]. There is the general perception that furniture made from lesser-known species is inferior to many Ghanaians. Most of them prefer furniture made with the traditional tropical species such as Cedar, Makore, Avodire, Odum and many more. The increased demand for traditional timber species in depletion of large areas of forest cover has necessitated a study into the alternative use lesser-known species for making furniture to save our dwindling forest.

### **2.2. Alternatives to High-Grade Hardwood**

#### **1) Agricultural Residues**

According to Haynes *et al.* [9], for many reasons in composite board production, agricultural residues constitute excellent alternative to using virgin wood fibre. Aside their abundance and renewability, using agricultural residues will benefit farmers, industry, human health and the environment. Using agricultural residues for industrial purposes is a much more environmentally friendly practice than other residue disposal methods currently in use, where many farmers dispose of agricultural waste by burning or land-filling.

#### **2) Non-Wood Lingo-Cellulose Biomass**

The increased demand for raw materials in wood composite industries has led researchers to investigate non-wood lingo-cellulose biomass utilization in composite manufacturing including particleboard. "Clear lumber" is generally de-

efined as wood free of defects such as knots, pith, ingrown bark pockets, small holes, various streaks and stains. Because these defects are part the wood's natural variability, they are called "character marks". Furniture made from wood with such characters is called character-marked furniture [10].

### **3) Low-Grade Hardwood**

While low-grade hardwood represents a significant percentage of any sustainable harvest, the majority of low-grade logs are now primarily used for pallet stocks, firewood, chips and pulpwood and these uses generate approximately 1 to 2 percent of the revenue from a comparable quantity of high-grade logs. While the total demand for hardwood has been projected to increase 53 percent over the next four decades, most of the projected demand is for high-grade hardwood (Haynes *et al.* 1995).

## **2.3. Effect of Increasing Demand for High-Grade Hardwood**

The limited inventory of and increasing demand for high-grade hardwood have serious implications for sustainable forest management, the wood products industry and many rural communities that depend on their forest resources. The following are some of the effects:

### **1) Biological Integrity of Timber**

First, economic forces may have influenced harvesting practices in a manner that adversely affects the grade mix and the value of the resource. Driven by short term profits, many landowners may make harvesting decisions with little consideration of the furniture stand quality and these results in the removal of only the largest and best quality trees. Continued removal of higher quality trees has negatively affected the basic conditions for maintaining or improving the biological integrity [11].

### **2) Competitiveness of Wood Products**

Second, increasing timber cost and competition for high-grade timber may increase the demand for wood products and make it more difficult for wood products manufacturers to enhance or maintain their competitiveness. Since these problems are primarily due to the lack of suitable markets for low-grade hardwood, there is a growing interest in probing the potential for using low-grade hardwood to produce high-value products. Adding value to low-grade hardwood through high-value products will directly benefit furniture users and wood products enterprises as well as many rural communities. It may also meet the demand of an increasing number of consumers who want to protect our forest and environment through their purchase of environmentally friendly products [12] [13].

## **3. Research Method**

The research is a case study in the Western Region of Ghana. The research methods adopted was purposive and random sampling. Purposive because the research targeted furniture shops and furniture showrooms and random sampling was used to make the selection. This was because the research sought to find out

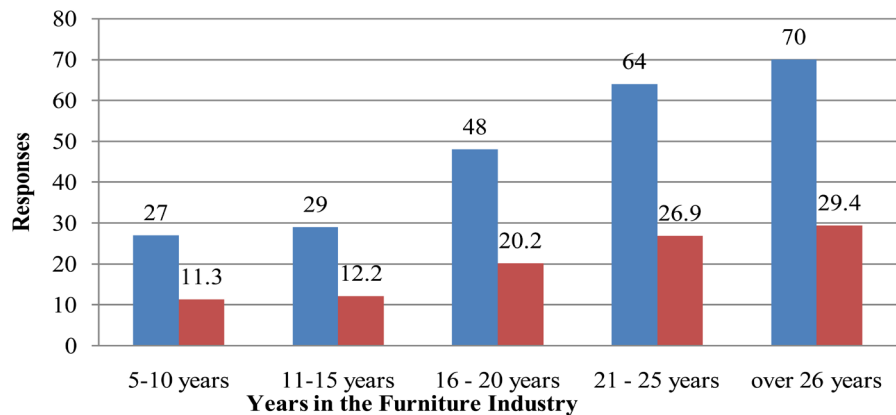
if furniture made from lesser-known species is common in many Ghanaian homes. A questionnaire was also developed to acquire data for the study from experienced people in the timber industry. The researchers visited 15 constituencies out of 29 in the Western Region. In each constituency 30 people were interviewed from some selected wood workshops and furniture showrooms. Personal interviews were also conducted. Specifically, 450 people were contacted to fill the questionnaire. The sample size gave a fair representation of people’s opinion about furniture made from lesser-known species.

#### 4. Results and Discussion

##### Length of Years in the Furniture Industry

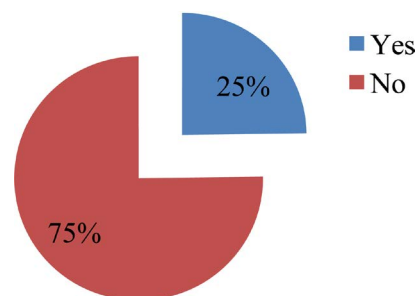
Seventy people responded that their companies have been in existence for more than 26 years and over (See **Figure 1**). Sixty-four had been between 21 - 25 years in the furniture industry and just twenty-seven had been in the furniture industry between five to ten years. This shows that most of the respondents have been in the wood industry for quite a long time and therefore could share their experience in the industry (Personal communication with managers in the timber industry).

The results in **Figure 2** show that 25% (59) out of 238 (75%) who responded to the questions said they have knowledge about lesser-known species.



Source: Field Study (2017).

**Figure 1.** Length of years in the furniture industry.



Source: Field Study (2017).

**Figure 2.** Knowledge about lesser-known species.

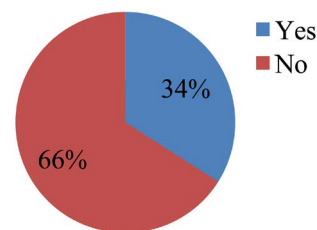
Majority of them 179 (75%) said they do not have any knowledge about lesser-known species. They only knew about the traditional species such as Odum, Wawa, Makore, Dahoma and many others. According to the Ministry of Lands and Forestry [7], in order to ensure sustainable forest management, several countries have put measures including utilization of lesser-known species, reforestation, setting margins for annual allowable cut, banning export of round logs, conservation of biological diversity, and promotion of efficient wood-based industries. The study has revealed that there is the need here in Ghana to promote the utilization of lesser known species; since majority of furniture manufacturers have little knowledge about their usage in the industry.

**Figure 3** shows that 81 (34%) of the people have used lesser-known species to make furniture before. The rest 154 (66%) of the people have not use some before. Whiles the government is encouraging people to use lesser-known species as a substitute to high grade lumber in many countries, majority of Ghanaians are not utilizing them. Vlosky [13] stated that, adding value to low-grade hardwood through a high-value product will directly benefit furniture users and wood products enterprise as well as many rural communities. It may also meet the demand of an increasing number of consumers who wants to protect our forest and environment through their purchase of environmentally friendly products.

The results indicated that, the mostly used lesser-known specie is celtic. Out of the 238 who responded to the questions, 78 (32%) said they mostly use celtic. Fifty-two (21.8%) also said they use yaya. Forty-one (17.2%) of them also indicated that they use koto. Others such as Chenchen, Esa and many more came with 30 (12.6%) whiles ceiba and cocowood followed with 23 (9.7%) and 14 (5.9) respectively (**Figure 4**).

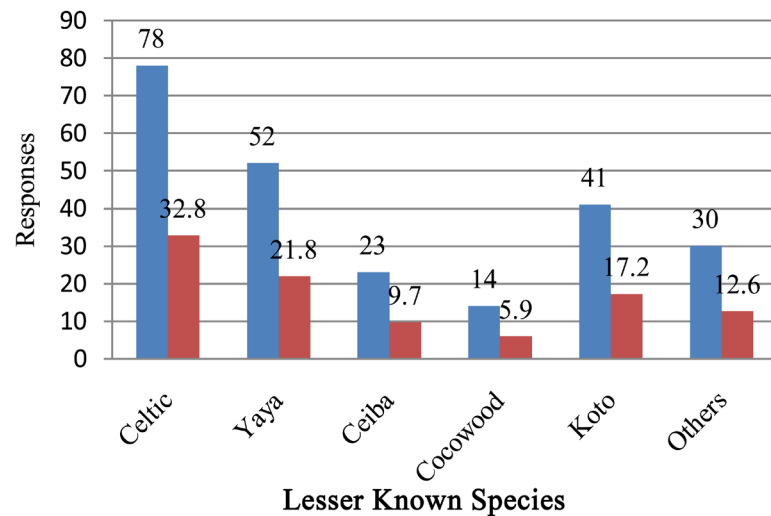
As to where furniture makers obtain lesser-known species to purchase, the results show that most of them get some to buy from the timber market whiles few places special order from sawmills or chainsaw operators. The bar chart above shows 170 respondents representing (71.4%) recording the highest percentage of those who buy lesser-known species from the timber market and 68 respondents representing (28.6%) also said they place special order from sawmills and chainsaw operators (**Figure 5**).

The researchers also sought to find out from the respondents if lesser-known species are available all the time in the local market. The results show that 77%



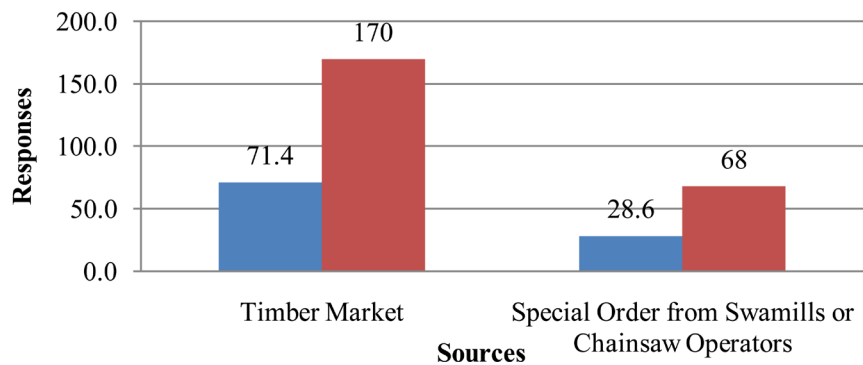
Source: Field Study (2017).

**Figure 3.** Usage of lesser-know species.



Source: Field Study (2017).

**Figure 4.** Mostly used lesser-known species.



Source: Field Study (2017).

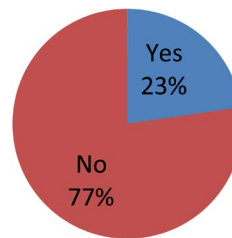
**Figure 5.** Source of lesser-known species for furniture production.

of the respondents said that lesser-known species are not always available in the local market. Vlosky [13] stated that due to lack of suitable market for low-grade hardwood, there is growing interest in probing the potential for using low grade hardwood to produce high-value products. Adding value to low-grade hardwood through high-value products will directly benefit furniture users and wood products enterprises as well as many rural communities. It may also meet the demand of an increasing number of consumers who want to protect the forest and environment through the purchase of environmentally friendly products (Figure 6).

Majority of the respondents who answered the question on whether people buy furniture made with lesser-known species 175 respondents making 74% said no while 63 respondents making 26% also said yes (Figure 7).

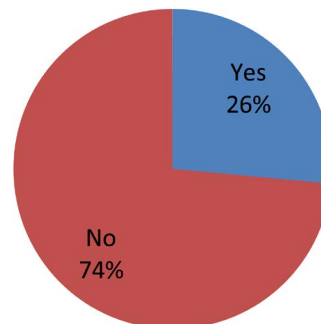
The researchers got to know that most people do not go to order furniture from shops rather they buy already made ones from outside. Out of 238 respondents 192 making (81%) said people do not come to order furniture made with lesser-known species and 46 making (19%) of the respondents said people come

to order furniture made with lesser known species from their shops. Vlosky [13] said that increasing timber costs and competition for high-grade timbers may increase the cost of wood products and may make it more difficult for wood products manufacturers to enhance or maintain their competitiveness. These problems are primarily due to the lack of suitable markets for low-grade hardwood to produce high value products. The research revealed that most Ghanaians prefer traditional species to the lesser-known ones. Out of 238 respondents who answered what is the perception of people about furniture made with lesser-known species to that of traditional species. Two hundred and thirty-one of them said they prefer using the traditional species. Seven of the respondents said they prefer the lesser-known to the traditional species. Those who said they prefer traditional species gave reasons that the lesser-known ones are difficult to purchase in the local timber market (Figure 8).



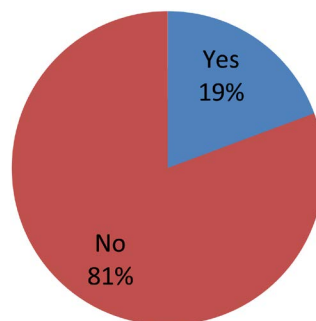
Source: Field Study (2017).

Figure 6. Availability of lesser-known species on local market.



Source: Field Study (2017).

Figure 7. Customers patronage of furniture made from lesser-known species.



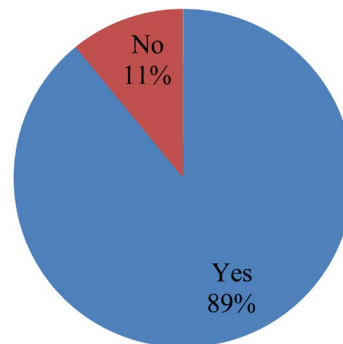
Source: Field Study (2017).

Figure 8. Order of furniture made from lesser-known species.



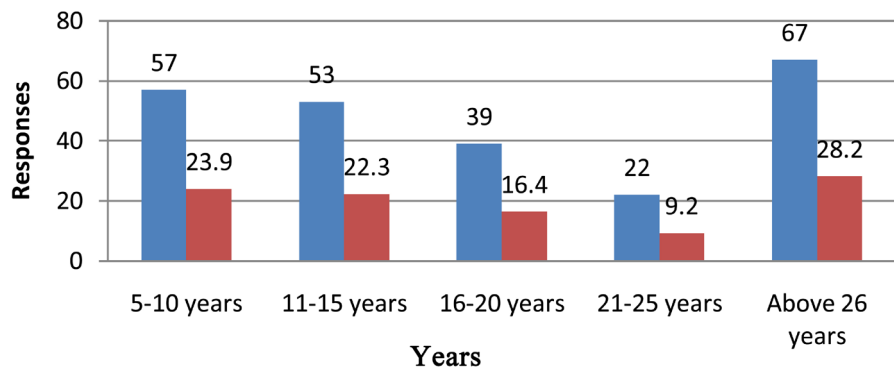
As to how wood processors compare the usage of both the traditional species and the lesser-known species, 89% of respondents preferred working with the traditional species to working with the lesser-known species, reason being that tools and machines for working on them are always available. Also, the results on the perception about furniture made with lesser-known species to that of the traditional species such as Odum, mahogany, Cedar, Avodrie, Walnut, and many more indicated that majority of the respondents, 89%, said they prefer traditional species to that of lesser-known species. Again, it was revealed that in Ghana, greater part of the population prefer species like Odum, Danta, Dahoma, Denyan etc. for roofing whiles Cedar, mahogany, Makore, Walnut, and Avodirie are used for furniture. The perception is that when the traditional species are used for either roofing or furniture they last longer (Figure 9).

The researchers sought to find out when companies started using lesser-known species to produce furniture. The results revealed that out of 238 respondents, 57 of them (23.9%) said they have used lesser-known specie between the past 5 to10 years. Forty-three of the respondents making (22.3%) also indicated that they have used it between the past 11 to 15 years whiles 39 of them (16.4%) have also used it between the past 16 to 20 years. Twenty-two of the respondents said they have used it between the past 21 to 25 years and 67 of them also said they have used it for more than 26 years (Figure 10).



Source: Field Study (2017).

Figure 9. Usage of furniture based on type of timber.



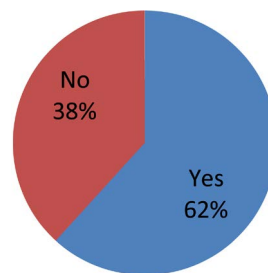
Source: Field Study (2017).

Figure 10. Length of years of usage of lesser-known species.

As to whether companies find it difficult to process lesser-known species, 62% of the respondents said they find it difficult to process while 38% also said they do not find it difficult to do so (Figure 11).

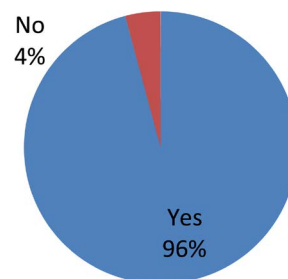
The research revealed that most companies prefer working with the traditional species to the lesser-known species. Out of the 237 respondents 234 of them said yes, they prefer working with the traditional species while 3 respondents said no they like working with the lesser-known species. According to the ministry of lands and forestry [7] in order to ensure sustainable forest management, several countries have put in place measures including utilization of lesser-known species, reforestation, setting marginal for annual allowable cut, banning of export of round logs, conservation of biological diversity and promotion of efficient wood-base industry. And from the researcher’s personal interview with some employers and employees, it was observed that most the most companies do not have the requisite machines to work with some of the lesser-known species (Figure 12).

The results in Figure 13 show that most Ghanaians use furniture base on the



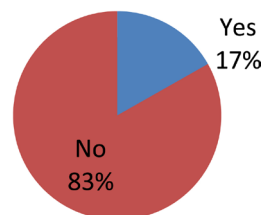
Source: Field Study (2017).

Figure 11. Ease of processing of lesser-known species.



Source: Field Study (2017).

Figure 12. Ease of finishing of lesser-known species.



Source: Field Study (2017).

Figure 13. Durability of furniture made with lesser-known species.

type of species. Eighty three percent of the respondents said the lesser-known species are not as durable as the traditional species whiles (17%) said that lesser-known species are durable. Okumi-Andoh [6] revealed that the increasing demand for tropical timber use in the housing industry has resulted in the depletion of large areas of forest cover. Okai [7] attests to that fact that Ghana is likely to lose her forest cover by the year 2022 if deforestation persists at the current rate.

## 5. Discussions

Although Ghana is generally considered as a country with abundant forest inventories, the available high-grade hardwood is quite limited due to a host of physical, economic and social factors. While the demand for wood products has been projected to grow a significant rate, a major problem faced by the wood products industry is a shortage of high-grade hardwood and contributed to the increasing pressure on the forest and the environment [6]. Analysis from the results revealed that most people do not have knowledge on the use of lesser-known species. Research has shown that in the 1970s timber was next to cocoa as a major foreign exchange earner in Ghana with a contribution to the Gross National Products of about 11% and started to decline reaching its lowest level in 1982 with a total capacity utilization fallen to a meager 15 percent [2]. Ozame and Smith [12] noted that increasing timber cost and competition for high-grade timber may increase the wood products and make it more difficult for wood products manufacturers to enhance or maintain their competitiveness. Since these problems are primarily due to the lack of suitable markets for low-grade hardwood, there is a growing interest in probing the potential for using low-grade hardwood to produce high value products. Adding value to low grade hardwood through high value products will directly benefit furniture users and wood products enterprises as well as many rural communities. The results revealed that many woodworkers do not have knowledge about the use of lesser-known species for making furniture. Out of 238 respondents 75% of them said they have no knowledge about making furniture with lesser-known species whiles 25% of them said they have knowledge about using lesser-known species to make furniture. Again, it was obvious from the results that few woodworkers use lesser-known species to make furniture. The rest do not use. Thirty-four percent of the respondents said they have use lesser-known species to make furniture before. Whiles the government is encouraging people to use lesser-known species as substitutes to high-grade lumber, majority of the people are not using them. The results also shown that, most lesser-known species are not always available in local market. Celtic, Yaya and Koto were the lesser-known species that could be found in the local timber markets.

In addition, it was seen that customers' patronage of furniture made from lesser-known species were very low. Seventy-four percent of the respondents said they have not use lesser-known species item or product before, while 26% of

them said they have used some before. Furthermore, the researchers got to know that most people do not go to order furniture pieces from the workshops; rather they buy already made ones from outside. It was clear from the results that, 81% of the respondents said people do not come to order lesser-known furniture from them but 19% said people come to order lesser-known furniture from their workshops. The research revealed that, most Ghanaians prefer traditional species to lesser-known ones. As to how wood processers compare the usage of both the traditional species and the lesser-known species 89% of them said they prefer working with traditional species to lesser-known species. Their reason was that tools and machines to work with the traditional species are always available, while that of traditional species are difficult to get.

## 6. Conclusion

The purpose of the study was to find out if furniture made with lesser-known species is common in many Ghanaian homes. The researchers sought to find out innovative ways of using lesser-known species to produce high-value products to save the degrading forest. The study revealed that many people do not have knowledge about the use of lesser-known species for furniture. It showed that people use furniture based on the type of species which are predominantly traditional species such as Odum, Wawa, Mahogany, Makore, Danta, Dahoma and many more which have been in existence since time immemorial [14]. This was the reason why most companies prefer using the traditional species for furniture making. Again, it showed that lesser-known species are not common in the local timber markets. The few common ones sometimes available in the local timber markets are Celtic, Yaya and Ceiba. The rest such as, Koto, Cocowood, Chenchen, Esa and others are ordered before they can be obtained. In addition, machines to process some lesser-known species are not common in the local timber markets. Few of the companies have machines for processing lesser-known species. The tools and machines for processing traditional species are available in the local timber markets and the woodwork shops. Furthermore, the results showed that when one compares the number of years' people who started using lesser-known species and the traditional species it was clear that many people do not know lesser-known species and that may be the reason why people do not patronize furniture made with lesser-known species.

## 7. Recommendations

The recommendations were based on the findings and conclusion drawn from the study by the researchers. It is therefore recommended that;

- People should patronize products made with lesser-known species as an alternative to the traditional species to save the forest.
- People should be sensitized so that products made with lesser-known species will not be seen as inferior.
- Lesser-known species require special tools and machines to work with,

therefore these tools should be made available for the processing.

- The depletion rate of the country's forest requires that alternative materials be used for furniture production.

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## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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