



## **Timber Trade Species Analysis in Benue State, Nigeria**

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### **Authors' contributions**

*This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.*

### **Article Information**

DOI: 10.9734/JAERI/2018/35201

#### Editor(s):

(1) Daniele De Wrachien, Department of Agricultural and Environmental Sciences, State University of Milan, Italy.

#### Reviewers:

(1) Souare Konsala, University of Maroua, Cameroon.

(2) Turkay Turkoglu, Mugla Sitki Kocman University, Turkey.

Complete Peer review History: <http://www.sciencedomain.org/review-history/24182>

**Original Research Article**

**Received 26<sup>th</sup> May 2017**  
**Accepted 5<sup>th</sup> August 2017**  
**Published 16<sup>th</sup> April 2018**

### **ABSTRACT**

This study examined the volumes of timber species traded and their market structure in Benue State. Applying a multistage sampling technique at 30% sampling intensity, seven (7) LGAs were sampled from the 23 LGAs of the state for the study. Thus, 164, 79 and 13 respondents from timber traders, chainsaw millers, and sawmillers adding up to 256 respondents were randomly selected and interviewed to elicit data. The highest Gini coefficient values recorded among the three market actors were 0.333936, 0.321828, and 0.28846 for timber traders in Zone A, chainsaw millers in Zone 'B' and sawmillers in Zone 'A' respectively. This indicated a fairly equitable distribution among the timber trade actors. This implies that the timber market is monopolistic competitive in structure in the study area. Twenty-five timber trade species were identified in the study area. The volumes of timber traded monthly by timber traders in zones A, B and C were 2411 m<sup>3</sup>, 37,733 m<sup>3</sup> and 69,492 m<sup>3</sup> respectively, while the volumes traded by chainsaw millers were 8,188 m<sup>3</sup>, 5,804 m<sup>3</sup> and 9,877 m<sup>3</sup>. Similarly, the volumes of timber traded by sawmillers were 8,614 m<sup>3</sup>, 724 m<sup>3</sup>, and 2,593 m<sup>3</sup> respectively in zones A, B and C. Generally, 109,636 m<sup>3</sup> of timber was sold monthly by the traders in Benue State. Out of this volume, 69,492 m<sup>3</sup> representing 63.4% of the total volume of timber sold monthly in Benue State was from zone 'C'. This was followed by 37,733 m<sup>3</sup> (34.4%) and 2,411 m<sup>3</sup> (2.2%) from zones 'B' and 'A' respectively. A monthly volume of

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36,545 m<sup>3</sup> of timber on average was sold by every timber trader in Benue State. On average, 7,289.67 m<sup>3</sup> of timber was traded by a chainsaw miller every month. The highest volume of timber trade was in zone C represented by 9,877 m<sup>3</sup>. This was followed by 6,1888 m<sup>3</sup> and 5,804 m<sup>3</sup> respectively in zones 'A' and 'B'. A total of 21,869 m<sup>3</sup> of timber was traded monthly by the chainsaw millers. A total of 9,835 m<sup>3</sup> of timber was traded by sawmillers in Benue State. Out of this quantity, 4614 m<sup>3</sup> representing 46.9% of the total timber sold in Benue State by sawmillers was from zone 'C'. This was followed by zone B with 2,788 m<sup>3</sup> representing 28.3% of the total volume of timber sold by sawmillers on monthly basis in Benue State. Sawmillers in zone 'A' had the least monthly volume (2,433 m<sup>3</sup>) of timber traded in Benue State. Sustainable management is therefore pertinent for the continuous supply of resources in Benue State.

*Keywords: Timber species; trade volume; timber trade.*

## 1. INTRODUCTION

The changing pattern of wood usage have to be continually studied if Nigeria is to remain relevant in tropical wood supply trade and also meet the challenges of her wood requirements. This is because forest resources of the country are fast diminishing and this constitutes a serious threat to the survival of the wood-based industry [1,2,3,4]. Wood is used for various purposes across the country and it is a fundamental to the socioeconomic development of the country [5,6,7]. However, the unsatisfactory rate of productivity of the natural forest, the increased demand for timber and the increasing human population has rendered our natural forest unreliable in meeting the current and future wood demand [8]. Sawn timber is one of the most important products from the forest which is often processed into various dimensions for efficient end uses. It is produced from both domestic and imported round wood. Sawn-wood has is widely produced and distributed in Nigeria for construction purposes such as building and furniture [9]. For instance, the demand for sawn wood alone is estimated at about 51, 563,000 m<sup>3</sup>, however its supply is projected at 4,217,000 m<sup>3</sup>, thus leaving a deficit of 47.346 m<sup>3</sup> [10]. Past studies by RMRDC, [11]; FDF, [12], FORMCU, [13]; BEAK CONSULTANTS, [14] and Ajewole, [15] all reported that production of sawn wood will continue to increase in the country, even though there are some discrepancies in their projected quantities.

In Nigeria, local sawn wood processing and marketing contributes to livelihood sustainability through cash income and employment in both rural and urban communities. Arowosoge et al. [16] reported that the wooden furniture industry is growing steadily in Nigeria and is solely depends on sawn wood sector for raw materials. Raw Materials and Research, [17] found that sawn wood production from the rich forests of southern

Nigeria serves over 1200 furniture factories apart from the numerous road side furniture makers across the country. The poor management and utilization of these resources has led to high rate of deforestation and forest degradation, which threatens the sustainability of the sector. According to Dykstra et al. [18] the forest sector has unique challenges for example, long gestation period of 50 years for most timber species. This poses a serious of challenge of efficiently harnessing the potentials of the forestry sector for economic development.

Thus, inadequate information on timber marketing presents problems investments for the development of the resource base and the market system. Therefore, information on types of market participants, species and quality of timber volumes, volume of trade which directly affects the viability of timber trade and the forest sector operations are inadequate. This study identifies the common timber species marketed and estimates the volume of trade in the study area.

## 2. METHODOLOGY

The study was carried out in Benue State, located at longitudes 6°35' E and 10°E and latitudes 6° 30' N and 8° 10' N within the guinea savanna area of Nigeria with a total land mass of 30,955 km<sup>2</sup> [19]. The State has twenty-three Local Government Areas (LGAs) with a total population of 4,219,244 persons [20]. Benue State lies in the southern Guinea Savanna. The natural forest types and their distribution show three distinct types namely trees/woodland/shrubs, lowland rain forest and riparian forest. However, the percentage coverage of this natural forest is very small relative to the major land use in Benue state [21].

The study population comprised timber traders, chainsaw operators and saw millers in Benue

State. Applying a 30% sampling intensity, seven (7) Local Government Areas (LGAs) out of 23 were sampled for the study. Thus two LGAs in zone A, two in B and three in zone C were purposively sampled based on the concentration of timber markets and trading activities. These LGA's were Konshisha and Kwande in Zone A., Makurdi and Gboko in Zone B, Otukpo, Okpokwu and Oju in Zone C. From these LGAs, respondents from the sub population; timber traders, chainsaw millers and saw millers were sampled for data collection. Thus, timber traders and Chainsaw millers were sampled using 30% sampling intensity, while complete enumeration was applied to collect data from Saw millers that were available in few numbers in the study area. Multistage sampling technique was applied to determine the study sample.

Out of the data collected from 164 sampled respondents of timber traders and 79 for chainsaw operators, only data from 160 and 73 respondents respectively from timber traders and chainsaw operators were used for analysis and subsequent discussion. This was due to incomplete information supply and limited responses to some vital qualitative and quantitative questions from some respondents. The 13 questionnaires for sawmillers were all utilized. Thus the utilized sets of questionnaires comprise respondents of timber trading (160), chainsaw operators (73) and sawmillers (13) respectively.

Data were collected using semi-structured questionnaire, personal observations and Focus Group Discussions. Three sets of semi-structured questionnaire were designed and administered on timber traders, chainsaw millers and saw millers from the sampled LGAs.

### 2.1 Analytical Techniques

The volume of timber marketed in the study area was measured in cubic meters. The mean monthly volumes timber were computed using 4' x 12' x 12' dimension; equivalent to 0.1016 m x 0.3048 m x 3.6756 m which equals 0.1138 m<sup>3</sup> in cubic metres (m<sup>3</sup>). A similar approach was adopted by Larinde and Popoola [22] in measuring technical efficiency of three Selected Tropical Hardwood Species processed into Furniture Parts and Components in determining output. The Gini-coefficient was used to examine the market concentration of timber dealers, that is, the measurement of the level of seller concentration in the market in order to determine the degree of competition or monopoly in the

market. Okereke and Anthonio [23], Bila and Bulama [24] used Gini coefficient to determine the degree of market concentration of sellers of grains markets in Eastern Nigeria and Maiduguri Cattle Market respectively by using the formula:

$$G = 1 - \sum x \cdot Y \quad (1)$$

Where,

- G = Gini – coefficient
- X = Percentage of sellers per period of study
- Y = Cumulative percentage of total sales (revenue)

The G has a value ranging from 0 to 1 expressing the extent to which the market is concentrated. When G is equal to zero (0), there is perfect equality in the size of the distribution of sellers however, when G is equal to one (1), there is perfect monopoly in the market.

### 3. RESULTS

Market concentration in market structure is concerned with the organizational characteristics of a market which influence the nature of competition and pricing within the market. UNDP [25] reported that Gini-coefficient with high inequality typically lie between 0.5 and 0.7. This suggests that timber traders saw miller and chainsaw operators were not able to control large shares of wood supply or sales in the study area. As such none could influence supplies by increasing or decreasing the quantity supplied. Each of the participant's output was an insignificant part of the volume of trade in the market such that it could not affect market price.

Table 1 shows the result of Gini-coefficient of inequality of the timber market in Benue State. The value of Gini-coefficient was 0.16991 or 16.99% in Zone A, 0.33936 or 33.93% in Zone B and 0.19169 or 19.16% in Zone C for timber traders implying a fairly equitable distribution. Similarly, chainsaw millers the Gini- coefficient values were 0.18912 or 18.91% for Zone A, 0.321828 or 32.185 for Zone B and 0.18289 or 18.28% for Zone C. While for sawmillers, the Gini- coefficient recorded values of 0.28846 or 28.84% for Zone A and 0.21953 or 21.95% for Zone C.

The mean monthly volume of trade by timber traders is presented in Table 2. The largest

volume (69,492 m<sup>3</sup>) of timber traded was recorded in Zone C, followed by 37,733 m<sup>3</sup> in Zone B and 2411 m<sup>3</sup> in Zone A. The numbers of tree species found in these zones were different. While only 8 and 9 tree species were marketed in Zones 'A' and 'C' respectively and 18 species were marketed in Zone 'B'. Generally, 109,636 m<sup>3</sup> of timber was sold monthly by the traders in

Benue State. Out of this volume, 69,492 m<sup>3</sup> (63.4%) of the total volume of timber sold monthly in Benue State was from zone 'C'. This was followed by 37,733 m<sup>3</sup> (34.4%) and 2,411 m<sup>3</sup> (2.2%) from zones 'B' and 'A' respectively. A monthly average volume of 36,545 m<sup>3</sup> of timber was sold by every timber trader in Benue State.

**Table 1. Gini coefficient values of timber marketers in Benue State**

Type of marker	Gini coefficient value	Standard error (STE)	Lower bound Gini coefficient	Upper bound Gini coefficient	Confidence level
<b>Timber traders</b>					
Zone A	0.16991645	0.05978144	0.05274698	0.28708592	95.00000000
Zone B	0.33936049	0.21572661	-0.08345589	0.76217688	95.00000000
Zone C	0.19169795	0.19494520	-0.19038762	0.57378351	95.00000000
<b>Chainsaw millers</b>					
Zone A	0.18912742	0.05081262	0.08953651	0.57378351	95.00000000
Zone B	0.32184737	0.14255092	0.04245269	0.60124204	95.00000000
Zone C	0.18289433	0.05110957	0.08272141	0.28306724	95.00000000
<b>Sawmillers</b>					
Zone A	0.28846274	0.12818475	0.03722524	0.53970024	95.00000000
Zone C	0.21953727	0.11269667	-0.00134414	0.44041867	95.00000000

Source: Computed from Field Data

**Table 2. Mean monthly volume of timber marketed by timber dealers in Benue State, Nigeria**

	Botanical name	Zone A mean volume (m <sup>3</sup> )	Zone B mean volume (m <sup>3</sup> )	Zone C mean volume (m <sup>3</sup> )	Total mean volume	Mean across the zones
1.	<i>Daniellia oliveri</i>	764 (31.69)	9,983 (24.46)	13,207(19.01)	23,954	7984.67
2.	<i>Gmelina arborea</i>	593 (24.6)	5,115 (13.56)	16,521(23.78)	22,229	7409.67
3.	<i>Khaya grandifoliola</i>	716 (29.7)	7,176 (19.02)	12,015(17.29)	19,907	6635.67
4..	<i>Pterocarpus erinaceus</i>	17 (0.71)	2,605 (6.90)	14,685(21.13)	17307	5769.00
5.	<i>Tectona grandis</i>	94 (3.9)	1,444 (3.83)	6,682(9.62)	8220	2740.00
6.	<i>Parkia biglobosa</i>	54 (2.29)	692 (1.83)	4,517(6.5)	5263	1754.33
7.	<i>Anogeissus leiocarpus</i>	0	3,962 (10.5)	32(0.05)	3994	1331.33
8.	<i>Triplochiton scleroxylon</i>	0	1,955 (5.18)	0	1955	651.67
9.	<i>Milicia excels</i>	130 (5.39)	1,166(3.09)	572	1868	622.67
10.	<i>Ceiba patandra</i>	43 (1.78)	1,095 (2.90)	0	1138	379.33
11.	<i>Sterculia tragacantha</i>	0	719 (1.91)	0	719	239.67
12.	<i>Mansonia altissima</i>	0	543 (1.44)	0	543	181.00
13.	<i>Terminalia ivorensis</i>	0	426 (1.13)	0	426	142
14.	<i>Terminalia superba</i>	0	354 (0.94)	0	354	118
15.	<i>Berlinia grandiflora</i>	0	274 (0.73)	0	274	91.33
16.	<i>Isoberlinia doka</i>	0	31 (0.09)	228(0.33)	259	86.33
17.	<i>Azelia Africana</i>	0	176(0.47)	0	176	58.67
18.	<i>Mangifera indica</i>	0	17(0.05)	0	17	5.67
	<b>Total</b>	<b>2,411(100)</b>	<b>37,733(100)</b>	<b>69,492(100)</b>	<b>109,636</b>	<b>36,545.30</b>

Source: Field Survey, 2013

Values in Bracket are percentages in columns

Table 3 presents the mean monthly volume of timber trade by chainsaw millers in Benue State. The highest mean volume (9,877 m<sup>3</sup>) of timber traded was recorded in Zone C; this was followed by 6,188 m<sup>3</sup> and 5,804 m<sup>3</sup> in Zones 'A' and Zone 'B' respectively. As is the case with timbered dealers, different numbers of tree species were found among chainsaw millers across the study area. For instance, while only 9 and 11 tree species respectively were marketed in Zones 'B' and 'C', 18 species were marketed in Zone 'A'. On average 7,289.67 m<sup>3</sup> of timber was traded monthly by a timber dealer. The highest volume of timber trade was in zone C represented by 9,877 m<sup>3</sup>. This was followed by 6,188 m<sup>3</sup> and 5,804 m<sup>3</sup> respectively in zones 'A' and 'B'. Chainsaw millers traded 21,869 m<sup>3</sup> of timber monthly.

Table 4 presents the mean monthly volume of timber species traded by sawmillers in the three geopolitical zones of Benue State. The highest volume of timber traded was recorded in Zone C (4,614 m<sup>3</sup>), followed by Zone B (2,788 m<sup>3</sup>) and 2,433 m<sup>3</sup> in Zone 'A'. While only 5 and 6 tree species were marketed in Zones 'A' and 'C'

respectively, 9 species were marketed in Zone 'B'. Generally, a total of 9,835 m<sup>3</sup> of wood was traded by sawmillers in Benue State. Out of this quantity, 4,614 m<sup>3</sup> (46.9%) out of the total wood sold in Benue State by sawmillers was from zone 'C' a derived savannah region. This was followed by 2,788 m<sup>3</sup> of timber from zone 'B' representing 28.3% of the total volume of timber sold on monthly basis in Benue State. Sawmillers in zone 'A' had the least monthly volume, 2,433 m<sup>3</sup> of timber traded in Benue State.

#### 4. DISCUSSION

##### 4.1 Common Timber Trade Species in Benue State

Twenty-five (25) timber species were identified as the common timber species marketed in Benue State as shown in Tables 1, 2 and 3. This list of species is similar to the earlier findings by Popoola [26] and Idoko [27]. Kalu and Ani [28], Okunomo [29], Arowosoge et al. [30] and Tukur et al. [31] have shown that because of the reliable qualities of the above species;

**Table 3. Mean monthly volume of timber traded by chainsaw millers in Benue State Nigeria**

Botanical name	Zone A mean volume (m <sup>3</sup> )	Zone B mean volume (m <sup>3</sup> )	Zone C mean volume (m <sup>3</sup> )	Total volume	Mean of means across the zones
1. <i>Milicia excelsa</i>	62 (1.00)	144 (2.48)	6,657(67.4)	6,863	2287.67
2. <i>Gmelina aborea</i>	1,308 (21.14)	1,859 (32.03)	615(6.23)	3,782	1260.67
3. <i>Daniellia oliveri</i>	947(15.3)	1,243 (21.41)	1,386(14.03)	3,576	1192.00
4. <i>Pterocarpus erinaceus</i>	436 (7.05)	352 (6.06)	671(6.79)	1,459	486.33
5. <i>Tectona grandis</i>	353 (5.7)	869(14.97)	96(0.97)	1,318	439.33
6. <i>Lennea bateri</i>	1,298 (20.9)	0	0	1,298	432.67
7. <i>Parkia biglobosa</i>	85(1.37)	724(12.47)	12(0.12)	821	273.67
8. <i>Syzygium guineese</i>	466(7.53)	0	0	466	155.33
9. <i>Khaya gradifoliola</i>	313(5.06)	138(2.38)	14(0.14)	465	155.00
10. <i>Dichrostachys cinerea</i>	0	394(6.79)	0	394	131.33
11. <i>Bombax constatum</i>	370(5.98)	0	0	370	123.33
12. <i>Anthocliasta djalensis</i>	278(4.64)	0	0	278	92.67
13. <i>Ceiba patandra</i>	40(0.65)	0	235(2.38)	275	91.67
14. <i>Vitex doniana</i>	28(0.45)	0	152(1.52)	180	60.00
15. <i>Anogeissus leiocarpa</i>	48(0.78)	81(1.4)	5(0.05)	134	44.67
16. <i>Tripolchiton sclerexylen</i>	85(1.37)	0	0	85	28.33
17. <i>Erythrophloem suaveolens</i>	0	0	34(0.34)	34	11.33
18. <i>Belinia gradiflora</i>	30(0.48)	0	0	30	10.00
19. <i>Terminalia ivorensis</i>	27(0.44)	0	0	27	9.00
20. <i>Azalia africana</i>	14(0.23)	0	0	14	4.67
<b>Total</b>	<b>6,188(100)</b>	<b>5,804(100)</b>	<b>9,877(100)</b>	<b>21, 869</b>	<b>7,289.67</b>

Source: Field Survey, 2013

Values in Bracket are percentages in columns

**Table 4. Mean monthly volume of timber species marketed by Sawmillers in Benue, Nigeria**

	<b>Botanical name</b>	<b>Zone A mean volume (m<sup>3</sup>)</b>	<b>Zone B mean volume (m<sup>3</sup>)</b>	<b>Zone C mean volume (m<sup>3</sup>)</b>	<b>Total Volume</b>	<b>Mean of means across the zones</b>
1.	<i>Daniellia oliveri</i>	1,774(72.91)	364(13.06)	1,240(26.87)	3,378	1126.00
2.	<i>Khaya grandifoliola</i>	226(9.29)	254(9.11)	1710(37.1)	2190	730.00
3.	<i>Gmelina arborea</i>	60(2.47)	411(14.74)	475(12.29)	946	315.33
4.	<i>Parkia biglobosa</i>	225(9.24)	450(16.14)	0	675	225.00
5.	<i>Milicia excels</i>	0	0	625(13.5)	625	208.33
6.	<i>Bombax costatum</i>	0	364(13.06)	0	364	121.33
7.	<i>Pterocarpus erinaceus</i>	0	0	320(6.94)	320	106.67
8.	<i>Azelia Africana</i>	0	320(11.48)	0	320	106.67
9.	<i>Anogesius leiocarpus</i>	0	294(10.55)	0	294	98.00
10.	<i>Erythrophloem suaveolens</i>	0	0	244(5.29)	244	81.33
11.	<i>Ceiba patandra</i>	0	175(6.28)	0	175	58.33
12.	<i>Vitex doniana</i>	0	156(5.6)	0	156	52.00
13.	<i>Tectona grandis</i>	148(6.08)	0	0	148	49.33
<b>Total</b>		<b>2433 (100)</b>	<b>2788(100)</b>	<b>4614(100)</b>	<b>9835</b>	<b>3278.33</b>

Source: Field Source, 2013

Values in Bracket are percentages in columns

particularly for strength, availability, resistance to attack by insects and affordable prices, they were very useful and significant in construction and furniture works. The presence of species like *Mansonia altissima* (an exotic species) *Tryplochiton scleroxylon* and *Milicia excelsa* in Benue State, a predominantly savannah land could be explained by the distributive function of trade. The species may have been brought into the State through inter-state trade in timber.

#### 4.2 Market Structure of Timber Trade in Benue State

The overall structure of timber market indicates that there are many small-scale dealers such that none could control the market. This type of market structure is competitive, because the individual dealers have little influence on the market price. Tee [32] and Enete [33] made similar observations with *Borassus aethiopum* in North-Eastern Nigeria and charcoal in Abia State Nigeria respectively. The Gini coefficient of timber traders, chainsaw millers in zone B also revealed that none had significant control since both market actors had their Gini coefficient value within the same range. In the same manner the result of the analysis showed that among the timber traders, chainsaw millers and sawmillers in zone C, none of the market actors also had control of the market except that the value of sawmillers had a relatively higher value. This implies that timber market is monopolistic

competitive in structure in the study area. This shows that none of the timber market actors controlled significant proportion of the timber trade. The distribution in all the zones for timber dealers shows a fairly equitable distribution

#### 4.3 Volume of Timber Trade in Benue State

Variations were observed in the volume of timber traded across the three geopolitical zones in Benue State. These observed variations were attributable to species availability and settlement pattern. For instance, the higher number of timber species marketed in Zone B were because of the Urban nature of the sampled LGAs, high population density and large market for timber products coupled with higher incomes of the urban dwellers in these zones. The ostensible trade in species regarded as Non-timber tree species was due to the scarcity of the timber species and growing demand for timber for construction works and others services.

The larger volume of *Daniellia oliveri* marketed in Benue State was partly due to its relative abundance from the forests in Benue State and partly due to extensive demand for its wood in the construction industry. The relatively larger volume marketed of species like *Gmelina arborea*, *Khaya grandifoliola*, *Pterocarpus erinaceus* and *Tectona grandis* among others was due primarily to demand for their wood.

These species possess preferred qualities like strength needed for construction works in Benue State. They were mainly imported into Benue State from neighbouring states. Ogunwusi, [34] noted that in nearly all ecological zones, the wood species mostly found in the timber market are those widely available within the forest zones. He also stated that *Irvingia gabonensis* wood is very popular in the planks markets in the south east and south west zones while *Prosopis africana* and *Detarium senegalense* are now very prominent in markets in the Northern parts of the country. According to the classification of timber species by Arowosage [35], the following are commonly used species; *Khaya grandifoliola*, *Azela africana*, *Mansonia altissima*, *Ceiba patandra*, *Milicia excelsa*, *Tectona grandis*, *Anogeissus leiocarpa*, *Isobertinia doka*, *Terminalia ivorensis*, *Terminalia ivorensis*, *Ceiba patandra*, *Tripolochiton scleroxylon* are used for end uses as building construction and flooring, furniture construction and decoration, veneer and house fitting, roofing, doors, window frames, stair cases, boat building, coarse packing and form work.

The timber species and volumes traded have serious implication on the sustainable supply of timber resources in Benue State especially in the long run. This is because the market demand far outstriped the supply. Agbeja and Opii [36] reported that the plantation establishment target of 400 ha per year of stands from 1999 to 2003 was a far cry from reality as only 335.5 ha of *T. grandis*, *G. arborea*, *E. guineensis*, *A. occidentale*, and *K. grandifoliola* were planted in the span of five years. They further stated that the demand and supply of wood in Benue State shows a deficit in supply; and this portend a danger especially for sawnwood and veneers for industrial development of the state. The consequence of such deficit will be increased pressure on the existing forests.

## 5. CONCLUSION

Species marketed and their monthly volumes gives information on timber species traded and volumes marketed. Continuous consumption without deliberate replenishment or regeneration can impact negatively on their availability and the timber resource base in the long run. It was apparently observed during the study that, deliberate action and programmes are not in place for replenishing the resource base. The information and statistics on quantities traded therefore serves as a useful tool to foster

planning for sustainable management of timber resources in Benue State.

Deliberate efforts should be made to encourage the marketers in investing in regeneration of forest trees in the state. Basic market information on timber species, trade volumes, demands and supply status should be improved and intensified to make marketing system more efficient.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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