

Original Research Article

Analysis of Timber Marketing in Lokoja Metropolis, Kogi State, Nigeria

ABSTRACT

Inadequate marketing information on timber species, their sources, market structure and performance has greatly hampered the effectiveness of the business and has hindered investment in the forestry sector. The study analysed timber marketing in Lokoja Metropolis, Kogi State. A semi-structured questionnaire was administered to collect relevant information. Purposive sampling and systematic sampling were applied to determine the study sample which was drawn from three timber markets. Applying 30% sampling intensity except in markets where the traders were less than ten, 40 timber traders were systematically sampled and interviewed on timber marketing activities. The study identified (7) most marketed timber species namely: Daniellia oliveri, Gmelina arborea, Milicia excelsa, Ficus exasperata, Prosopis africana, Triplochiton scleroxylon, Khaya grandifoliola. The major source of timber was from the open forest (92.5%), while supply within the state (27.5%) accounted as the highest, followed by Abuja (20%). The Gini-correlation co-efficient analysis for the study was 0.1552 implies that the timber market is imperfectly competitive with the market structure tending towards monopoly. Timber income analysis per truck of the seven species revealed that Daniellia oliveri recorded the highest mean return of ₦517, 005.99 per month while Ficus exasperata had the least mean monthly gross margin of ₦ 35,336.56. The mean gross margin of Khaya grandifoliola, Milicia excelsa Prosopis africana, Gmelina arborea and Triplochiton scleroxylon had the same mean returns of ₦ 466,270 per month. Low patronage, Scarcity of demanded wood species, Lack of supply of wood species and high tax were identified as the major challenges facing timber market in the study area. Provision of adequate market education, proper examination and checking of excess associations will improve market efficiency and performance. Investment in raw material base will ensure sustainable supply of efficient market system.

Keywords: Timber Marketing, Timber Species, Profitability, Market structure

1.0 INTRODUCTION

Forests serve as an engine of growth that propels economic activities especially for a nation that is endowed with abundant forest resources (FAO, 1995). According to Sambe (2015) sawn timber is one of the most important products from the forest that is used for various purposes and is fundamental for the socio-economic development of the country. It is processed into many various dimensions for efficient end uses and the product is produced for both domestic and imported round wood either by sawing lengthwise or by a profile

chipping process. Sawn wood has the highest production and demand and is the most diversified and serves as raw material for the production of furniture, furniture components and other secondary wood products (Izekor, 2011).

In Nigeria, local sawn timber marketing activities constitutes a reliable source of livelihood sustainability through cash income and employment in many rural and urban areas. These activities include loading, offloading, transportation, processing among others (Arnold, 2001; Kozak, 2007). According to Fuwape, (2003) and Ofoegbu, (2014), the timber industry has contributed significantly to the socio-economic development of Nigeria and ranks among the highest revenue and employment generating sectors and a major contributor to the national domestic product (GDP). According to Badejo, (2008) timber enterprise is capable of inducing investment in other branches of production because of its heterogeneous nature and versatile uses which encourage new industrial activities in any economy.

The timber sector has however been experiencing a gradual set back in recent times largely because of overexploitation, decline timber species availability and partly because of the industry is still largely oriented towards exporting raw materials (Geist 2002; Rudel 2005; Adedokun *et al.*, 2017).

Sustainably managed forests can contribute to poverty alleviation, the protection of environment service and sustainable economic growth in developing and transition countries (Edo, 2004). This can have high rate of multiplier effect on capacity utilization, employment generation and foreign exchange earnings.

Marketing provides a set of tools which people can use to create efficient economic value for its resources and products (Ebe, 2007; Kotler *et al.*, 2007). However, research has shown that timber marketing is characterised by inadequate information on species marketed, sources of supply and nature of competition which has compromised the ability of the sector to contribute optimally to employment and development. The requirement for efficient marketing operations such as knowledge on species supply and distribution, performance, competition, conduct and organisation directly affects the efficiency of timber marketing (Emtage 2004). This presents problems for investment and development of the resource base and the market system. Adequate therefore information can bring about improvement of return to plantation development and enhance tree planting about sound silvicultural management. These benefits could be sustained through effective management, conservation,

and adequate distribution and allocation. Hence, this study seeks to assess timber marketing in Lokoja metropolis of Kogi State.

METHODOLOGY

2.0 Study area

Lokoja lies at the confluence of Niger and Benue rivers and is the capital of Kogi State. It is bounded by the Niger in the north and east upstream from the capital until the border with Kwara State. It is located at latitude $7^{\circ} 48' 59.99''$ N and longitude $6^{\circ} 44' 59.99''$ E. The climate of the area is tropical savannah climate or tropical wet or dry climate. Lokoja has an area of $3,180\text{km}^2$ with an estimated population of 195,261 (NPC, 2006). Its vegetation falls within the guinea savanna belt of Nigeria. Some common timber species found in the area includes Iroko, Mahogany, Obeche, Gmelina, and Iron wood. Timber activity is carried out in three locations in the study area namely, Felele, Ganaja and Zango daji which forms the three timber markets in the area. Zango daji timber market was the first timber market to be demarcated and allocated by the State government for timber activities, which later gave birth to two other timber markets namely Felele timber market and Ganaja timber market. The major occupation of the people in the study area is farming. Although other enterprise such as the timber enterprise is thriving in the area.

2.1 Study Population and Sampling Techniques

The study population comprises of timber traders in the study area and their activities in the trade. The study was carried out in three timber markets purposively selected. In each of the three markets 30% of sampling intensity was applied to select the study sample except in markets where the number of marketers is less than 10. The markets include, Ganaja timber market, Felele timber market, and Zango daji timber market. 10 samples were collected from the Ganaja timber market, 10 samples from the Felele timber market and 20 samples were collected from Zango daji timber market. A total of 40 samples were collected by administered questionnaires.

2.2 Data collection

Data was collected from two sources: the primary and secondary sources. The primary sources included questionnaire, personal observation and enquires. A semi structured questionnaire was designed and was administered on timber traders.

2.3 Data analysis

The data collected was analysed using descriptive statistics, Gini- correlation coefficient and

Frequency	Percentage (%)
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Gross margin analysis. Descriptive statistics such as frequency, percentages and tables were used to identify timber species and their sources and challenges in the study area, while Gross margin analysis was applied for determine the income from the enterprise. Gini- correlation coefficient was used the market structure and performance in the study area.

Gross margin

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

$$\text{Gross margin} = \text{GI} - \text{TVC}$$

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.).

Gini-correlation coefficient

Gini- coefficient was used to examine the market concentration of timber traders which involves the measurement of the level of sellers' concentration in the market in order to determine the degree of competition or monopoly in the market. As used by Billa and Bullama (2005), the formula is given as:

$$G = 1 - \sum XY$$

Where:

G= Gini-Coefficient

X= percentage of sellers

Y= Cumulative percentage of sales

When G= 0, there is perfect equality in the size of the distribution of the sellers, however when G= (1), there is perfect monopoly in the market.

Age		
21-30	8	20.0
31-40	13	32.5
41-50	16	40.0
51 and above	3	7.5
Total	40	100
Sex		
Male	30	75.0
Female	10	25.0
Total	40	100
Marital status		
Single	9	22.5
Married	31	77.5
Total	40	100
Educational background		
Primary	7	17.5
Secondary	26	65.0
Tertiary	7	17.5
Total	40	100
Experience(years)		
1-5	4	10.0
6-10	7	17.5
10 years above	29	72.5
Total	40	100
Business ownership		
Sole proprietorship	40	100
Total	40	100
Nature of business		
Wholesale	2	5.0
Retail	7	17.5
Wholesale and retail	31	77.5
Total	40	100

3.0 Results and Discussion

Table 1: Socio economic Characteristics of Respondent in the Study Area

Source: Field Survey 2018

3.1 Socio economic Characteristics of Respondent in the Study Area

The result in Table 1 reveals that majority (87.9%) of timber marketers were between 41-50 years. In terms of sex, 75.5% of the respondents were male while 25% were female. For marital status, 77.5% were married while 22.5% were single. The data further shows that

17.5% had primary school education, 65.0% had secondary school education while 16.5% had tertiary education. Based on experience, majority of the respondents (72.5) has had 10 years and above experience.

3.2 Timber Species Most Marketed and their Sources in the Study Area

3.2.1 Most Marketed Species in the Study area

Seven marketed timber species were identified in the study area. They are *Prosopis africana*, *Gmelina arborea*, *Khaya grandifoliola*, *Daniellia oliveri*, *Milicia excelsa*, *Triplochiton scleroxylon*, *Ficus exasperate* Table 2.

Table 2: Timber Species and volume marketed in the Study Area

Common Name of species	Scientific Name	Quantity Marketed
Mahogany	<i>Khaya grandifoliola</i>	1669.90
Gmelina	<i>Gmelina arborea</i>	1669.90
Agba	<i>Daniellia oliveri</i>	2225.40
Obeche	<i>Triplochiton scleroxylon</i>	1669.90
Iroko	<i>Milicia excelsa</i>	1669.90
Iron wood	<i>Prosopis africana</i>	1669.90
Araba	<i>Ficus exasperata</i>	945.75

Source: Field Survey, 2018

3.2.2 Location of Supply in the Study Area

The results in Table 3 shows that highest proportion (92.5%) of timber supply to markets in the study area is sourced from open forest and the least proportion (7.5%) is sourced from forest reserve.

The result in Table 4s shows the various areas of supply of timber from the study area. It indicated that the highest proportion (27.5%) of supply comes from within Kogi state. This is followed by Abuja (20%), while the least proportion (2.5%) of supply comes from Akwa Ibom, Bauchi, Benue, Katsina, Borno, Niger and Zamfara.

Variables	Frequency	Percent
Forest reserve	3	7.5

Open forest	37	92.5
Total	40	100

Table 3: Location of Timber Supply in the Study Area

Source: Field survey, 2018

Table 4: Areas of Supply in the Study Area

Areas of supply	Frequency	Percent
Kogi	11	27.5
Abuja	8	20.0
Kaduna	5	12.5
Kano	5	12.5
Adamawa	2	5.0
Delta	2	5.0
Benue	1	2.5
Awka Ibom	1	2.5
Bauchi	1	2.5
Katsina	1	2.5
Borno	1	2.5
Niger	1	2.5
Zamfara	1	2.5
Total	40	100.0

Source: Field Survey, 2018

3.3 Analysis of Income from Timber Marketing in the Study Area

The result in Table 5 shows the analysis of mean gross income per month from timber in the study area. *Daniellia oliveri* recorded the highest mean return of ₦517, 005.99 per month while *Ficus exasperata* had the least mean monthly gross margin of ₦ 35,336.56. The mean gross margin of *Khaya grandifoliola*, *Milicia excelsa* *Prosopis africana*, *Gmelina arborea* and *Triplochiton scleroxylon* had the same mean returns of ₦ 466,270 per month.

UNDER PEER REVIEW

Table 5: Income Analysis of Timber marketing in the Study Area

Timber Species	1	2	3	4	5	6	7	8
	Mean	Mean	QTY	Total	Total Sales	Variable	Total	Gross Margin
	Cost	Selling		Purchase	(Gross Income)	Cost	Variable	5-7
	Price	Price		1x3	2x3		Cost	
							4+6	
<i>Daniellia oliveri</i>	820.66	1078.75	2225.40	1,826,296.76	2,400,650.25	57,347.50	1,883,644.26	517,005.99
<i>Khaya grandifoliola</i>	827.55	1080.00	1669.90	1,381,925.74	1,803,492.00	57,347.50	1,439,273.24	364,218.76
<i>Milicia excelsa</i>	827.55	1080.00	1669.90	1,381,925.74	1,803,492.00	57,347.50	1,439,273.24	364,218.76
<i>Prosopis Africana</i>	827.55	1080.00	1669.90	1,381,925.74	1,803,492.00	57,347.50	1,439,273.24	364,218.76
<i>Gmelina arborea</i>	827.55	1080.00	1669.90	1,381,925.74	1,803,492.00	57,347.50	1,439,273.24	364,218.76
<i>Triplochiton scleroxylon</i>	827.55	1080.00	1669.90	1,381,925.74	1,803,492.00	57,347.50	1,439,273.24	364,218.76
<i>Ficus exaspe</i>	675.75	773.75	945.75	639,090.50	731,774.06	57347.50	696,437.50	35,336.56
<i>Rata</i>								

Source: Field Survey, 2018

3.4 Determination of Timber Market Structure and Performance

3.4.1 Market structure

3.4.1.1 Market composition by association membership

The result in Table 6 revealed that majority of the respondents 97.5% are members of the market association.

Table 6: Distribution of Respondents according to their Membership Association

Membership of Association	Frequency	Percent
Yes	39	97.5
No	1	2.5
Total	40	100.0

Source: Field Survey, 2018

3.4.1.2 Market concentration

Table 7 shows the result of market concentration of the timber market in the study area. The result indicates that the highest proportion of (65.0%) of respondents accounted for 31.5% total sales, followed by 20% of respondents accounted for 27.2%, 12.5% of respondents accounted for 16.7% while the least proportion of sellers 2.5% of timber sellers possessed 24.6% of monthly sales at the market.

The Gini- correlation coefficient of timber marketing obtained in the study area was 0.1552.

Number of Sellers	Frequency distribution	Percentage of sellers (X)	CF	Sales	Percentage of Sales	Cumulative % of sales (Y)	XY
<=750000.00	1	2.5	2.5	113,166	24.6	24.6	0.0062
750001.00-3750000.00	5	12.5	15.0	76,820	16.7	41.3	0.0516
3750001.00-6750000.00	8	20.0	35.0	124,900	27.2	68.5	0.137
6750001.00+	26	65.0	100	145,130	31.5	100	0.65
	40	100		460016	100		0.8448

Table 7: Market Performance of Timber Marketers

Source: Field Survey, 2018

$$GC = 1 - \sum XY$$

$$GC = 1 - 0.8448$$

$$GC = 0.1552$$

3.4.2 Market Performance in the Study Area

Table 8 shows that majority (35%) of timber traders agrees that with ₦200, 000 and above it is possible to start up timber business in the study area.

Amount for Business Set-up	Frequency	Percentage
50,000	5	12.5
51-100,000	12	30.0
150,000-200,000	9	22.5
200,000 above	14	35.0
Total	40	100.0

Table 8: Market performance of timber marketers

Source: Field Survey, 2018

Table 9: Availability of timber supply

Availability of timber	Frequency	Percent
Yes	34	85.0
No	6	15.0
Total	40	100.0

Source: Field survey, 2018

Table 10: Degree of Availability of Timber Supply

Degree	Frequency	Percent
Regular	26	65.0
Irregular	14	35.0
Total	40	100.0

Source: Field survey, 2018

3.5 Factors influencing marketing of the Species in the Study Area

According to the results in Table 11, it shows that 47.5% which is resistance to insect attack has the highest percentage while durability which is 22.5% has the least. The resistance of the wood to attack can be attributed to the quality of hardness of the timber species especially the hard woods which makes them resistant to insect attack.

Table 11: Factors influencing the marketing of the species in the study area

Variables	Frequency	Percentage
Durability	9	22.5
High demand	12	30.0
Resistance to insect attack	19	47.5
Total	40	100

Source: Field Survey, 2018

3.6 Challenges of Timber Marketing in the Study Area

Table 12 revealed the challenges of timber trade in the study area. It indicates that major challenge is low patronage (20.2%), followed by scarcity of wood species (18.0%), lack of supply of wood species (16.3%), Increasing prices (12.0%), Credit (1.1%), faulty sawing of wood (1.1%), Capital (1.1%) and wood damage (0.6%).

Variables	Frequency	Percentage (%)
Lack of supply of wood species	29	16.3
Scarcity of demanded wood species	32	18.0
High taxes	26	14.6
Low patronage	36	20.2
Increasing prices	23	12.9
Transportation cost	25	14.0
Capital	2	1.1
Wood damage	1	0.6
Faulty sawing of wood	2	1.1
Credit	2	1.1
Total	178	100

Table 12: Challenges identified in the Study Area

Source: Field Survey, 2018

The socio-economic analysis revealed that majority of the respondents engaged in timber markets were adults. This could be because the enterprise provides incomes that sustains livelihood of its participants. In a related study, Okundayo *et al.*, (2000) and Sambe *et al.*, (2019) also established that traders in this trade are gainfully employed and are productive and energetic with greater potential for better performance to explore opportunities in their existing trade business.

The dominance of the male gender over the female is attributable to the hard and strenuous nature of the trade. This agrees with the findings of Adedokun *et al.*, (2017) and Sambe, (2019) that timber require tedious and require physical strength which could limit women participation. The reason for a greater proportion of the respondents being married is that timber provides

income for them to cater for their household needs. This finding agrees with that of Akinbile (2007) which states that marriage confers responsibility. Hence, the business provides income to meet household responsibilities. The implication for all the respondents been formally educated, defines their effectiveness towards their marketing activities, skill acquisition and book keeping positively (Oluyole and Usman 2006; Oladele, *et. al.*, 2013)

The indication by majority of the respondents having long years of experience implies that they have been involved in the trade for a long time and must have had good and acquired adequate skills, and hence timber marketing serves as a source of sustainable employment.

The reason for *Daniellia oliveri* as the most marketed species in the market could be due to the high demand and hence provides the highest income in the market. This also implies that *Daniellia oliveri* is the most exploited, meaning that it has the greatest tendency for depletion if not exploited on a sustainable basis while *Ficus exasperata* which is the least demanded species with the lowest income in the market has the least tendency for depletion. The reason for open forest being the highest source of supply according to the respondents is that there are very high restrictions placed forest reserves by the state government which makes it difficult to source timber in reserves. This makes open source readily available to merchants where timber can be sourced by just settling the community. This agrees with Shansaya *et al.*, (2015) that the main source of supply of traditional Nigeria timber such as Iroko, Mahogany, Obeche has been from areas outside the forest reserve.

The reason for Kogi state and Abuja having the highest proportion of supply to the study area could be attributed to proximity and availability of raw materials of these areas to the study area. The cost of transportation could be much less compared to the other areas, because the further the distance, the more marketing cost incurred and the less the profit and on the prevailing price (Andinanto *et al.*, 2010, Eckelmann *et al.*, 2010 and Popoola, 2010).

The higher proportion of timber marketers being members of market association of implies that market structure is oligopolistic in nature. This poses barrier to entry in the market, Karugia, (1990) states that serious barriers to entry in to the market indicate oligopolistic tendencies. This mean that they are responsible for price determination of their products. This will lead to high profit accruing to the timber sellers as the timber prices will not be determined or controlled by

the forces of demand and supply. This usually results into imperfect market where the timber sellers are the price makers and hence monopolists.

The Gini- correlation coefficient of timber marketing obtained in the study area was 0.1552. This implies that the market is fairly equitable in distribution of timber sellers. It indicates that the measure of inequality of sales and incomes is low. The timber market however is imperfectly competitive with the market structure tending towards monopoly. The outcome will be bad market performance as a result of certain stakeholders which are sellers and in most cases control prices rather than the forces of demand and supply (Nadda and Swamp, 1979, Babatunde and Babatunde, 2020). Timber marketing in the study area is profitable venture with good financial returns to the marketers. However, the market system is inefficient, the business is monopolised because sellers fix prices for buyers (Usman, 2014). Hence, there is little influence of market forces of demand and supply within the timber market exemplifying bad market conduct and performance.

Though timber business is capital intensive, anybody with amount of money between fifty-one thousand naira and hundred thousand naira can invest in the timber trade as a means of livelihood. This implies that timber business in the study area is capital intensive and thus will require adequate capital for set up.

The fact that majority of the respondents agrees that timber is readily and regularly available for the trade in the study area confirms that the forest contains a wide range of timber species and is being exploited at an unsustainable rate provoking a continuous availability of timber species. According to Arowosoge *et al.*, (2008) and ITTO, (2013), The increase in number of timber species harvested and marketed has grown in recent years led to prime species been largely logged out and has thus threatened the sustainability these timber species.

Based on the challenges of timber of timber business in Lokoja metropolis, low patronage ranks the highest as a result of the fact that the State in which the study area is, largely constitute of civil servants who solely depends on salary which are patronisers of the market has not been paid salary for several months and hence this has reduced their purchasing power causing very low patronage in the market. Hence the low patronage can be attributed to the present economic challenges facing the country.

The Scarcity of demanded wood species could be attributed to the fact that demand of wood species is higher than the available wood species. This indicates therefore that the forest is not being harvested on a sustainable basis, the rate of harvest does not match the rate of regeneration because of the high depletion of forest and decline in the quality and quantity of species in markets (Adedokun *et. al.*, 2017). General Wood and Veneers Consultants Ltd (GWVC), (1994) reported that because of the decline in the commonly used timber species (CUTS) used for furniture and wood industries, the timber market has been forced to resort to the use of lesser known and predominant timbers species (Lesser-known species, LUTS) available in the localities of the markets.

The lack of supply of wood can be affected by factors such as season. According Langbour *et al.*, (2010) timber supply is highly seasonal and this complicates felling operations and transportation. Multiple taxing system by the state Government has also been indicated as one of the major factors affecting the profit margin of the respondents. The remoteness of extraction areas in addition to bad roads and increased price of fuel and diesel and gifts given at check points has made transportation cost a challenge to the profit margin of the respondents.

Increasing prices also constitutes a challenge as this can affect demand and supply of the commodity. As prices increases, supply increases and demand falls. Hence this affects the profit margin of the traders. The challenge of lack of credit corroborates the finding of Akanni and Adetayo (2011) who observed that access to credit facilities affects timber trade. Credit buying can be attributed to the current economic state of the country and the state that has affected their finances making unable to pay immediately for the commodity. Faulty sawings of wood by operators reduces the number of dimensions of wood that can be produced from a timber, thus, reducing profitability. Capital also affects the profit margin of respondents as timber business is quite capital intensive in the study area and this pose a challenge too to profitability. Wood damage can be caused by insects and in the process of offloading breakage can occur.

5.0 Conclusion and Recommendations

5.1 Conclusion

Timber marketing provides a ready source of raw materials for both industrial and domestic purposes in Lokoja Metropolis. The business is male dominated and involved people in their

active ages. The result reflected that *Daniella oliveri* is the most marketed specie in the market with the highest tendency for depletion.

5.2 Recommendations

The State government should make and implement afforestation and reforestation policies in the state in order to ensure sustainability of the forest for continuous timber supply. Also, private sector to investment in plantation forestry should be encouraged in order to reduce the pressure on available species and their chances for depletion especially on the *Daniella oliveri* species.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

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