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ASSESSMENT OF ECONOMIC TREE SPECIES DIVERSITY IN ADEKUNLE AJASIN UNIVERSITY, AKUNGBA-AKOKO, ONDO STATE, NIGERIA

Ajayi, E[1] and Arowosoge, O.G.E[2*]

[1]Department of Forestry and Wildlife Management, AdekunleAjasin University, Akungba-Akoko, Ondo State, Nigeria
[2]Department of Forest Resources and Wildlife Management, Ekiti State University, Ado-Ekiti, Nigeria
*****Corresponding author E-mail: yemisoge@yahoo.co.uk. Phone: +234 803 355 2632

ABSTRACT

The study assessed the abundance, diversity and merchantable trees species on 15 hectares of forest land ceded to Faculty of Agriculture for farming at Adekunle Ajasin University, Akungba-Akoko (AAUA), Ondo State, Nigeria with a view of documenting them as a baseline information before the clearing of the forest. The whole forest area was divided into 15 regular plots of 100 m x 100m and all the tree species in the plots were identified and enumerated. The diameters at breast height (Dbh) of trees with Dbh of 20cm and above were measured using diameter tape. Diversity indices were estimated using appropriate equations. Data were subjected to descriptive statistics. The result revealed 367 indigenous trees belonging to 28 species and 16 families. *Recinodendron heudolotii* species had the highest number of trees (79) followed by *Cleistopholis patens* (77) while *Albizia zygia*, *Endandrophragma angolense*, *Pterygota macrocarpa* and *Ceiba pentandra* had 63, 28, 27 and 21 trees respectively. The forest is dominated by Euphorbiaceae family with four species followed by Sterculiaceae and Caesalpinioideae families with three species each. *Recinodendron heudolotii* had the best species diversity indices with Margalef index (Ma) of 14.69, relative density (RD) of 39.11% and relative abundance (Pi) of 0.39. Seven tree species had RD = 4% and were classified as abundant while 9 species had RD <1.00% and were classified as threatened or endangered. 195 trees had Dbh that is= 40 cm and were recommended for harvesting to generate income to develop forest plantation for *Tectona grandis* and *Gmelina aborea*. The findings of this study coupled with the knowledge of the soil type in the study area could serve as a baseline for determining the environment where these trees could survive in restoration of indigenous tree species within forest ecosystem.

Keywords: Abundance, Diversity, Merchantable, Economic Tree Species.

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INTRODUCTION

Trees are major forest resources that play important role in the life of man and the environment as a whole. Though trees are mostly used as timber for economic purposes, theirimportance in ensuring environmental stabilization and being a source of health care raw materials cannot be over emphasized. Wood of economic tree species are mainly used for: (i) construction purposes which can be processed into sawn logs, veneer, plywood and particleboard (ii) pulp and paper which include newsprint, paperboard and printing paper (iii) electric and telephone poles; and (iv) energy generation such as fuelwood and charcoal. In emphasizing the importance of trees, Aimufia (2002), stated that the cot on which the baby lies at birth, the buildings and furniture he uses at the various levels of his education, the accommodation and furniture he acquires as a worker, the armchair he relaxes on in his old age, and the coffin or casket in which he returns to Mother Earth are all from trees.Thus emphasizing the important roles trees play in the life of man from cradle to grave.

It is worth noting that in the past, forest timber, in addition to cocoa, groundnut, cotton and palm produce were the mainstay of the country's economy. Between 1880 and 1935, the timber trade was mainly in mahogany and ebony logs (Adeyoju, 1970). The number of species increased to about 25 in the 1950's and timber export increased between1955 and 1965 with total annual value increasing from ₦2 million in 1955 to ₦13.2 million in 1964 (Okoro*et al.,* 1989). The profit accruing from trees exploitation has led to its continuous harvesting in both the constituted forest and the free areas (Adekunle *et al*., 2013).

However, forest ecosystems which host the trees and many other organisms of biological nature is now depleted due to the removal of forest resources,most especially trees without replacement. According to Oyebo (2006), the forest cover in the country had reduced to 15% by 1995 and is expected to be currently less than 10%.In South West Nigeria,the rapidly degrading forest has been reported to be at an annual average rate of 2.6% mainly for agricultural purposes **(**Oyinloye *et al., 2010;* Yohanna *et al.,* 2012**).** Trees have thus undergone different levels of disturbances over the years due to unprecedented increase in human population, which have led to cutting of trees for firewood collection, charcoal production, farming and infrastructural development among others (Omoro *et al.*, 2010).

With continuous exploitation in an unsustainable manner, tree species composition, diversity and abundance are lost and this has been the greatest challenge in sustaining the richness of

the forest ecosystem. Suratman (2012) is of the opinion that information on composition, diversity of tree species and species-rich communities is of primary importance in the planning and implementation of biodiversity conservation efforts. This study was therefore undertaken to assess forest trees on the proposed site for farming by Faculty of Agriculture at Adekunle Ajasin University, Akungba-Akoko (AAUA). This is with a view to providing information on their abundance, diversity and merchantability before they are completely destroyed and the land converted for farming. Species abundance here refers to the total number of species present in the area while diversity takes into account how individual trees are distributed among the species. This information coupled with the knowledge of the soil type in the area would help to determine the environment where these trees could survivein future. Furthermore, the data on the basal area of the trees would indicate merchantable trees that could be harvested to generate income rather than destroying them.

MATERIAL AND METHOD

Study Area

This study was conducted on 15 hectares of forest land ceded to Faculty of Agriculture for teaching, research and commercial farming at AAUA, Ondo State, Nigeria. AAUA has a total land area of 8.04km^2. It is situated in Akoko South West Local Government Area of Ondo State between latitudes 7^o 28" 9.15' to 7^o 29" 15.18’ North of the equator and longitudes 5^o 44" 15.96' to 5^o 46" 14.78’ East of Greenwich Meridian. Akungba-Akoko town shared boundaries with Supare-Akoko in the West, Iwaro-Oka in the East, Ikare-Akoko in the North and in the South with Oba-Akoko (Allen, 2012).

The ecological zone which used to be rainforest is gradually becoming derived savannah due to erratic rainfall pattern resulting from climate change. The zone is characterized by two distinct seasons: the raining season which occur between April and September and the dry season which falls between September and March. The zone has a mean annual rainfall of 1250 mm andthe average temperature which ranges between 18°C and 35°C. The topography is generally undulating with Eastward highlands of granitic origin. Furthermore, the study area is characterized by Precambrian Basement rocks such as grey gneiss, quartzo-feldspathic gneiss, charnockite; granite gneiss; and porphyritic gneiss (Okpoli, 2015).

Data Collection

The whole forest area of 15 hectares was divided into regular plots of 100 m x 100m (1hectare) in size to facilitate enumeration. This makes a total of 15 plots. All the tree species in the 15 plots were identified and enumerated while recording the frequency of occurrence according to species. The diameters at breast height (Dbh) of trees with Dbh of 20cm and above were measured using diameter tape. The trees were identified with the help of a taxonomist who gave the common and local names of the trees. Trees' identification were further carried out in the office using guide book (Keay, 1989) while the reconciliation of the trees' local names to their scientific and vernacular names followed Keay (1989) and Gbile (2002). For tree species that could not be identified on field, their specimens such as leaves, bark and fruits where available were collected from field for identification at the Department of Plant Science and Biotechnology herbarium in AAUA.

Data analysis

Data obtained were subjected to descriptive statistics and tree species diversity indices in order to determine species richness of the study area as well as basal area computations to assist in making harvest decision of trees that could be converted to planksfor economic values.

Tree species diversity and abundance

Tree Species Diversity indices as used by Aslam, (2009) and Ogwu *et al*., (2016) were used. The formulae are as presented in Equations 1, 2 and 3.

Margalef species richness index (Ma), is a simple measure of species richness (Margalef, 1958).

$$Ma = \frac{S-1}{LnN} \quad \text{.....Equation 1}$$

Where S = total number of species; N = total number ofindividual trees in the site and Ln = natural logarithm.

Relative density of species (RD) % =

$$\frac{Number\ of\ Individual\ species}{Total\ Number\ of\ Trees}\ X\ 100 \quad \text{..... Equation 2}$$

The decision for RD according to Brashears *et al.*, (2004) is to classify the species as:

(i) abundant when RD is equal to 4.00% or greater than 4.00%,

(ii) frequent when RD ranges between 3.00% and 3.99%,

(iii) occasional when RD ranges between 2.00% and 2.99%,

(iv) rare when RD ranges between 1.00% and 1.99% and

(v) threatened/endangeredwhen RD is less than 1.00%

Relative abundance of species (RA) =

$$\frac{\text{Relative Density of species}}{100} \quad \text{..... Equation 3}$$

Basal area

The basal area of all the trees with Dbh of 20cm and above was calculated using the following formula:

$BA = (л D^2)/4$ **.....** *Equation 4*

Where: BA = Basal area (m^2)

D = Diameter at breast height (cm)

Л = Pie (3.142)

RESULT AND DISCUSSIONS

Tree Species Identification in the study area

Three hundred and sixty-seven (367) trees were identified. The trees were compiled according to species and presented alphabetically in their scientific names, common names and families (Table 1). Both the botanical and vernacular names followed Keay (1989) and Gbile (2002).

Table 1: Tree Species Identified in the Study Area

S/N	Scientific Name	Common Names	Family
1	*Afzelia africana*	Apa	Caesalpinioideae
2	*Albiza ferruginea*	Ayure-Iroko	Alangiaceae
3	*Albizia zygia*	Ayure	Alangiaceae
4	*Bosqueia angolensis*	Koko-Igbo	Moraceae
5	*Ceiba pentandra*	Araba	Bombacaceae
6	*Celtis zenkeri*	Ita	Ulmaceae
7	*Chrysophyllum albidum*	Osan	Sapotaceae
8	*Cleistopholis patens*	Afako	Annonaceae

9	*Crudia klainei*	Afomo	Caesalpinioideae
10	*Entandrophragma angolense*	Ijebo	Meliaceae
11	*Guarea cedrata*	Obobo	Meliaceae
12	*Hevea brasiliensis*	Rubber	Euphorbiaceae
13	*Keayodendron bridelioides*	Ebo	Euphorbiaceae
14	*Milicia excelsa*	Iroko	Moraceae
15	*Pachyelasmatess mannii*	Eru	Caesalpinioideae
16	*Pentadesma butyracea*	Oriro	Guttiferae
17	*Piptadeniastrum africana*	Agboyin	Mimosoideae
18	*Pterocarpus osun*	Osun	Papilionoideae
19	*Pterygota macrocarpa*	Oporoporo	Sterculiaceae
20	*Pycnanthus angolensis*	Akomu	Myristicaceae
21	*Rhodognapha lonbrevicuspe*	Awori	Bombacaceae
22	*Recinodendron heudolotii*	Orunmadu	Euphorbiaceae
23	*Sterculia rhinopetala*	Aye	Sterculiaceae
24	*Terminalia superba*	Afara	Combretaceae
25	*Tetrapleura tetraptera*	Eyindo/Aridan	Mimosoideae
26	*Triplochiton scleroxylon*	Obeche	Sterculiaceae
27	*Uapaca staudtii*	Ahun	Euphorbiaceae
28	*Zanthoxylum leprieurii*	Ata	Rutaceae

Tree species diversity and abundance

The 367 individual trees identified on the 15 hectares of forest land belong to 28 species and 16 families (Table 2). This makes an average of 24 trees per hectare. The 24 trees per hectare obtained in this study is lowerthan what is obtained in a strict nature reserve or undisturbed forest. Adekunle *et al.,* (2013) obtained 387 trees per hectare in a study in a strict nature reserve at Akure, Ondo State, Nigeria. Furthermore, trees species that range from 245 to 467 stems per hectare had been obtained in some other tropical rain forests (Kanzaki *et al*., 2005, Raj-kumar and Parthasarathy, 2008; Lu *et al.,* 2010). It could therefore be deduced that the forest area studied had been disturbed with anthropogenic activities. More so that the study area has the history of been exploited through illegal felling.

The 28 species identified are indigenous and they constitute 5% of the total known Nigerian forest tree species and 47% of the marketable wood species in Nigeria. Beak Consultants (1999) gave the total known Nigerian forest tree species and the marketable wood species in Nigeria to be 600 and 60 respectively. *Recinodendron heudolotii* species had the highest number of trees (79) followed by *Cleistopholis patens* with 77 trees. *Albizia zygia,*

Endandrophragma angolense, Pterygota macrocarpa and *Ceiba pentandra* had 63, 28, 27 and 21 individual trees respectively. Nine species namely *Crudia klainei, Piptadeniastrum africanum, Afzelia africana, Zanthoxylum leprieurii, Sterculia rhinopetala, Albiza ferruginea, Pachyelasmatess mannii, Celtis zenkeri* and *Hevea brasiliensis* had one tree each (Table 2). The forest is dominated by Euphorbiaceae family with four species followed by Sterculiaceae and Caesalpinioideae families with three species each. Alangiaceae, Bombacaceae, Meliaceae, Mimosoideae and Moraceae families had two species each while other eight families had one species each (Tables 2). This finding corroborates other studies (Kanzaki *et al*., 2005; Raj-kumar and Parthasarathy, 2008; Lu *et al.*, 2010; Adekunle *et al.*, 2013) where families of Sterculiaceae, Euphorbiaceae, Meliaceae, Mimosoideae and Moraceae were found to dominate the tropical rainforest ecosystems.

Recinodendron heudolotii species which had the highest trees (79) also had the best species diversity indices. The Ma was 14.69, RD was 39.11% while Pi was 0.39. This trend was obtained for other species, whereby the higher the number of trees, the higher the species diversity indices. Species with one tree had zero (0) Ma, low RD of 0.50 and Pi of 0.01 (Table 3**)**. From the result of this study it could be deduced that *Recinodendron heudolotii* was the most abundant species in the study area. Adekunle *et al.*, (2013) however obtained a higher Ma of 64.72 in a study carried out in a strict nature reserve which was an undisturbed area. The Low Ma (14.69) obtained further reveals a disturbed forest area.

Classification of the tree species using the decision criteria of RD as stated in equation 2 revealed that seven tree species: *Recinodendron heudolotii, Cleistopholis patens, Albizia zygia, Endandrophragma angolense, Pterygota macrocarpa, Ceiba pentandra* and *Uapaca staudtii* had RD = 4.00% and were classified as abundant. Four species: *Tetrapleura tetraptera, Pentadesma butyracea, Milicia excelsa,* and *Pterocarpus osun* had RD that ranged between 3.00 – 3.99% and were classified as frequent. Furthermore, four species: *Pycnanthus angolensis, Keayodendron bridelioides, Guarea cedrata* and *Chrysophillum albidum* had RD of 2.00 – 2.99% and were classified as occasional. The four species of *Bosqueia angolensis, Triplochiton scleroxylon, Terminalia superba* and *Rhodognaphalon brevicuspe* had RD of 1.00 – 1.99 and were classified as rare while nine species had RD <1.00% and were classified as threatened or endangered (Table 4).

Table 2: Family, tree species and number of individual trees

Family	Tree species	No of individual trees
Alangiaceae	*Afzelia ferruginea*	1
	Albizia zygia	63
Annonaceae	*Cleistopholis patens*	77
Bombacaceae	*Ceiba pentandra*	21
	Rhodognapha lonbrevicuspe	2
Caesalpinioideae	*Pachyelasmatess mannii*	1
	Afzelia africana	1
	Crudia klainei	1
Combretaceae	*Terminalia superba*	2
Euphorbiaceae	*Hevea brasiliensis*	1
	Keayodendron bridelioides	5
	Recinodendron heudolotii	79
	Uapaca staudtii	8
Guttiferae	*Pentadesma butyracea*	7
Meliaceae	*Entandrophragma angolense*	28
	Guarea cedrata	5
Mimosoideae	*Tetrapleura tetraptera*	7
	Piptadeniastrum africanum	1
Moraceae	*Milicia excelsa*	6
	Bosqueia angolensis	3
Myristicaceae	*Pycnanthus angolensis*	5
Papilionoideae	*Pterocarpus osun*	6
Rutaceae	*Zanthoxylum leprieurii*	1
Sapotaceae	*Chrysophyllum albidum*	4
Sterculiaceae	*Sterculia rhinopetala*	1
	Pterygota macrocarpa	27
	Triplochiton scleroxylon	3
Ulmaceae	*Celtis zenkeri*	1
Total		**367**

Table 3: Tree species diversity and abundance indices (Ma., RD., Pi)

S/N	Scientific Name	Ma	RD(%)	Pi
1	*Recinodendron heudolotii*	14.69	39.11	0.39
2	*Cleistopholis patens*	14.32	38.12	0.38
3	*Albizia zygia*	11.68	31.19	0.31
4	*Endandrophragma angolense*	5.90	13.86	0.14
5	*Pterygota macrocarpa*	4.98	13.37	0.13
6	*Ceiba pentandra*	3.77	10.40	0.10
7	*Uapaca staudtii*	1.32	4.00	0.04
8	*Tetrapleura tetraptera*	1.13	3.47	0.04
9	*Pentadesma butyracea*	1.13	3.47	0.04
10	*Milicia excelsa*	0.94	3.00	0.03
11	*Pterocarpus osun*	0.94	3.00	0.03
12	*Pycnanthus angolensis*	0.75	2.48	0.03
13	*Keayodendron bridelioides*	0.75	2.48	0.03
14	*Guarea cedrata*	0.75	2.48	0.03
15	*Chrysophillum albidum*	0.57	2.00	0.02
16	*Bosqueia angolensis*	0.38	1.49	0.02
17	*Triplochiton scleroxylon*	0.38	1.49	0.02
18	*Terminalia superba*	0.19	1.00	0.02
19	*Rhodognapha lonbrevicuspe*	0.19	1.00	0.02
20	*Crudia klainei*	0.00	0.50	0.01
21	*Piptadeniastrum africana*	0.00	0.50	0.01
22	*Afzelia africana*	0.00	0.50	0.01
23	*Zanthoxylum leprieurii*	0.00	0.50	0.01
24	*Sterculia rhinopetala*	0.00	0.50	0.01
25	*Albiza ferruginea*	0.00	0.50	0.01
26	*Pachyelasmatess mannii*	0.00	0.50	0.01
27	*Celtis zenkeri*	0.00	0.50	0.01
28	*Hevea brasiliensis*	0.00	0.50	0.01

***Keys**: RD = Relative density (%), Pi =Relative abundance, Ma = Margalef species richness index*

Table 4: Classification of tree speciesusing Relative Density (RD)

S/N	Species Name	Grade	No of Trees	RD (%)
1	*Recinodendron heudolotii*	Abundant	79	39.11
2	*Cleistopholis patens*	Abundant	77	38.12
3	*Albizia zygia*	Abundant	63	31.19
4	*Endandrophragma angolense*	Abundant	28	13.86
5	*Pterygota macrocarpa*	Abundant	27	13.37

6	*Ceiba pentandra*	Abundant	21	10.40
7	*Uapaca staudtii*	Abundant	8	4.00
1	*Tetrapleurat etraptera*	Frequent	7	3.47
2	*Pentadesma butyracea*	Frequent	7	3.47
3	*Milicia excelsa*	Frequent	6	3.00
4	*Pterocarpus osun*	Frequent	6	3.00
1	*Pycnanthus angolensis*	Occasional	5	2.48
2	*Keayodendron bridelioides*	Occasional	5	2.48
3	*Guarea cedrata*	Occasional	5	2.48
4	*Chrysophillum albidum*	Occasional	4	2.00
1	*Bosqueia angolensis*	Rare	3	1.49
2	*Triplochiton scleroxylon*	Rare	3	1.49
3	*Terminalia superba*	Rare	2	1.00
4	*Rhodognapha lonbrevicuspe*	Rare	2	1.00
1	*Crudia klainei*	Threatened	1	0.50
2	*Piptadeniastrum africana*	Threatened	1	0.50
3	*Afzelia africana*	Threatened	1	0.495
4	*Zanthoxylum leprieurii*	Threatened	1	0.495
5	*Sterculia rhinopetala*	Threatened	1	0.495
6	*Albizia ferruginea*	Threatened	1	0.495
7	*Pachyelasmatess mannii*	Threatened	1	0.495
8	*Celtis zenkeri*	Threatened	1	0.495
9	*Hevea brasiliensis*	Threatened	1	0.495

Basal Area of Merchantable Tree Species

From the 367 trees identified, 202 trees belonging to 28 species had Dbh of 20cm and above. Sevenof the 202 trees which constitute 3.46% had their Dbh between 20- 40cm while 195 (96.54%) were of Dbh greater than 40cm (Table 5). Seven tree species could be regarded as small diameter trees and 195 tree species with Dbh greater than 40cm could be regarded as big trees which could be converted for timber use (Adekunle*et al.*, 2013).

The mean basal area (m^2) per tree and species basal area (m^2) are as presented in Table 6. The mean Dbh for species ranges from 20cm to 140cm with *Zanthoxylum leprieurii* and *Sterculia rhinopetala* having the least Dbh of 20cm each while *Piptadeniastrum Africana* had the highest Dbhof 140cm. *Zanthoxylum leprieurii* and *Sterculiar hinopetala* which had the least Dbh also had the least species basal area of $0.03m^2$ each since they had one tree each. *Piptadeniastrum africana* which had the highest Dbh of 140cm had the least species basal area of $1.54m^2$since it also had one tree species. *Cleistopholis patens* had the highest number

of individual trees (50) with mean Dbh of 89.3cm per treeand species basal area of 31.32m^2.The total basal area for the 202 individual trees was 123.53m^2. This result showed that *Cleistopholis patens* was the most abundant merchantable tree species in the study area

These 28 tree species enumerated are timber of high economic value with various end uses as detailed in Table 7. Apart from their end use as timber, they are also used for medicinal purposes, foods such as fruits, nuts and vegetables as well as animal forage, gum and latex. The end use value of the 28 species stated in Table 7 followed Burkill (1985) and Beak (1999). The species ranged from low grade such as *Ceiba pentandra* to high grade such as *Milicia excels*a. *Cleistopholis patens* which was the most abundant merchantable tree species was graded as medium grade while its end use values include canoe building, musical instruments and general fitting.

Table 5: Tree Species according to diameter

Diameter Class (cm)	Frequency of Trees (n = 202)	Percentage (%)
20 – 40	07	3.46
41 - 60	43	21.29
61 - 80	31	15.35
80 - 100	69	34.16
> 100	52	25.74

Table 6: Basal Area of merchantable tree species in descending order

S/N	Scientific Name	Individual trees	Mean Dbh(cm) per tree	Mean Basal Area (m^2)	Species Basal Area (m^2)
1	*Cleistopholis patens*	50	89.30	0.63	31.32
2	*Ricinodendron heudolotii*	12	110.00	0.95	11.40
3	*Ceiba pentandra*	9	117.80	1.09	9.81
4	*Albizia zygia*	39	54.00	0.23	8.92
5	*Tetrapleura tetraptera*	7	127.10	1.27	8.89
6	*Pterygota macrocarpa*	10	96.00	0.72	7.24
7	*Pentadesma butyracea*	7	110.00	0.95	6.65
8	*Milicia excelsa*	6	106.70	0.89	5.36
9	*Guarea cedrata*	5	115.00	1.04	5.19
10	*Pterocarpus osun*	6	98.30	0.76	4.56
11	*Entandrophragma angolense*	10	72.00	0.41	4.07
12	*Uapaca staudtii*	8	76.30	0.46	3.65
13	*Termilia superba*	2	127.50	1.28	2.55

14	*Pycnanthus angolensis*	5	78.00	0.48	2.39
15	*Triplochiton scleroxylon*	3	93.30	0.68	2.05
16	*Piptadeniastrum africanum*	1	140.00	1.54	1.54
17	*Keayodendron bridelioides*	5	62.00	0.30	1.51
18	*Celtis zenkeri*	1	130.00	1.33	1.33
19	*Hevea brasiliensis*	1	130.00	1.33	1.33
20	*Crudia klainei*	1	120.00	1.13	1.13
21	*Bosqueia angolensis*	3	58.30	0.27	0.80
22	*Rhodognapha lonbrevicuspe*	2	67.00	0.35	0.71
23	*Chrysophyllum albidum*	4	35.00	0.10	0.38
24	*Albiza ferruginea*	1	65.00	0.33	0.33
25	*Afzelia africana*	1	60.00	0.28	0.28
26	*Pachyelasmatess mannii*	1	30.00	0.07	0.07
27	*Zanthoxylum leprieurii*	1	20.00	0.03	0.03
28	*Sterculia rhinopetala*	1	20.00	0.03	0.03
	Total	**202**			**123.53**

Table 7: Tree Species and their end uses as timber

S/N	**Scientific Name**	End uses as timber
1.	*Afzelia africana****	Carving, building construction and flooring
2.	*Albizia ferruginea***	Ornamental fittings
3.	*Albizia zygia***	Ornamental fittings,charcoal and paper production.
4.	*Bosqueia angolensis***	Joinery and form work
5.	*Ceiba pentandra**	Coarse packing cases and form work where strength and durability are not essential
6.	*Celtis zenkeri***	Axe handles and roofing
7.	*Chrysophyllum albidum***	Joinery work,carving and musical instruments
8.	*Cleistopholis patens***	Canoe building, musical instruments and general fitting
9.	*Crudia klainei**	Match making
10.	*Entandrophragma angolense***	Furniture, joinery work, boat building, carving and flooring
11.	*Guarea cedrata****	High class furniture construction and decoration work
12.	*Hevea brasiliensis***	Joinery work, wall panelling, picture frames
13.	*Keayodendron bridelioides**	Joinery work
14.	*Milicia excelsa****	Building construction (roofing doors, window frames, staircases, flooring) and furniture.
15.	*Pachyelasmatess mannii**	Plywood cores and match making
16.	*Pentadesma butyracea***	Furniture and joinery work
17.	*Piptadeniastrum africana****	Joinery and construction work where strength and durability are essential
18.	*Pterocarpus osun***	Drums and walking stick
19.	*Pterygota macrocarpa***	Frame houses, glued-laminated timber and Interior fittings
20.	*Pycnanthus angolensis***	Furniture, joinery and interior work
21.	*Rhodognapha lonbrevicuspe**	Packing cases, sliced veneer and form work
22.	*Recinodendron heudolotii***	Furniture and joinery work
23.	*Sterculia rhinopetala**	Form work

24.	*Terminalia superba***	Rotary/sliced veneer and form work
25.	*Tetrapleura tetraptera**	Pestles, tool handles and carvings.
26.	*Triplochiton scleroxylon**	Match making, interior fittings and veneer
27.	*Uapaca staudtii**	Form work
28.	*Zanthoxylum leprieurii***	Beehives, chewing sticks

Source: Burkill (1985); Beak Consultants Ltd (1999)

Key: *** = High grade species, ** = Medium grade species, * = Low grade species

CONCLUSION AND RECOMMENDATIONS

Since the trees on the forest land would be destroyed for farming activities, the 195 trees found with Dbh that is = 40cm should be harvested to generate income to develop forest plantation for *Tectona grandis* and *Gmelina aborea*. Planting such trees will no doubt reduce the effects of deforestation and climate change. The findings of this study could serve as a baseline information for restoration of indigenous tree species within the forest ecosystem since they survived under special environmental and edaphic conditions. This therefore calls for further research of the forest soil where this study was carried out.

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