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FURNITURE AND JOINERY INDUSTRY IN NIGERIA 1/

by

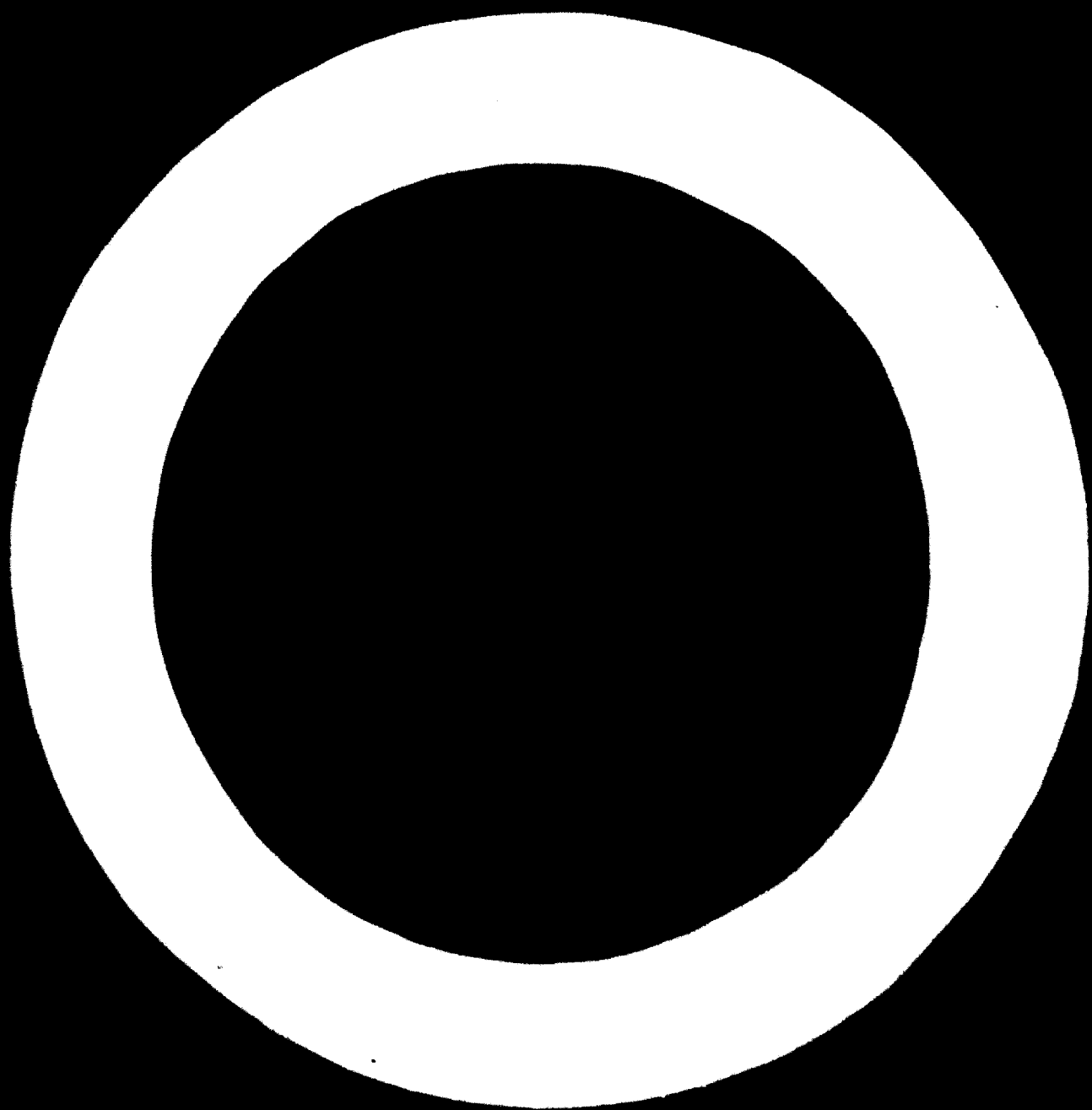
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## INTRODUCTION

Nigeria ranks among the largest and most highly populated countries in Africa. The land area is 356,000 square miles, and the 1963 official census figures put the country's population at about 60 million. The economy has grown very rapidly in recent years resulting in greater production and consumption of commodities. The country extends from  $4^{\circ}\text{N}$  to  $14^{\circ}\text{N}$  of the equator and thus embraces a wide range of ecological conditions, from the tropical rain forest in the south, through Savanna, to thorn scrub in the extreme north-east. The range of timber species is consequently exceptionally wide; it is generally considered that the hardwoods of Nigeria embrace all the characteristics of wood, and consequently a versatility equalled by that of few other countries.

### 1. Climate

#### 1.1 Rainfall, temperature and relative humidity

The annual rainfall is highest in the south, averaging about 70 inches on the western end of the coast and increasing to nearly 200 inches in the extreme south-east. The rainfall decreases inland and is about 50 inches over much of central Nigeria and falls to less than 20 inches in the extreme north.

The mean maximum temperature is about  $87^{\circ}\text{F}$  in the coastal area and about  $94^{\circ}\text{F}$  in the north. Maximum temperatures are highest from February to April in the south and from March to June in the north.

The relative humidity is highest near the southern coast, with a maximum of 95% to 100% throughout the year, decreasing to a minimum of 70% to 80% in the afternoon. Towards the north the relative humidity decreases and varies with the season. In Kano, for example, the relative humidity during June to October varies from 90% at dawn to 60% in the afternoon, while in the November to April dry season, the relative humidity averages 35% at dawn and 12% in the afternoon.

#### 1.2 Equilibrium moisture content

In general furniture and joinery will be exposed to conditions where the equilibrium moisture content is of the order of 20% in the southern coastal belt and as low as 7% in parts of the northern states during the long dry season. Air conditioning is becoming more and more common in office buildings and domestic houses; in these situations the equilibrium moisture content of wood is of the order of 10%.

Such variable exposure conditions mean that the wood furniture industry is faced with additional problems. In many instances these low moisture contents cannot be obtained by air seasoning, particularly in the south of Nigeria, and in the virtual absence of drying kilns the practice adopted by the better quality furniture manufacturers is to use relatively stable timbers, subject them to very long air drying periods, and adopt construction techniques that permit 'movement' to take place without accompanying degrade.

## 2. Present situation

### 2.1 Structure

The furniture and joinery industry is the most important of the secondary wood using industries, and it is the second largest employer of labour in the wood industries sector after sawmilling.

The enterprises range in size from the "one-man" carpenter's shops to the mechanised factories employing hundreds of workers. The firms may conveniently be divided into the following groups on the basis of the number of employees:

- a. Large - employing more than 75 persons
- b. Medium - employing between 10 and 75 persons
- c. Small - employing less than 10 persons

#### 2.1.1 Large factories

These are large scale enterprises employing over 75 persons and using modern equipment in production operations.

The more efficient factories operate on a production line basis and aim at 'flow-line' operation. They turn out a wide range of high quality and expensive furniture mainly for the high income private sector and also for the public sector. They have experienced and well trained personnel in management as well as on the shop floor.

It is worth noting that even in this group, only two firms in the whole of Nigeria have kiln drying facilities; the general practice is to purchase green timber and stack it for air drying.

Some of the firms in this group are equipped for both furniture and joinery production and they are thus better able to cope with variation in consumer demand.

## 2. 1.2 Medium size enterprises

In this group there are factories or workshops which make furniture of varying quality for both the private and the public sectors. Some of them use mechanical equipment, but a large number depend solely on the use of hand tools.

Unseasoned timber is purchased in the local market and used almost immediately. The more enlightened concerns attempt to air dry their timber and to model themselves after the large factories.

## 2. 1.3 Small scale enterprises

These are small entrepreneurs making rough and simple furniture for the lower income groups. Their premises generally consist of carpenter shops and the labour force usually comprises one master carpenter with two to five apprentices.

The main products are tables, benches, simple cupboards, folding chairs and other low quality items ranging in price from as little as N0.5 to N10.00 (N1.00 = US\$1.50).

## 2.2 Distribution of furniture establishments

The larger factories are concentrated in the state capitals in Lagos, Ibadan, Benin and Kano where the population is sufficient to justify large scale operations. The total number of large factories employing more than 75 persons is estimated at 6. The medium group is situated in the remaining state capitals, and in one or two other large towns in each state. In the Industrial Directory (1970) the large and medium size operations are grouped together and 70 establishments are identified.

The small carpenters' shops are found almost everywhere in Nigeria in large cities and small villages and run into several thousands. They occupy specific areas, and groups of 10 to 20 are frequently found in different parts of the larger cities.

In Ibadan, the largest city in Nigeria with a population of nearly 2 million, the number of enterprises is estimated to be as follows: large: 1, medium: 3, and small 500. An enumeration carried out in 1963 listed 641 individual carpentry shops in Ibadan.

### 2.3 General

Not much completed wood furniture is exported from Nigeria at present, but proposals have been made from time to time concerning the export in 'knock-down' form of certain items. Flooring strips and flooring blocks however enjoy a good market overseas. Furniture is imported in limited quantities but the import duties are high.

There is an incentive to mechanise operations for higher quality furniture production, but this is not so with the very many small enterprises which do not have sufficient capital or continuity of demand to justify the capital outlay.

### 3. Timbers

#### 3.1 Resources

Ten per cent of the total land area of Nigeria consists of permanent forest reserves. However, only about 20% of this area, or about 2% of the total land area, consists of forest reserve carrying high forest. Most of the commercial timbers come from this relatively small area of high forest, and there is little doubt that future timber supplies will have to come largely from the plantations now being established at about 20,000 acres per year.

At the present time about 65 million cubic feet of roundwood is extracted annually from the forests of Nigeria. It has been estimated (Enabor 1971) that 30 million cu. ft. of roundwood is converted into sawn products yielding about 16.5 million cu. ft. of sawn wood, assuming a conversion ratio of about 55%. About 10% of the country's sawn timber has been estimated (Lucas 1973) to be consumed by the furniture industry, which is thus second largest consumer, ranking after building construction.

#### 3.2 Species

Nigeria's forests contain about 150 species of commercially useful timber, but only about 65 are used at present. Of these 35 in number, which are more commonly used in the furniture and joinery industry, are listed in Appendix 1.

There is a natural tendency for species to be used in that part of the country where they occur. Examples of such utilisation are given:



- (i) Lagos area: Abura, Lagos mahogany, Idigbo, African Walnut, Obeche, Teak.
- (ii) Western area: Danta, Lagos Mahogany, Idigbo, Obeche, Teak.
- (iii) Mid-western area: Agba, Berlinia, Cordia, Abura, Mahogany.
- (iv) Eastern area: Camwood, Lagos Mahogany, African Walnut, Obeche.
- (v) Northern area: A mixture of species brought from the West, Midwest and Lagos areas. A start is being made in using exotic species including Pines and Eucalypts.

Although 83% of the land area of Nigeria bears savannah vegetation, the forest areas are very scattered, the trees are generally of poor form and the wood fairly dense. The resources therefore are of limited use for large scale furniture production, although they may be imported locally. *Khaya ivorensis*, the dry zone mahogany, is a notable exception, being an excellent furniture wood; the suitability of other species for furniture and joinery is still under research, and many of them appear suitable for flooring blocks and specialised turned furniture items, etc.

### 3.3 Prices

In spite of the increase in commodity prices, good quality furniture timber can still be obtained in Nigeria for about N2.00 to N3.00 per cubic foot, depending upon species. Teak (*Tectona grandis*), which is only available in very small quantities from the plantations, is the most costly of all the furniture woods at about N6.00 per cubic foot, with *Afrormosia* (*Pericopsis elata*), also very scarce, coming second. At the other end of the price range *Ceiba* (*Ceiba pentandra*), which is used by the local carpenters for the cheapest wooden cupboards, costs about N0.5 per cubic foot.

### 3.4 Importation

Nigeria is more than self sufficient in her solid wood requirements, and timber is no longer imported in this form. A certain amount of veneer is imported however, together with limited quantities of fibre-board.

Small quantities of furniture are imported particularly special upholstered items, but import duties are high.

### 3.4 Seasoning

A limited number of furniture factories in the country are integrated with sawmilling operations, but the vast majority buy their timber direct from the sawmills (in the case of the larger concerns), or from the timber markets (in the case of the smaller enterprises).

Timber is almost invariably purchased in the 'green' condition. The larger factories air dry their wood for long periods, but the carpenters' shops usually use it in a fairly wet condition.

There are only four drying kilns in the country: in Lagos, Ibadan (Federal Department of Forest Research), Enugu and Sapale. For any export operation kiln drying facilities will be essential.

At present the problem of seasoning is partially overcome by the large factories who air dry their timber for long periods (eight months to one year) and use timbers which are fairly 'stable' in service. Air drying in a humid atmosphere is very slow and cannot be entirely satisfactory. The need for improvement in the drying operations in the country cannot be over emphasised. For this reason a specific proposal for assistance by UNIDO in this area, is made at the end of this report.

### 3.5 Problems

There are many problems facing the furniture industry in Nigeria. The major one is probably the lack of well sawn and properly seasoned timber of the species required for use. Other problems relate to lack of capital, modern designs, marketing techniques and technical know-how, especially by the small concerns. The technical problems are being tackled by the Federal Department of Forest Research.

As far as joinery is concerned, it is necessary to have timber that is seasoned, properly treated with preservatives, as well as dimensioned. There are only 6 preservative treatment plants in Nigeria, so at present the more reputable joinery manufacturers tend to be confined to the use of the more durable (and usually more expensive) timbers.

Joinery firms are rarely found in isolation, because firstly, they have to compete with construction companies who have their own joinery facilities, and secondly, many of the furniture factories use their equipment for joinery work when furniture is not in demand.

#### 4. Other materials used and availability

##### 4.1 Wood-based panels

Wood based panels are being increasingly used in the furniture industry. This was initially mainly in the form of plywood which is available from the four mills presently operating in Nigeria and from imports. However, plywood is relatively costly and the trend now is for the factories to use imported plywood which is veneered locally. The larger concerns have well equipped veneering units. Nigerian sliced veneer is in big demand overseas, and so paradoxically, many of the local factories use imported veneer; African Walnut, Mahogany and Sapele veneers are commonly used. One firm specialises in the use of teak veneer for its high quality furniture.

Particle board production is still in its initial stages in Nigeria, and at the moment is confined to the manufacture of 6mm. ceiling boards. The proposed production of thicker boards suitable for veneering, for use by the furniture industry will be a major step forward.

Fibreboard is little used in the furniture industry, and is at present imported. The major use is for ceilings, in the form of soft-board.

##### 4.2 Other materials

All glues are imported with the exception of that used by one integrated wood industry at Sapele which manufactures synthetic resins from largely imported raw materials, for the production of plywood and particle boards. The most widely used glue for furniture manufacture is urea resin.

A wide range of surface finishes are available, most of them being made in factories which have been established in the Lagos area.

Virtually all hardware is imported and this is a significant factor in keeping the cost of the better quality furniture at a relatively high level. Some upholstery fabrics are made locally and are of a very good standard, others are imported such as the luxury brocade materials.

## 5. Labour

Unskilled labour is in plentiful supply; skilled labour is now becoming readily available, and technical training establishments are now turning out large numbers of trained operators. Skilled managerial staff is still relatively scarce, but again the situation is rapidly improving.

Vocational training for the furniture and joinery trades is undertaken in the Trade Centres which are distributed throughout the country. Higher technical education is not yet available at the colleges of technology.

It is interesting to note that there is an excellent school of architecture, at Ahmadu Bello University, but the school does not specifically teach furniture design.

In the main then, there is adequate labour available in Nigeria at all levels, with the possible exception of the highest managerial/technical cadre.

## 6. Furniture and joinery factories

### 6.1 Products and design

Furniture production in Nigeria covers partially all the known categories ranging from the simplest wooden stool selling in the carpenters' shops for 20k to a luxury suite costing over N1,000. Dining room, bedroom, nursery, office, school, laboratory and garden furniture of all levels of sophistication are made. Kitchen furniture has tended to lag behind, but even here the situation is now changing.

In the small carpenters' shops the designs tend to follow a fairly simple standard pattern that becomes accepted in each particular area of the country, but the more enterprising entrepreneurs try to develop their own ideas. The large factories have their own designs but tend to follow European styles, and it is perhaps unfortunate that little traditional culture has been introduced into local designs. It is likely that this will come about in the future, however with increasing emphasis now being placed on the retention and the development of Nigerian art.

## 6.2 Technical level

Technically the Nigerian furniture and joinery industry suffers from the disadvantage of serving a captive home market. This means that although the timber of suitable species and quality is available, the incentive is not there, with one or two notable exceptions, to produce "export quality" products.

In order to improve standards, more attention needs to be paid to the whole furniture processing operation starting with the introduction of timber drying kilns and ending with the improvement of the wood finishing process.

## 6.3 Marketing

**Home market:** The large majority of Nigerians do not accept the idea that furniture has to be a replaceable commodity. Major factors supporting the home market are the rapid urbanisation, various development programmes and the general development in the economy, all requiring more building, joinery and furnishing.

Furniture export is very much in its infancy, primarily to the wood deficient countries around Nigeria. One major factor inhibiting large scale export is the rather sub-standard nature of some of the products, particularly the smaller firms. The bigger firms have assured local markets and do not at present bother to go into the highly competitive export market. In the future however, the trend will be to find other markets, particularly as competition for home market increases and the standard of products improve.

## 7. Possible assistance by UNIDO

### 7.1 Timber drying

Although there are many areas in the furniture and joinery industries in which UNIDO aid would be welcomed, it is considered that the most effective assistance could be given, at relatively little cost, in the field of wood drying.

It is probably true to say that greater trouble is experienced in the furniture and joinery industries as a result of timber not being adequately dried than from any other single cause.

There are at present only four commercial kiln drying units in the whole of Nigeria, and with the exception of the facilities at Sapele they consist merely of individual kilns of about 400 cubic feet capacity.

The Federal Department of Forest Research is presently engaged in a programme to develop low cost timber drying equipment. It has been concluded that drying by de-humidifier offers the cheapest, and simplest form of drying, particularly for the smaller furniture manufacturer, in the present Nigerian situation. To this end, a dynamic de-humidifier unit is on order and will be used to investigate the most suitable form of kiln building, arrangement of fans and timber stack, etc., and to determine suitable drying schedules for Nigerian timbers.

In order to make this project much more effective it is suggested that UNIDO make available additional de-humidifier units to be located in some of the field stations of the Department of Forest Research in different parts of Nigeria: at Samaru, Kano, Umuahia, Benin, Port-Harcourt, Calabar, Lokoja and Sokoto. These would be run on an experimental/  
demonstration/commercial basis. Commercial drying would be undertaken for local furniture and joinery makers who would, at the same time, realise the benefits of artificial drying and be encouraged to purchase similar units for themselves.

It is suggested that if six units could be made available and installed in different parts of the country, chosen from the places indicated above, then a marked improvement in the efficiency of the furniture and joinery industry in Nigeria would result. The estimated cost of six units required together with auxiliary fans would be about US\$18,000. A similar arrangement was made by F.A.O. in 1964. A steam kiln provided by this organisation is now being run commercially in Ibadan, but it is the only one and is very much overbooked.

APPENDIX I

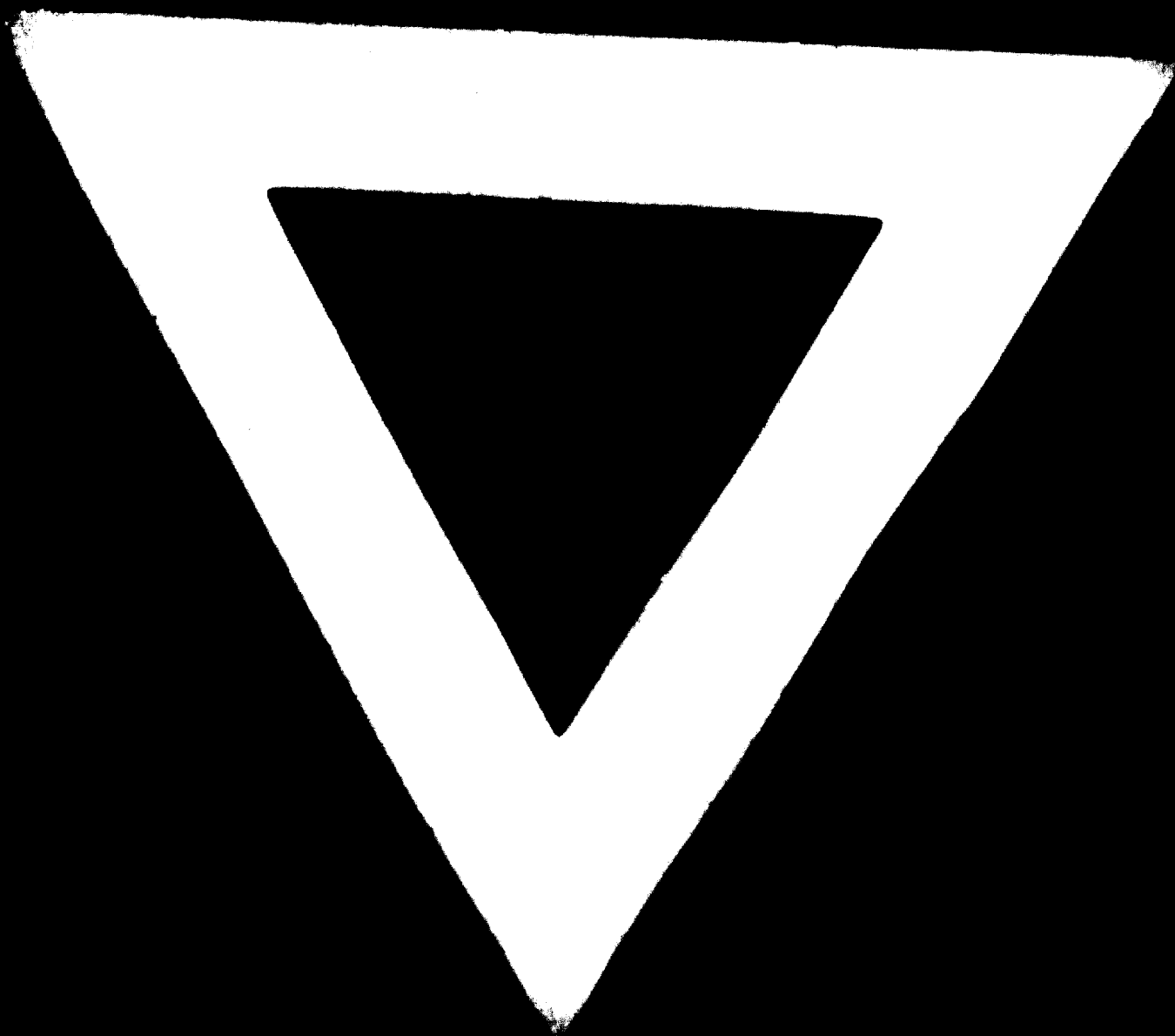
The Common Timber Species used are listed below:

| No. | Botanical Names                                  | Trade Names              | Other Nigerian Names       |
|-----|--|--------------------------|----------------------------|
| 1.  | <i>Azolia</i> spp.                               | Azolia/Apa               | Apa-Alige                  |
| 2.  | <i>Antiaris</i> spp.                             | Antiaris                 | Oro, Ogiuru                |
| 3.  | <i>Berlinia</i> spp.                             | Berlinia                 | Ekpogoi                    |
| 4.  | <i>Bombax boumoponense</i>                       | West African<br>(Bombax) | Cotton Hood<br>(Kapok)     |
| 5.  | <i>Chlophora</i>                                 | Iroko                    |                            |
| 6.  | <i>Gordia platythyrsa</i>                        | Omo                      |                            |
| 7.  | <i>Cylocodiscus gabunensis</i>                   | Okon                     |                            |
| 8.  | <i>Diospyros (crassiflora<br/>mospiliformis)</i> | African Ebony            |                            |
| 9.  | <i>Distomonanthus<br/>benthamicus</i>            | Ayan                     |                            |
| 10. | <i>Entandrophragma<br/>angolensis</i>            | Gedu nohor               |                            |
| 11. | <i>Entandrophragma<br/>cylindricum</i>           | Sapele Mahogany          | Sapele Wood                |
| 12. | <i>Entandrophragma utile</i>                     | Utile                    |                            |
| 13. | <i>Entandrophragma<br/>candollei</i>             | Onu                      |                            |
| 14. | <i>Gossweilerodendron<br/>balcaniferum</i>       | Agba                     |                            |
| 15. | <i>Guarea cedrata</i>                            | Scented guarea           | White guarea<br>Obobomafuo |
| 16. | <i>Scottellia coriacea</i>                       | Okoko                    |                            |
| 17. | <i>Sterealia oblonga</i>                         | Yellow<br>sterealia      | Okoko                      |
| 18. | <i>Sterealia rhinopetala</i>                     | Brown Sterealia          | Ayo                        |
| 19. | <i>Terminalia ivoronsis</i>                      | Idigbo                   | Black Afara                |
| 20. | <i>Terminalia superba</i>                        | Afara                    | White Afara                |
| 21. | <i>Triplechiten<br/>selorexylon</i>              | Obeche - Nawa            | Arere                      |
| 22. | <i>Khaya ivorensis</i>                           | Lagos Mahogany           |                            |
| 23. | <i>Khaya grandifoliola</i>                       | Benin Wood               |                            |
| 24. | <i>Khaya senegalensis</i>                        | Dry Zone<br>Mahogany     |                            |

| No. | Botanical Names   | Trade Names    | Other Nigerian Names |
|-----|---|----------------|----------------------|
| 25. | <i>Lophira alata</i>  | Ekki           |                      |
| 26. | <i>Lourea trichilioides</i><br>(Syn. <i>L. Klaineana</i> )                  | African Walnut |                      |
| 27. | <i>Mansonia altissima</i>   | Mansonia       | Ofun                 |
| 28. | <i>Nitragyna ciliata</i>  | Abura          |                      |
| 29. | <i>Nauclea diderrichii</i><br>(Syn. <i>cistanthera diderrichii</i> )        | Opope          |                      |
| 30. | <i>Nesogordonia Papaverifera</i><br>(Syn. <i>cistanthera papaverifera</i> ) | Danta          | Otutu                |
| 31. | <i>Piptadeniastrum africanum</i><br>(Syn. <i>Piptadenia africana</i> )      | Dahoma         | Ekhimi, Agbonin      |
| 32. | <i>Pterocarpus soyauxii</i>   | Cam Wood       | Osun                 |
| 33. | <i>Tectona grandis</i>  | Teak           |                      |
| 34. | <i>Brachystegia</i> spp.  | Okwen          |                      |
| 35. | <i>Holoptelea grandis</i>   | Holoptelea     |                      |







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