



Assessment of Chainsaw Milling Enterprise in Benue State, Nigeria

L. N. Sambe^{1*}

¹*Department of Social and Environmental and Forestry, University of Agriculture Makurdi, Makurdi, Benue State, Nigeria.*

Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

Article Information

DOI: 10.9734/AJRAF/2019/v4i230058

Editor(s):

- (1) Dr. Nebi Bilir, Professor, Forestry Faculty, Isparta University of Applied Sciences, Turkey.
(2) Dr. Lucia Bortolini, Assistant Professor, Department of Land, Environment, Agriculture and Forestry, University of Padova, Italy.

Reviewers:

- (1) Julia Nelson, Universiti Malaysia Sarawak, Malaysia.
(2) J. Dario Aristizabal-Ochoa, Universidad Nacional de Colombia, Colombia.
(3) Benedito Albuquerque da Silva, Federal University of Mato Grosso, Brasil.
Complete Peer review History: <http://www.sdiarticle3.com/review-history/50941>

Original Research Article

Received 01 July 2019
Accepted 02 September 2019
Published 14 September 2019

ABSTRACT

The paucity of information on chainsaw milling enterprise has contributed to poor planning and development of timber resources in Nigeria. This study has accessed the marketing efficiency and structure with a view of evaluating its potential contribution to the livelihoods and economic development of Benue State. Multistage sampling technique and purposeful sampling technique were applied to determine the study sample which was drawn from the three geopolitical zones in the State; Zone A, Zone B and Zone C. Applying a sampling intensity of 30%, seven (7) Local Government Areas (LGAs) were sampled from the 23 LGAs of the State for the study. Based on this arrangement 79 chainsaw millers were selected and interviewed on the trading activities. Data were collected and analyzed using descriptive statistics such as percentages and frequency distribution. Also gross margin analysis, marketing margin, marketing efficiency, Analysis of variance, T-test Statistics, Index of market concentration (IMC), Rate of return on investment (RORI) and Gross Ratio (GR) were used in the determining the profitability and the efficiency of chainsaw millers trading efficiency in the study area. The study revealed that the trade is male dominated having 100% of the respondents as males. Similarly, the indigenous groups dominated the chainsaw milling and with the Tiv having the majority of (65.8%), this was followed by the Idoma

*Corresponding author: E-mail: leoskalisambe@yahoo.com;

(13.7%), Igede, (12.5%) and Igbo (5.5%), Igala and Sura 1.4% each. The study identified 18 timber species that were marketed in the study area and that 2,411, 37,733, and 69,492 volumes were marketed in zones A, B and C respectively. The result of the gross margin and market efficiency showed that the chainsaw milling activities are profitable and efficient. It revealed the mean monthly gross margin (GM) of 39,688.00, 128,730, and 84,000 with corresponding RORI of 84.19, 43.93, and 1.80 for the chainsaw millers. The Analysis of Variance (ANOVA) of GMs were significant with 0.013. The Total Revenue and Total Variable Cost (TVC) equally showed significance with 0.045, 0.000, 0.000. The IMC, Gini coefficient of 0.1891, 0.3218 and 0.1829, indicated that the concentration was low with income inequality but with a competitive market.

Keywords: Chainsaw milling; marketing efficiency; market concentration.

1. INTRODUCTION

Nigerian forests support a wide range of forest industries, both the formal and informal sub-sectors, which a vast majority of the Nigerian populace depends on for their livelihood (FAO, 2009; Akpabio et al., 2013 [1,2]. According to Fuwape [3] and FAO [4], the sub sector has contributed significantly to the socio-economic development of Nigeria; ranking among the highest revenue and employment generating sectors. Ofoegbu, [5] and Bichi [6] asserts timber resources and timber trade has been a major contributor to the national gross domestic product (GDP) and thus a formidable tool for poverty alleviation. This is evident in the direct and far-reaching influences of the forest to livelihoods as the available forests are continually diminishing in the presence of rising human population and demand; this has unequivocally increased pressure on the forest resource base of the nation [7,8,9,10].

Chain sawmilling in Nigeria is a fully fledged economic informal sector that generates income for a range of participants in the timber trade chain, including rural people, transporters and urban traders [11]. Chainsaw milling is the method used in log conversion into boards after felling at the stump site before evacuation from the forest using the chainsaw machine. According to Popoola [12], chainsaw milling is unauthorized and illegal in Nigeria, but the operators illegally gain access to the forest, fell the trees, convert them to boards of various dimensions and hurriedly hand-carry them to the nearest road for transportation to timber markets.

According to Muthike et al. [13], chainsaw milling is a legal and important subsector of the forest industry that supports rural livelihoods in some countries while in many others, it is associated with illegal forest activities.

In Nigeria, though the system is illegal, it is permitted under some regulations, restricted to domestic use only while in other countries it is only permitted for small-scale commercial production. This operation is common mostly during illegal felling and flitching activities especially in the rainforest zone of Nigeria. According to Sambe [14], chainsaw milling is rampant and dominates the timber trade in Benue State situated the guinea savanna zone. Its activities are often difficult to monitor due to the large number of people involved and the small size and mobility of its operations even when it is authorized [11].

Chainsaw milling operation though illegal has some advantages. The operation requires little investment and the cost of purchase of equipment is very low compared to that of establishing a sawmill. It could be used in conversion of low-quality logs and isolated trees. Aside that this operation is illegal; it is a wasteful practice that produces low quality timber, reduces the revenue accruable to the government, causes a great harm to the environment and loss biodiversity and sustainability of forest resources [15,16].

The operation is very suitable in difficult terrain and areas that are inaccessible in the forest while the use of heavy equipment like tractors, skidders, and the cost of other installations are replaced by cheap and direct labour in the evacuation of sawn boards [17]. Chainsaw milling operations supplies cheap wood to local markets which in turn sells them at cheaper prices. A study by Ogunsanwo et al. [18] revealed that sawn-chain planks are sold at lower prices in local markets compared to those produced from conventional sawmills. This effect could be attributed to the fact that the boards produced from chainsaw milling operations are usually re-processed by consumers before they could be used effectively in production. In most

states of Nigeria, chainsaw milling has been identified as an illegal enterprise, however in Benue State its use is permitted under certain restrictions or regulations when they are adhered to.

Legislations that disapprove the activities of chainsaw milling operators are already being compromised and standards have been lowered. Several factors that resulted in this development were identified by Popoola [12] as:

- Depletion of timber resources that made investments in establishment of formal sawmills unattractive.
- Rising transportation cost of logs to the sawmill
- Huge capital requirement for the establishment of formal sawmills have increased by 1,000 – 5,000% since 1985;
- Unreliable power supply from the national grid and ever-increasing cost of diesel and petrol;
- Increasing fees and charges paid by timber contractors and formal sawmilling operators without commensurate returns; and corruption among forestry officials.

He posited that as result of these factors, many sawmills in Nigeria have resorted to the use of chainsaws to the extent that they now seek to be recognized by their respective State Forestry Departments. He also noted that while many are seeking to legalize the operation of chainsaw milling in Nigeria, another West African country like Ghana have placed a ban on it since 1998.

The income from chainsaw operations represents a substantial proportion of household income which in some cases is much higher than income from alternative work. This corroborates report by Popoola [12] in a study on chainsaw milling in Benue State that though chainsaw milling is illegal in the state, it provides employment for both families and hired labor, thereby improving household and social well-being. He noted that, the wages earned compare favorably with those of the average skilled worker and are far higher than the less than US\$1 on which more than 60% of Nigerians subsist. According to Ten Brink et al. [19], a healthy forestry sector can lead to the attainment of long-term socio-economic development that can promote social equity, poverty eradication, and human well-being of the people.

Studies on chainsaw milling activities are therefore invaluable and expedient in providing

information relevant in repositioning the sector and addressing the challenges that chainsaw milling pose to sustainable development of the forestry sector of the economy. Thus, developing the forestry sector requires market information on the performance of marketing activities of this industry. Hence the lack of regular market information and data on the local, national and international markets is responsible for inefficient market system of timber trade in Nigeria and Benue State in particular. Therefore, this impedes the drawing up of plans for sustainable forest management and development. According to FGN, [20] inadequate data base remains a major constraint to forest policy formulation, project planning and implementation of forestry development program.

Thus, information on income, market concentration, species and volumes marketed can serve as a springboard for addressing inefficiencies in the marketing system and hence stimulate policy measures for repositioning trade of timber in the state. It will also encourage and trigger investment in the development of the sector and stimulate policy response for the sustainable management of forest resources. These considerations therefore justify the need for this study.

2. METHODOLOGY

2.1 The Study Area

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 area of 30,955 km² [21]. The State has twenty-three local government areas (LGAs) with a total population of 4,219,244 as against 2,780,398 in 1991 [22].

Benue State has a tropical sub-humid climate, with two distinct seasons, namely the wet and dry seasons. The wet season lasts for seven months; from April to October while the dry season lasts from November to March. The annual rainfall total ranges from 200 to 2,000 mm. Temperatures are generally very high during the day, particularly in March and April. Along the river valleys, these high temperatures plus high relative humidity produce clement and debilitating weather conditions. 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 [23].

Dense forests are few and far apart, except in a few local government areas such as Vandeikya, Kwande, and Okpokwu [24]. In these forests, typical rainforest trees such as *Khaya grandifoliola* (mahogany), *Terminalia superba*, (Afara) *Milicia excelsa* (Iroko), *Triplochiton scleroxylon* (Obeche), etc. occur and are used for timber. Other economic trees in these forests include *Dacryodes edulis* (African pear), *Irvingia gabonensis* (bush mango or ogbono), bamboo, raffia palm, *Elaeis guineensis* (oil palm), orange, and *Cocos nucifera* (coconut) [25].

The study population comprised chainsaw operators in Benue State. Multistage sampling technique, purposive sampling and complete enumeration were applied to determine the study sample drawn from the three geopolitical zones in the state; Zone 'A', Zone 'B' and Zone 'C'. Applying a sampling intensity of 30%, seven (7) LGAs were sampled from the 23 LGAs of the state for the study. Thus two (2) LGAs in zone A, two (2) in B and three (3) 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 population; chainsaw millers and were sampled for data collection. Thus, Chainsaw millers were selected using 30% sampling intensity in these locations. Based on this arrangement 79 chainsaw millers were selected and interviewed on the trading activities.

2.2 Data Collection Techniques

Data were collected from two sources: The primary and secondary sources. The primary sources included questionnaires, personal observations and focus group discussions. A semi-structured questionnaire was designed and administered on chainsaw millers from the sampled LGAs namely Kwande, Konshisha, Gboko, Makurdi, Otukpo, Okpokwu and Oju to elicit relevant information for the study. Thus, the chainsaw millers were interviewed for the required information.

2.2.1 Analytical techniques

Combinations of statistical and budgetary tools were used to analyze the data. The descriptive

statistics: mean, percentage, tables, frequency distribution, and standard deviation were used. Marketing Efficiency, Rate of Return on Investment (RORI), Gross Ratio, Gross Margin Analysis, Gini coefficient and Lorenze curve and T-test and Analysis of Variance (ANOVA) and were used.

2.2.1.1 Determination of marketing efficiency

Marketing efficiency refers to maximization of the ratio of output in marketing. This study adopted Olukosi and Isitor [26] technique in marketing efficiency. This is represented by equation 1 as:

$$\text{Marketing Efficiency} = \frac{\text{Total Revenue}}{\text{Cost of Marketing}} \times 100\% \quad (1)$$

Total Revenue = Gross income

Cost of Marketing = Total Variable Costs.

2.2.1.2 Gross margin

Gross margin is defined as the difference between Gross Income (GI) and Total Variable costs (TVC). According to Tee (2007), the model is as follows.

$$GM = GI - TVC \quad (2)$$

where

GM = Gross Margin; GI = Gross Income, an equivalent of Total revenue;

TVC = Total Variable Costs (Transportation, Tariffs, Association levies, permits, tax, loading/offloading etc.).

2.2.1.3 Gross ratio (GR)

This is the total expenses divided by the gross income (GI), given as:

$$GR = GC/GI \text{ or } TVC/GI \quad (3)$$

The ratio shows the percentage or proportion of total physical cost that constitutes the gross income. A less than 1 ratio is desirable for any production business. The lower the ratio the higher the return per Naira invested. The gross cost and gross income values calculated above are applied in this equation for the determination of gross ratio.

2.2.1.4 Rate of return on investment (RORI)

The Rate of Return on Investment (RORI) depicts the level of profitability of an investment and is an important criterion in determining the

choice of investment. According to McCarthy (27), Arene (28) and Alao and Kuje (29), it is given by the following relationship:

$$RORI = \frac{TR - TC}{TC} \times \frac{100}{1} \quad (4)$$

Where

TR= Total revenue, an equivalent of Gross income (GI)

TC= Total cost, an equivalent of Gross cost (GC).

Thus, Eq. (4) becomes:

$$RORI = \frac{GI - GC}{GC} \times \frac{100}{1} \quad (5)$$

2.2.1.5 Estimation Procedure for Market Concentration

Gini coefficient and Lorenz curve: The Gini-coefficient along with Lorenz curve was used to examine the market concentration of chainsaw millers that is, the measurement of the level of their concentration in the market in order to determine the degree of competition or monopoly in the market. Okereke and Anthonio [30], Bila and Bulama [31] 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:

$$G = 1 - \sum X Y \quad (6)$$

Where:

G = Gini – coefficient;

X = Percentage of sellers per period of study; and

Y = Cumulative percentage of total sales (revenue)

G varies from 0 to 1 expressing the extent to which the market is concentrated. When G is equal to zero, 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.

The Lorenz curve shows the level of concentration in the market. The value of the

coefficient is the same as the ratio of the area between the Lorenz curve and the 45° line to the total area above or below the line. When there is perfect equality in the size of distribution of sellers in the market, the curve coincides with the 45° line. The farther away the curve is from the 45° line, the greater the level of concentration in the market.

A perfect equality in concentration (low) of sellers is expected if G.C tends towards zero, while perfect inequality in concentration (high) of sellers is expected if G.C tends towards one. If G.C= 1, market is imperfect and if G.C= 0, market is perfect and competitive. Lorenz Curve was used to give a visualized nature of the sellers' concentration in the markets through a graphical representation. The graph of cumulative percentage of total sales is plotted against the cumulative percentage of the sellers. It is used in economics to describe inequality in income or wealth (Damagaard and Weiner, 2000). If all individuals are the same size, the Lorenz Curve is a straight diagonal line (45°), called the line of equality, if there is any inequality in size then the Lorenz Curve falls below the line of equality (45°).

3. RESULTS AND DISCUSSION

3.1 Socio-economic Characteristics of Respondents in Benue State

The result on socio-economic characteristics of respondents is presented in Table 1. The socio-economic variables studied were age, marital status, gender, educational status as well as ethnic group and work experience.

The age distribution of respondents showed that 80.8 % fell within the age bracket of ≤ 30 to 40 years, and the remaining 19.2 % were between 41 years and above. Based on gender, 100% of chainsaw millers were males.

Educational status distribution of the respondents shows that the highest proportion (72.6%) of chainsaw millers had secondary education followed by those with primary education (20.5%), tertiary education (6.9%) while 5.5% had no formal education. In terms of ethnic composition distribution, a higher proportion (65.8%) of the chainsaw millers were Tiv, 3.7% were Idoma, 12.3% Igede, 5.5% Igbo while Igala and Sura, constituted 1.4% each. The distribution based on years of experience showed that chainsaw millers, a greater proportion of

respondents of 69.8% had ≤ 5 to 10 years while 30.1% had more than 10 years of experience.

3.2 Mean Monthly Volume of Trade by Chainsaw millers in the Three Geopolitical Zones of Benue State

Table 2 presents the mean monthly volume of timber trade by chainsaw millers in Benue State. The highest mean volume (9,877m³) of timber traded was recorded in Zone C, this was followed by 6,188m³ in Zone A and 5,804 m³ in Zone B. Different numbers of tree species were found

among chainsaw millers across the study area. For instance while only 9 and 11 tree species were marketed in Zones 'B' and 'C' respectively, 18 species were marketed in Zone 'A'. Of the species marketed a greater volume of 6,657m³ from *Milicia excelsa* was traded in Zone 'C', followed by *Gmelina arborea* (1,859m³) in Zone 'B', *Daniellia olliveri* in Zone 'C' (1,386m³), *Gmelina arborea* (1,308m³) and *Lennea bateri* (1,298 m³) in Zone 'A', *Daniellia olliveri* (1,243m³) in Zone 'B', in that order. The least volume of timber species marketed was *Anogeissus leiocarpa* with 5m³ in Zone C.

Table 1. Socio economic characteristics of respondents in the study area

Variable/Category	Chainsaw operators	
	Frequency	Percentage
Age (Years)		
≤ 30	27	37.0
31 – 40	32	43.8
41 - 50	12	16.5
≥51years	2	2.7
Total	73	100.0
Marital status		
Married	55	75.3
Single	15	20.5
Widowed	3	4.2
Total	73	100.0
Gender		
Male	73	100.0
Female	0	0.0
Total	73	100.0
Educational status		
No formal Education	4	5.5
Primary	15	20.5
Secondary	53	72.6
Tertiary	5	6.9
Total	73	100.0
Ethnic composition		
Tiv	48	65.8
Idoma	10	13.7
Igede	9	12.3
Igala	1	1.4
Igbo	4	5.5
Sura	1	1.4
Total	73	100.0
Working experience (years)		
≤ 5	22	30.1
6 – 10	29	39.7
11 – 15	16	21.9
≥16	6	8.2
Total	73	100.0

Table 2. Mean monthly volume of timber trade by chainsaw millers across the three geopolitical zones in Benue State

Scientific name	Zone A mean volume (m ³)	Zone B mean volume (m ³)	Zone C mean volume (m ³)	Total volume	Mean of means across the zones
1. <i>Milicia excelsa</i>	62	144	6,657	6,863	2287.67
2. <i>Gmelina aborea</i>	1,308	1,859	615	3,782	1260.67
3. <i>Daniellia oliveri</i>	947	1,243	1,386	3,576	1192.00
4. <i>Pterocarpus erinaceus</i>	436	352	671	1,459	486.33
5. <i>Tectona grandis</i>	353	869	96	1,318	439.33
6. <i>Lennea bateri</i>	1,298	0	0	1,298	432.67
7. <i>Parkia biglobosa</i>	85	724	12	821	273.67
8. <i>Syzygium guineense</i>	466	0	0	466	155.33
9. <i>Khaya gradifoliola</i>	313	138	14	465	155.00
10. <i>Dichrostachys cinerea</i>	0	394	0	394	131.33
11. <i>Bombax constatum</i>	370	0	0	370	123.33
12. <i>Anthocliesta djalensis</i>	278	0	0	278	92.67
13. <i>Ceiba patandra</i>	40	0	235	275	91.67
14. <i>Vitex doniana</i>	28	0	152	180	60.00
15. <i>Anogeissus leiocarpa</i>	48	81	5	134	44.67
16. <i>Tripolchiton sclerexylen</i>	85	0	0	85	28.33
17. <i>Erythrophloeum suaveolens</i>	0	0	34	34	11.33
18. <i>Belinia gradiflora</i>	30	0	0	30	10.00
19. <i>Terminalia ivorensis</i>	27	0	0	27	9.00
20. <i>Afzelia africana</i>	14	0	0	14	4.67
Total	6,188	5,804	9,877	21,869	7,289.67

Table 3. Gross margin analysis of timber trade participants in Benue State

Market location	Mean gross income (₦)	Mean total variable cost (₦)	Mean gross margin (₦)	Rate of return to investment	Gross ratio
	<i>Chainsaw millers</i>	<i>Chainsaw millers</i>	<i>Chainsaw millers</i>	<i>Chainsaw millers</i>	<i>Chainsaw millers</i>
Zone A	86,828.00	47,140.00	39,688.00	84.19	0.54
Zone B	292,970.00	164,240.00	128,730.00	43.94	0.56
Zone C	221,170.00	136,690.00	84,480.00	61.80	0.62
Total					

Based on grand mean volume of the trade across the Zones, *Milicia excels* with 2,287.67m³, had the highest mean volume of timber species marketed per month, followed by *Gmelina arborea* (1,260.67m³), *Daniellia oliveri* (1,192.00m³), *Pterocarpus erinaceus* (4,86.33m³), *Tectona grandis* (439.33m³), *Lennea bateri* (432.67m³), and *Parkia biglobosa* (273.67m³). The least volume of tree species marketed across the zones was *Azalia africana* with 4.67m³ per month. This was available only in Zone 'A'.

On average 7,289.67m³ of wood (timber) was traded by a timber dealer every month. The highest volume of timber trade was in zone C represented by 9,877m³. This was followed by 6,188m³ and 5,804m³ respectively in zones 'A' and 'B'. A total of 21,869m³ of timber was traded monthly by the chainsaw millers.

3.3 Analysis of Income of Chainsaw millers in the Study Area

The result of income of chainsaw millers is presented in Table 3. The monthly average gross margin (GM) for chainsaw millers was obtained to be ₦39, 688.00, ₦ 128,730.00 and ₦ 84,480.00, for zones A, B, and C respectively. Chainsaw millers in zone 'B' generated the highest mean GM followed by those in zone 'C' and then 'A'. This means chainsaw millers in zone B generated higher incomes followed by those in Zone C while chainsaw millers in Zone A generated the least. Similarly, chainsaw millers in zone A had the highest RORI (84.19%) but

the lowest GR of 0.54 among the zones, followed by those in zone C with a RORI of 61.80% with the highest GR of 0.62 while zone 'B' had the least RORI in the three zones with a corresponding higher GR of 0.56.

RORI measures the speed at which the capital invested is able to yield dividends or profit, GR measures the proportion of the capital in hand that is utilized in off-setting costs. In essence, RORI measures profit level, GR measures the entrepreneur or producer's ability to minimize costs or efficiency in inputs utilization and other costs in production to improve profit. The lower the GR the better is the business, conversely, the higher the GR the lower the profit margin.

3.4 Result of Analysis of Variance (ANOVA) Test for Gross Margin of Chainsaw Millers

The result of chainsaw millers is presented in Table 4 showed a significant value of 0.013 at 5% level of significance. This means there is a significant difference (P<0.05) in the gross income of chainsaw millers across the study area.

The implication of this result is that there is significance difference in the incomes of chainsaw millers from timber trade is accepted. This means income of chainsaw millers from timber trade across the study area are different; income from one zone being higher than that from other zones.

Table 4. Results of one way ANOVA of gross margin of Chainsaw millers

	Df	Sum of Squares	Mean Square	F	Sig.
Between Groups	2	9.513 x 10 ¹⁰	4.756 x 10 ¹⁰	4.591	0.013*
Within Groups	70	7.253 x 10 ¹¹	1.036 x 10 ¹⁰		
Total	72	8.204 x 10 ¹¹			

Note: Ns = Not Significant at 5% Probability level. * = Significant at 5% Probability level

Table 5. Post Hoc multiple comparisons test of gross margin of chainsaw millers in the zones

(I) Zone	(J) Zone	Mean difference (I-J)	Std. Error	Sig.	95% Confidence interval	
					Lower bound	Upper bound
ZONE A	ZONE B	-8.90356E4	3.01928E4	.015	-1.6389E5	-14185.9921
	ZONE C	-44788.25388	2.68249E4	.272	-1.1111E5	21531.4586
ZONE B	ZONE A	89035.58583	3.01928E4	.015	14185.9921	163885.1796
	ZONE C	44247.33195	3.05321E4	.390	-31375.0004	119869.6643
ZONE C	ZONE A	44788.25388	2.68249E4	.272	-21531.4586	111107.9663
	ZONE B	-44247.33195	3.05321E4	.390	-1.1987E5	31375.0004

Note * = The mean difference is significant at the 0.05 level

Table 6. T-Test for chainsaw millers in zones A, B and C of the study area hypothesis: There is no significant difference between incomes and costs

Zone	Mean	N	Std. Deviation	Std. Error Mean	T	Df	Sig. (2-tailed)
Zone A							
Gross income	86828	24	108691	22186.54121			
Total variable cost	47140	24	39067.52460	7974.62507	1.123	23	0.045*
Zone B							
Gross income	292970	24	268903	54889.63052			
Total variable cost	164240	24	186644	38098.45155	5.429	23	0.000*
Zone C							
Gross income	221170	25	254778	50955.57841	4.391	24	0.000*
Total variable cost	136690	25	180085	36016.91501			

Note: Ns = Not Significant at 5% Probability level. * = Significant at 5% Probability level.

Table 7. Gini coefficient values of timber marketers in Benue state

Type of marker	Gini Coeffi-cient value	Standard error (STE)	Lower bound Gini coefficient	Upper bound Gini coefficient	Confidence level
Chainsaw millers					
Zone A	0.18912742	0.05081262	0.08953651	0.57378351	95
Zone B	0.32184737	0.14255092	0.04245269	0.60124204	95
Zone C	0.18289433	0.05110957	0.08272141	0.28306724	95

Table 8. Distribution of Chainsaw Millers' by Size of Monthly Sales in Zone A, Benue State

Sales ₦	Frequency of sellers	Percentage of sellers	Cumulative percentage of sellers	Total sales (₦)	% Sales	Cumulative % of sales
<= 50000.00	11	45.8	45.8	339000.00	16.3	16.3
50000.01 - 150000.00	10	41.7	87.5	832000.00	39.9	56.2
150000.01 - 250000.00	2	8.3	95.8	365000.00	17.5	73.8
450000.01+	1	4.2	100.0	548000.00	26.3	100.0
Total	24	100.0		2084000.00		

Table 9. Distribution of chainsaw millers by size of monthly sales in Zone B, Benue State

Sales ₦	Frequency of sellers	Percentage of sellers	Cumulative percentage of sellers	Total sales (₦)	% Sales	Cumulative % of sales
<= 50000.00	5	20.8	20.8	195000.00	2.8	2.8
50001.00 - 200000.00	8	33.3	54.2	779000.00	11.1	13.9
200001.00 - 350000.00	2	8.3	62.5	667000.00	9.5	23.4
350001.00 - 500000.00	3	12.5	75.0	1240000.00	17.6	41.0
500001.00 - 650000.00	1	4.2	79.2	600000.00	8.5	49.5
650001.00 - 800000.00	5	20.8	100.0	3550000.00	50.5	100.0
Total	24	100.0		7031000.00		

Table 10. Distribution of chainsaw millers by size of monthly sales in Zone C, Benue State

Sales ₦	Frequency of sellers	Percentage of sellers	Cumulative percentage of sellers	Total sales (₦)	% Sales	Cumulative % sales
<= 50000.00	5	20.0	20.0	170000	3.07	3.07
50001.00 - 150000.00	10	40.0	60.0	777000	14.04	18.11
150001.00 - 250000.00	2	8.0	68.0	386000	6.98	24.09
250001.00 - 350000.00	1	4.0	72.0	338000	6.11	30.20
350001.00 - 450000.00	3	12.0	84.0	1170000	21.14	51.34
450001.00 - 550000.00	2	8.0	92.0	940000	16.98	68.32
650001.00 - 750000.00	1	4.0	96.0	673000	12.16	80.48
750001.00+	1	4.0	100.0	1080000	19.52	100
Total	25	100.0		5534000	100 .0	

Table 11. Profitability and marketing efficiency of timber trade by chainsaw millers in Benue state

	Total revenue B (₦)	Expenditure on timber (Wood) (₦)	Transportation (₦)	Taxes (₦)	Dues (₦)	Loading/ offloading (₦)	Wages	Other costs* (₦)	Total marketing Cost C	Net margin (₦)	Efficiency $\frac{B}{C} \times 100$ (%)
ZONE A	86,828.00	11,963.71 (25.38)	7,979.34 (16.93)	1,554.20 (3.29)	1,915.27 (4.06)	14,303.87 (30.35)	9,069.00 (19.24)	354.07.00 (0.75)	47,140.00 (100)	39,688.00	184.19
ZONE B	292,970.00	54,210.70 (33.01)	32,292.00 (19.66)	9,833.30 (5.99)	1,558.30 (0.95)	16,470.90 (10.03)	49,854.00 (30.35)	20.83 (0.01)	164,240.00 (100)	128,730.00	179.38
ZONE C	221,170.00	58,738.00 (30.64)	49,440.00 (25.79)	2,020.00 (1.05)	1,582.00 (0.83)	35,418.00 (18.48)	42,372.00 (22.10)	2,120.00 (1.11)	136,690.00 (100)	84,480.00	161.80

Source: Computed from Field Data, 2013

NB: (1) *Others Miscellaneous (Monetary and material gifts given to the village heads, Informants on timber species are available in the forests, road expenses, dues).

(2) Values in bracket are components of costs in rows as a proportion of total marketing cost 'C'

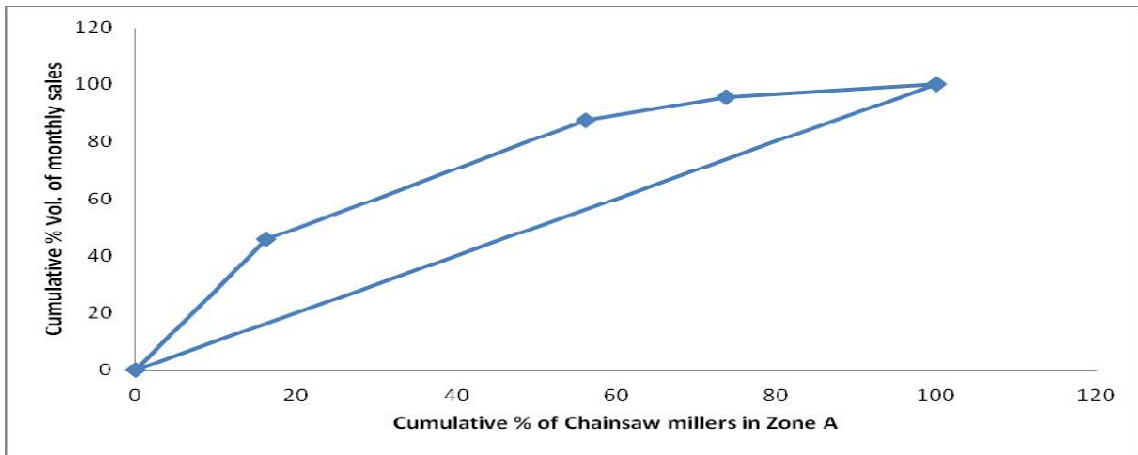


Fig. 1. Lorenze curve for chainsaw millers in Zone A, Benue State

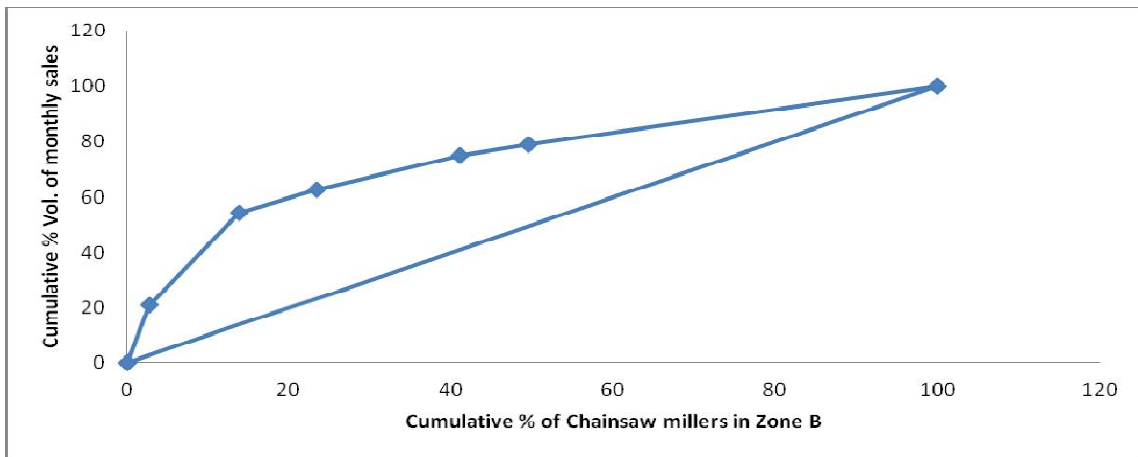


Fig. 2. Lorenz curve for chainsaw millers in Zone B, Benue State

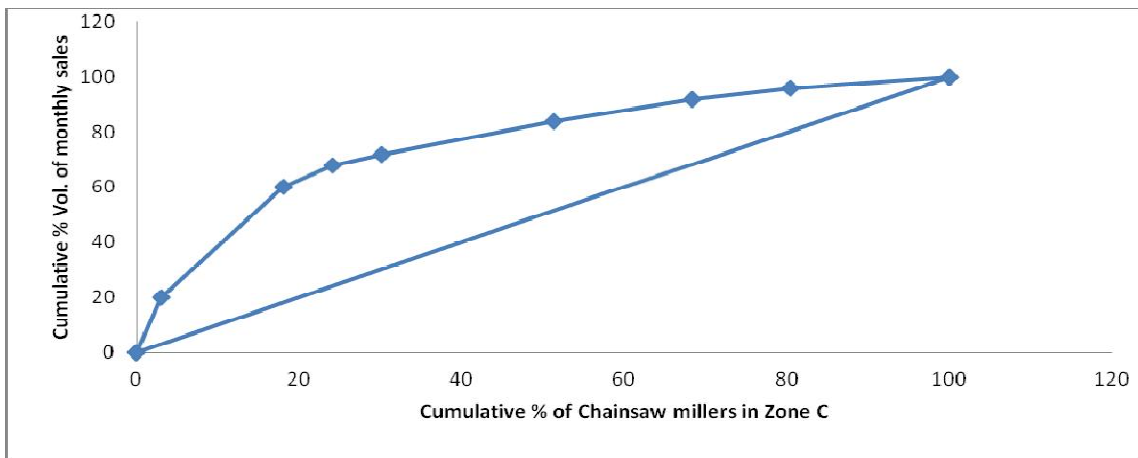


Fig. 3. Lorenze curve for chainsaw millers in Zone C, Benue State

Thus, the post- hoc multiple comparisons analysis presented in Table 5 showed that income of chainsaw millers from zone B and is significantly ($P < 0.05$) higher than that of A. It also shows that income from zone B in turn is higher than that of zone C but without a significant difference ($P > 0.05$). From all the profitability indices applied, it is evident that business in the study area was highly profitable.

3.5 T-test for profitability of Chainsaw Milling in Benue State

3.5.1 T-test for profitability of chainsaw milling in zones of Benue State

The result of chainsaw millers for Zone A, revealed a significant difference ($p < 0.05$) in the gross incomes and Gross Cost of chainsaw millers in zone 'A'. This means income from chainsaw milling is significantly higher than the gross cost from this operation in the three zones of the study area, Table 6.

The result of chainsaw millers revealed a significant difference ($P < 0.05$) in the gross incomes and Gross Cost of chainsaw millers in zone 'B'. This means income from chainsaw milling is significantly higher than the gross cost from this operation in the three zones of the study area (Table 6).

The result of chainsaw millers in Zone 'C' revealed a significant difference ($P < 0.05$) in the gross incomes and Gross Cost of chainsaw millers in zone 'C'. This means income from chainsaw milling is significantly higher than the gross cost from this operation in the three zones of the study area (Table 6).

3.6 Market Concentration of Chainsaw Millers in Benue State

For 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 (Table 7). This shows low market concentration of timber traders. This reveals an economically fairly equitable distribution of volume of trade among chainsaw millers in the study area. However, based on the values of Gini-coefficient in each case, trade in zone C was less un-equally distributed followed by zone A and lastly B. The size and distribution of sales of timber flichtches or planks from timber traders is presented in Tables 8, 9 and 10. The illustration

of this distribution by the Lorenze curve shown in figures 1, 2 and 3 does not skew far away from the line of equal distribution (LED) [32].

3.7 Chainsaw Millers Marketing Efficiency in Benue State

The result of chainsaw millers marketing efficiency in Table 11 revealed that chainsaw millers in zone 'A' received the total sum of as 86,828.00 average gross revenue per month. The mean total marketing costs was ₦47,140 representing 54.29% of the mean gross income. A breakdown of the marketing costs revealed that loading and offloading had the highest cost (30.35), followed by expenditure on timber (25.38%), wages (19.24%), and transport (16.93%). The least cost of 0.75% was incurred on others.

For zone B the average gross revenue per month for Zone B was 292,970.00 while the cost was ₦164,240 representing 56.06% of the mean gross income. Expenditure on timber (33.01%) possessed the highest cost followed by wages (30.35%), transport (19.66%) and taxes (5.99%) while the least cost was incurred on others. Similarly, the study showed that all chainsaw millers sampled in Zone C received the total sum of ₦221,170.00 average gross revenue per month while the mean total costs was ₦136,690.00 representing 61.80% of the mean gross income. In the same vein expenditure on timber (30.64%) possessed the highest cost followed by transportation (25.79%), wages (22.10%), loading and offloading 18.48% while the least cost of 0.83% was recorded on dues.

The coefficient or marketing efficiency of chainsaw milling was highest for Zone A, followed by 184.19% for Zone B 179.38% and 161.80% for Zone C, Table 11. The implication of this result is that in Benue State, chainsaw milling is highly efficient.

4. DISCUSSION

4.1 Socio Economic Characteristics of Timber Dealers in Benue State, Nigeria

This study revealed that all of the chainsaw millers that were male were involved in the timber business enterprise. It is thus a male-dominated occupation. The lack participation of female in timber business could be attributed to

the tedious nature of the business. This finding corroborates the earlier view expressed by Kalu and Ani [33] and Sekumade and Oluwatayo [34], that dominance of the trade by men is due to the fact that its operation is tedious, and this tends to discourage most women from engaging in the enterprise.

The fact that the majority of the timber merchants fall within the active age distribution of 30 -40 years further justify the above claim. These youths are gainfully employed and can earn their livelihood from timber business despite the enormous strength and energy required for this kind of business; their youthful exuberance can match the toils involved. The study revealed that a greater proportion of the chainsaw millers were married. The larger proportion of married families implies that timber trade is perhaps a secured livelihood activity in the area; and could sustain their responsibilities to wives, children, and other family members under their care.

The relatively larger proportion of literate respondents over the illiterate in timber business seems to be a blessing. According to Aiyeloja et al. [35] timber business requires some degree of literacy due to measurements and simple calculation involved in plank processing from round wood into different sizes. The respondents would also be more amenable to development policies required to be implementable. This also implies that timber trade is perhaps a profitable venture that engages the educated and provides alternative source of income and employment.

The implication is that greater proportions of these market actors are educated and can communicate in English. The higher profitability and income from the enterprise may have attracted individuals with higher educational status to get involved in the enterprise compared to income from white collar jobs that in most cases do not guarantee above average quality of life in Nigeria [36].

Data on the ethnic composition implies that timber market is dominated by the indigenes. The relatively dominant proportions of the Tiv, Idoma, and Igede, could be attributed perhaps to their familiarity with the terrain and locations of raw timber. Furthermore, the formation of co-operative societies by timber dealers will also give them more enablement to source for credit facilities. This agrees with the finding by Sidiku and Oyerinde [37], on the analysis of sawn

timber market in Ondo State that sawn timber traders solely depend on personal savings.

The relatively larger proportion of timber merchants with moderate trading experience of less than 10 years; and very few with 10 years and above, is an indication that timber business has been in existence in Benue State for a long time now. However, only recently that many people, including non-indigenes, are getting into the business.

4.2 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 study 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 other 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 of marketed 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, [38] 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 plank's 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 [39], the following are commonly used species; *Khaya grandifoliola*, *Azelaia africana*, *Mansonia altissima*, *Ceiba patandra*, *Milicia excelsa*, *Tectona grandis*, *Anogeissus leiocarpa*, *Isoberlinia doka*,

Terminalia ivorensis, *Terminalia ivorensis*, *Ceiba patandra*, *Triplochiton scleroxylon*. These are used for ends uses as building construction and flooring, furniture construction and decoration, veneer and house fitting, roofing, doors, window frames, staircases, 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 outstripped the supply. Agbeja and Opii [23], 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. The increasing timber logging activities in the savanna region spells doom for timber supply in Nigeria if adequate and more serious measures or decisions are not taken. Deliberately injecting external funds into the system to replenish timber stock as they are removed will ensure its sustainable development and supply in the state, and the country.

4.3 Comparisons of Income from Timber Trade in Benue State

Gross margin measures (GM) the level profit generated from a business or any production activity, after all expenses are deducted.

The results revealed that the trading activities in timber marketing in Benue State were profitable. At the end of every month of trading, a chainsaw miller goes home on average with ₦39,688.00, ₦128,730.00 and ₦84,474.00 in zones A, B and C respectively. The GM values are far higher than the national minimum wage. This justifies timber trade as a viable enterprise for sustainable livelihood. Based on the gross margins (GMs), and their trend in all the timber traded, the study revealed that timber merchants in zone 'B' had the highest average GM which implies that the timber market in the zone is more efficient compared to trader in timber markets. This could also be attributed to its high population and cosmopolitan nature of the zone

compared to the other zones. This could result to higher demand, construction activities and higher magnitude of trading activities which could in turn lead higher rates of returns. This in turn is followed by timber traders in one 'C' and then 'A'. This means, all things been equal timber traders in zone 'A' generated higher profits from sales compared to those in zones A and B. The RORI and GR values also support the above conclusion. Therefore, GR of 0.54 for timber traders in zone 'A' means 54% of the total income generated is used in off-setting marketing costs. By implication the profit made from timber sales is 46% over the capital invested. That is one naira invested will generate fifty kobo or 0.46 naira as profit thus raising the amount invested to ₦1.46. The result showed low values of GR and high values of RORI, but the GM was positive and high.

The implication of these results is that, high profit margin does accrue to timber merchants because the low GR value implies that not too much expenses were incurred in offsetting marketing costs; transportation, loading, off-loading, taxes, purchasing costs among others except for zone B. This cost gulped as high as 54% of the gross benefits realized by timber trader.

Now based on the GR, RORI and GM concepts together with their observed values, it can be safely concluded that, the observed differences in the level of profit generated and hence efficiency in marketing across the three market segments is due to the interaction between quantities of wood supplied, producer prices and marketing cost components. These factors are the parameters that can affect returns from any marketing activity.

Generally, the marketers had a fair profit margin, but relatively those in Zones A and B realized higher profit margins as the GM indicates. This is similar to Bichi's [6] findings in Kano State which revealed that timber business can generate between N5,000 to 450,000 per month and can generate even one hundred thousand naira (₦100,000) per day based on demand and season. According to the findings by Popoola [12] in Benue state, incomes from chainsaw milling range between \$2.50 and \$80 per day, and range between \$75 and \$2,400 per month. This capture mean income from this study of ₦39,688 which amounts to \$110.24 per month. Akinyemi et al. [40] also made a similar observation from the study on profitability, prospect and constraints of Sawmill Industry in

Kaduna State. His finding revealed a monthly net income to be ₦118,789.40 while the rate of return on investment was calculated to be 50.18%. This is therefore an indication that timber business is generally profitable in Benue State.

Based on the magnitude of GMs of chainsaw millers in the zones, the zone A is more efficient followed by zone B and then zone C. This means that all things being equal, timber traders in zone A generated higher profits from their sales compared to traders in other zones. This variation in the gross margin between the zones could be attributed to greater risk and differences in costs incurred, high demand and high turnover rates. From the profitability index applied, it is evident that the enterprise in the study area was highly profitable for lumber marketers.

5.6 Concentration and Efficiency of Timber Trade in the Study Area

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. According to Tee [41] an efficient marketing system is relevant in stimulating and producing forestry development and economic growth. According to Todaro [42], for economic variables with relatively equitable distribution, the Gini coefficient value should be between 0.20 and 0.35.

UNDP [43] reported that Gini-coefficient with high inequality typically lie between 0.5 and 0.7. This suggests that 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.

The low Gini coefficient values in all the zones showed that chainsaw millers were evenly distributed in Benue State and none of the market participants have control on significant proportion of the timber market. Similarly, the Gini coefficient of 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 chainsaw millers in the zones, none of the market actors also had control of the market. This implies that timber market is monopolistic competitive in structure in the study area. Thus, the concentration of sales volume among chainsaw millers was low although higher than the others. This shows that none of the timber market actors controlled significant proportion of the timber trade.

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 [41] and Enete [44] made similar observations with *Borassus aethiopum* in North-Eastern Nigeria and charcoal in Abia State Nigeria respectively.

The results of marketing efficiency of timber trader indicate that timber trade in the study area provides a profitable market where the all the market actors and traders get a high return on their investments. This finding is in conformity with the results obtained by other researchers on marketing margin and efficiency of agricultural and forestry products [45,46].

6. CONCLUSIONS AND RECOMMENDATIONS

Chainsaw milling is economically important and viable, it is a profitable and efficient business enterprise with good financial returns to the marketers. The structure of timber trade in Benue State exhibited features that were competitive. Thus, the distribution of the volume of the trade was economically equitable. Hence, Benue State government should develop policy framework for ploughing back some of the profit in developing the timber resource in the state.

COMPETING INTERESTS

Author has declared that no competing interests exist.

REFERENCES

1. FAO. State of the World's Forests. Food and Agriculture Organization of the United Nations, Rome, Italy; 2009.
2. Akpabio G, Akachi AP, Wilcox RI. The socio-economic impact of forestry in Nigeria. International Journal of Social

- Sciences and Humanities Reviews. 2013; 4(3):198–202.
3. Adeyoju SK. Forestry and the Nigerian Economy. Ibadan University Press, Nigeria. 1975;308.
 4. FAO. Community-Based Tree and Forest Enterprises. Food and Agricultural Organization of the United Nations. Rome, Italy; 2007.
[Accessed February 21, 2006]
Available:<http://www.fao.org/forestry/site/25491/en/>
 5. Ofoegbu C, Ogbonanya S, Babalola FD. Sawmill conversion efficiency and wood recovery in Cross River State Nigeria. *Journal of Agriculture and Forestry*, 2014; 60(1):105-113. Podgorica.
 6. Bichi AM. Timber and non-timber products as tools for the eradication of poverty: A millennium development goal approach. Proceedings of the 38th annual conference of forestry association of Nigeria held in Osogbo, Osun State, Nigeria. (ed) L. Popoola. 2011;147-155.
 7. Adeyoju SK. Forestry and the Nigerian economy. Ibadan University Press, Nigeria. 1975;308.
 8. Kalu C, Okojie CEE. Economic contributions of forests in Nigeria, 1970-2000. *Research Journal of Social Science*. 2009;4:59-73.
 9. Amiebenomo O. Tropical secondary forest management in Africa: Reality and perspectives Nigeria Country Paper. Written for the fao/ec Inv/gtz workshop on tropical secondary forest management in Africa: Reality and perspectives In collaboration with ICRAF and CIFOR Nairobi, Kenya; 2002.
 10. Faleyimu OI. The declining forestry contribution to gross domestic product. Causes and Cure. *Resources and Environment*. 2013;3(4):83-86.
 11. Wit M, Dam VD, Cerruti OP, Lescuyer G, Mackeown JP. (eds.). Chainsaw milling: Supplier to local markets: A synthesis. Tropenbos International, Wageningen, the Netherlands. The European Tropical Forest Research Network (ETFRN) News Issue No. 52. 2010;vii-xxii.
 12. Popoola L. Chainsaw milling and lumber trade in Nigeria. Technical Report submitted to Tropenbos International, Center for International Forestry Research (CIFOR) 2010 ETFRN and Tropenbos International, Wageningen the Netherlands; 2010.
 13. Muthike GM, Shitanda D, Kanali LC, Muisu NF. Chainsaw milling in Kenya. Tropenbos International, Wageningen, the Netherlands. 2010;166-173.
 14. Sambe LN. Timber trade analysis in Benue State, Nigeria. Unpublished M.Sc thesis. Department of Social and Environmental Forestry, University of Agriculture, Makurdi, Nigeria. 2015;202.
 15. Marfo E. Chainsaw milling in Ghana: Context, drivers and impacts. Tropenbos International, Wageningen, the Netherlands. 2010;64.
 16. Marieke W, Jinke Van Dam Paolo OC, Guillaume L, Rohini K, James PM. Chainsaw milling: Supplier to local markets - a synthesis. *ETFRN News* 52. 2010;16.
 17. Oksanen T, Pajari B, Tuomasjukka T. (eds.) Forests in poverty reduction strategies capturing the potential. Proceedings No. 47. Proceedings of a workshop in Tuusula, Finland. 2002;206.
 18. Ogunsanwo OY, Aiyeloja AA, Filani GS. Assessment of offsite waste associated with timber flicthing in Ibadan, Nigeria. Proceedings of the 30th annual conference of the Forestry Association of Nigeria, FAN in (Eds) Popoola, L. Fen P.M and P.I Oni. 2005;335-342.
 19. Ten Brink P, Mazza L, Badura T, Kettunen M, Withana S. Nature and its role meeting basic needs in the developing countries, Oxford: Oxford University Press; 2012.
 20. Federal Government of Nigeria (FGN). National Forest Policy: Federal Ministry of Environment, Abuja; 2006.
 21. BENSEEDS. Benue State Economic Empowerment and Development Strategy. Benue State Planning Commission, Makurdi; 2004.
 22. NPC, National Population Commission: Population Census of the Federal Republic of Nigeria: Analytical Report at the National Population Commission, Abuja; 2007.
 23. Agbeja BO, Opii EE. Assessment of demand and supply of timber products in Benue State of Nigeria. Implication for Forest Policy Implementation. *Journal of Environmental Extension*. 2005;5:1-10.

24. Hula MA. Population dynamics and vegetation change in Benue State, Nigeria. *Journal of Environmental Issues and Agriculture in Developing Countries*. 2010; 2(1):17.
25. Keay RJW. *An outline of Nigerian Vegetation*: Government Printer Lagos, Nigeria. 1989;37.
26. Olukosi JO, Isitor SU, Ode MO. Introduction to agricultural marketing prices: Principles and applications. 3rd Edition. Living Book Series GU publications Abuja, Nigeria. 2005;2-47.
27. McCarthy JE. *Basic marketing, a management approach*, 3rd edition, New York; 1968.
28. Arene CJ. *Introduction to economic analysis of projects in tropical agriculture*. Fulladu Publishing Company. Nsukka; Nigeria; 1998.
29. Alao JS, Kuje ED. Economics of small-scale furniture production in Lafia Metropolis, Nasarawa State. *Journal of Economics*. 2012;3(1):49-54. Kamla-Raj 2012.
30. Okereke O, Anthonio QBO. The structural characteristics of the market for grains in Eastern Nigeria. In: Adekanye TO (Ed.): *Readings in Agricultural Marketing*. Nigeria: Longman. In Reuben J. and Mshelia S.I. *Structural Analyses of Yam Markets in Southern Taraba State*. *J AgriSci*, 1988;2(1):39-44. Kamla-Raj 2011. 2011;116-124.
31. Bila Y, Bulama Y. Structure of Maiduguri cattle market, Borno State Nigeria. *Global Journal of Agricultural Science*. 2005;4(2): 159–164.
32. Damagaard C, Weiner J. Describing inequality in plant size or fecundity. *Ecology*. 2000;81:1131-1142.
33. Kalu C, Ani PI. Marketing of round logs in Benin City, Edo state, Nigeria. *Journal of Applied Sciences Research*. 2009;5(7): 785-789.
34. Sekumade AB, Oluwatayo IB. Economic analysis of plank production in Gbonyin Local Government Area of Ekiti State, Nigeria. *International Journal of Agricultural Economics and Rural Development*. 2011;4(1):36-40.
35. Aiyeloja AA, Oladele AT, Ezeugo OE. Evaluation of non-timber forest products trade in Ihiala Local Govt. Area, Anambra State, Nigeria. *International Journal of Science and Nature*. 2012;3(2):55-60.
36. Aiyeloja AA, Oladele AT, Furo SB. Sustaining livelihood through sawn wood marketing in Port Harcourt, Nigeria. *International Journal of Science and Nature*. 2013;4(1):84-89.
37. Sidiku NA, Oyeride OV. Analysis of sawn timber marketing in Ondo state, Nigeria in: *Climate change and forest resources management the way forward proceedings of the 2nd biennial national conference of the forests and forest products society of Nigeria* (Onyekwelu JC, Adekunle VAJ, Oke DO. (Eds)). 26 – 29th April. 2010;339-346.
38. Ogunwusi AA. Forest products industry in Nigeria. *African Research Review, An International Multidisciplinary Journal*, Ethiopia. 2012;6(4):191-205. Available:<http://dx.doi.org/10.4314/afrrrev.v6i4.13>
39. Arowosege OGE. Lesser used wood species and their relevance to sustainability of tropical forests. In S. Kolade Adeyoju and S.O Bada (ed) *Readings in Sustainable Tropical Forest Management*. 2010;305-322.
40. Akinyemi O, Obadimu O, Sodimu AI, Obadimu OD. Profitability, prospect and constraints, of sawmill industry in Kaduna state. *Proceedings of the 38th annual conference of forestry association of Nigeria held in Osogbo, Osun State, Nigeria*.(ed) L. Popoola. 2011;486-491.
41. Tee NT. *Marketing and utilization of Borassus aethiopum* (Mart) In North-eastern Nigeria. Ph.D thesis. Department of Forest Resources Management, University of Ibadan. 2007;210.
42. Todaro MP. *Economic development in the third World*. Longman Inc. New York, 2nd Edition in: Tee, N.T (2007). *Marketing and Utilization of Borassus aethiopum* (Mart) In Northeastern Nigeria. Ph.D thesis. Department of Forest Resources Management, University of Ibadan. 1981;210.
43. United Nations Development Programme *The importance Forestry Statistics in: Anete AA, Agbugba KI. Charcoal marketing in Abia State*. In: *Farm Management Association of Nigeria (Famam) 22nd Annual Conference*. 2008 (ed). Umeh, J.C, Obinne, C.P, and Lawal, Wuraola. 1992;338-346.

44. Enete AA, Agbugba KI. Charcoal marketing in Abia State. In: Farm Management Association of Nigeria (Famam) 22nd Annual Conference. 2008 (ed). Umeh JC, Obinne CP, Lawal Wuraola. 2008;338-346.
45. Kudi TM, Olukosi JO, Ogungbile AO. Economic analysis of sesame marketing in Jigawa state. Journal of Agriculture, Forestry and the Social Sciences (JOAFSS) 2006;4(1).
46. Kola-Oladiji KI, Adesope AAA, Adio AF. Profit ability of marketing African bread Fruit (*Treculia africana Decne*) in Ibadan metropolis. Journal of Agriculture Forestry and the social sciences (JOAFSS). 2006; 4(1).

© 2019 Sambe; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:
The peer review history for this paper can be accessed here:
<http://www.sdiarticle3.com/review-history/50941>