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SUSTAINING LIVELIHOOD THROUGH SAWN WOOD MARKETING IN PORT HARCOURT, NIGERIA

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ABSTRACT

Timber is mainly marketed as sawn wood (planks) in the developing tropical regions due to sparse wood processing industries. This study aimed at determining the profitability and livelihood support prospects of sawn wood marketing in Port Harcourt, Nigeria. A total of 100 well-structured research questionnaires were administered among plank marketers in two major timber markets in Port Harcourt metropolis (Illabuchi and Marine Base plank markets). Data were analyzed using Net income, Rate of Return on investment (RORI), Benefit-Cost ratio and multiple linear regression to determine the profit level on investment of the marketers. Results revealed that the plank marketers were all male with 70% and 43.3% possessing high school education in Illabuchi and Marine base markets respectively. The average net incomes from sawn wood sales were ₦184, 239.00 and ₦70, 355.00 for Illabuchi and Marine Base plank markets respectively, while RORI was 78.7% and 30.2% for the two markets. Benefit –Cost analysis showed that plank marketing is a viable investment in Port Harcourt (1.81 and 1.33 for Illabuchi and Marine base markets respectively), Net Present Value was higher in Illabuchi (₦107, 180.70) than Marine Base markets (₦42, 630.44). Educational level of the marketers was significant (0.032, 0.018, 0.012, 0.024, $p \leq 0.05$) in four regression functions tested on profitability of sawn wood marketing. Wood quality (65%), availability (20%) and price (15%) were identified as the main factors of consumer preference in the study area. Findings showed that ten (10) timber species were mostly preferred for building and other wood works. Sawn wood marketing is a viable enterprise in Port Harcourt; however, there is the need for sawn wood marketers to organize themselves into cooperative groups in order to secure loan and credit facilities from funding agencies for improved marketing efficiency.

KEYWORDS: Sawn wood, marketing, profitability, livelihood, Nigeria.

INTRODUCTION

The ubiquitous nature of wood has made it a valuable material in every stage of human development such as building construction, marine and sea applications, construction purposes, railway, domestic appliances and musical instruments, (ITTO, 2005). In Nigeria, sawn-wood is used for various purposes across the country and its prices are fundamental pre–requisite for socio-economic development of the country. Out of the semi-processed and processed wood categories, sawn-wood has the highest production and demand and it is the most widely distributed in Nigeria (FAO, 1999) for construction purposes such as building and furniture. Prime marketable product of most forest today is wood for use as timber, fuel-wood, pulp and paper, providing some 3.4 billion cubic meters of timber equivalent a year globally (FAO, 2004)

The grading of sawn wood into categories (uniform and desirable quality) as it is processed helps to determine to a large extent the value and potential use possible for each board of sawn wood (Pierre and Steve, 2006). Tropical hardwood demand is benefiting from housing renovation activity in some parts of Europe and demand for sawn wood has revived to some extent, (Holopainen, 2011). The European Union is the largest importer of tropical wood from Africa; most of these wood species are usually extracted from natural forests and sometimes from plantations. Logs are sawed into planks of different sizes for distribution and marketing. However, logs and sawn wood are marketed locally in designated plank markets and sawmills across the country. Sawmills account for 93.32% of the total number of wood based industries in Nigeria, while sawnwood constitute 70% of wood consumption in Mexico respectively, (Fuwape, 2001, Forster et al., 2005). Locally, sawn wood processing and marketing contributes to livelihood sustainability through employment and cash income in the rural and urban communities in Nigeria. Giliba et al, (2010) reported that large numbers of households in the forest regions of Tanzania generate some of their income from selling forest products. The wooden furniture industry is growing steadily in Nigeria, (Arowosoge et al, 2010) and solely depends on sawn wood sector for raw materials. RMRDC, (2001) 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. Sawmills, plywood and veneer mills are ranked among the highest revenue and employment generating sectors in the forest based industries in developing economies such as Nigeria. In this work we investigate the contributions of sawn wood marketing to livelihood sustenance in Port Harcourt city, Nigeria.

METHODS

The study area

Port Harcourt is the administrative headquarters of Rivers State with an estimated population of 1,230,000 (NPC,

2010) and located on Lat. $4^0\ 47^1$N and Long. $7^0\ 00^1$ E. It features a tropical monsoon climate with heavy lengthy rainfall season and a short dry season with an average temperature of about 25°C - 28°C. The major occupation of the local inhabitants are mainly fishing and farming at subsistence level. Influx of professionals and expatriates as a result of crude oil exploration has led to expansion and development of socio infrastructural facilities which promoted it to a metropolis; this was associated with urbanization and untold impact on the forest resources to meet the need of the teeming population.

The two largest and well organized timber markets (Illabuchi and Marine Base located at Mile 3 Diobu and Marine Base junction respectively) were purposively selected for this work. Illabuchi timber market was established in 1989 on about 1.5ha of land comprising 180 plank retail shops, while Marine base timber market was established in 1993 on a hectare of land comprising 120 plank retail shops.

Data Collection and Analysis
The data for the study was gathered through the use of pre-tested open ended questionnaire administered in the form of oral interview and personal observation. Total of 100 pretested semi-structured questionnaires were randomly administered among the timber marketers in the selected markets, 60 at Illabuchi and 40 at Marine Base. Other sources of information were personal communication and interview as well as secondary sources.

Sawn wood marketers' demographic data was presented in simple frequency and percentages. Net Income from plank sales was used to determine if the enterprise is profitable. Cost-benefit Analysis was used to evaluate the viability of the enterprises, while Rate of Returns on Investment (RORI) was calculated to determine the rate at which the money invested on the enterprises could be realised. In addition, sensitivity analysis was carried out on both the Benefit-Cost and Rate of Returns on Investment to establish the point at which viability and profitability can be threatened. Multiple Regression analysis was used to assess the relationship between profits as a function of demographic characteristics of the entrepreneurs.

Net income (NI): Total income (TI) less total cost (TC), NI = TI – TC.

Cost-Benefit (B/C): Cost-Benefit analysis is a technique that allows project evaluators and entrepreneurs to determine if benefits exceed costs for a given project or enterprise in a specific period, (Aiyeloja, 2007). The

investment is economically viable if the benefit cost ratio is greater than one (1).

$$B/C = \frac{\sum_{t=0}^{t=n} \frac{R_t}{(1+r)^t}}{\sum_{t=0}^{t=n} \frac{C_t}{(1+r)^t}}$$

Where: C_t = cost of each project year, R_t = benefit from each project year, R = the discount rate, T = time, n = the range from one to whenever the project ends

Rate of return on investment (RORI): The RORI depicts the level of profitability of the investment.

RORI = TR/TC x 100. Where: TR = Total revenue, an equivalent of Gross Income (GI), TC = Total cost, an equivalent of Gross Cost (GC), RORI = GI/GC x 100

Multiple Linear Regression Models: This model was used in explaining the relationship between profit level on the planks and factors affecting the level of profit that is derived from it based on, Ola (1999). The multiple regressions used to investigate the influence of demographic characteristics of the entrepreneur on profitability of plank marketing and specified thus;

$$Y = a = b_i x_i + b_2\ X_2 + .. + b_n X_n + e$$

Where: Y = dependent variable (level of profit), X_i - X_n = Independent Variables (age, education, gender, household size), a = Intercept, b1...bn = Regression coefficient or estimators, ei = error coefficient.

RESULTS
Demographic characteristics of sawn wood marketers
The demographic characters of timber dealers in the two plank markets were captured in (Table 1). All the plank marketers interviewed were males, their age ranges from 30 to above 70. Majority of the plank dealers are married, Illabuchi (83.33%) and Marine base (66.67%). Educational qualification of the dealers varies in the two markets, Illabuchi have more of high school leavers (56.67%) and 10% tertiary education level while in Marine Base, 30% were high school leavers and 30% have tertiary education.

TABLE 1: Demographic characteristics of sawn wood marketers in Illabuchi and Marine Base Timber markets, Port Harcourt, Nigeria

Demographic characteristics		Illabuchi Market	Marine base Market	Total
		%	%	
Sex	Male	100	100	100
	Female	0	0	
Age	Less 30	4.35	0	
	30-39	17.39	20.84	
	40-49	30.09	33.33	
	50-59	28.43	33.33	
	60-69	12.04	12.5	100
	Above 70	7.70	0	

Marital status	Married	83.33	66.67	
	single	10.1	23.33	
	Divorced	3.33	3.33	100
	Widower	3.33	6.67	
Educational qualification	primary	20	26.67	
	secondary	70.00	43.33	100
	tertiary	10	30	

Livelihood sustenance of sawn wood marketing: profit and poverty line in Port Harcourt
Students t-test distribution was used to establish if the mean annual profits on sawn wood marketing will be adequate to lift a family of six (average family size in Nigeria) above poverty line. Sawn wood marketing in both markets have mean annual profit of ₦ 831,112 and ₦ 745,063.67, (Table 2). Profit in the two markets is significant at $1 per family daily (0.000) but not significant at $2 per family daily (0.075 and 0.297) in a family of six.

TABLE 2: Livelihood sustenance of sawn wood marketing: profit and poverty line in Port Harcourt

Market	Mean Annual profit (₦)	Standard deviation	Poverty line ($1/Day) 6 People/yr	Poverty line ($2/Day) 6 People/yr	P-level student t-test ($1/Day) 6 People/yr	P-level student t-test ($2/Day) 6 People/yr
Illabuchi	831,112.00	5.17011	328500	657000	.000*	.075
Marine base	745,063.67	4.54091	328500	657000	.000*	.297

Significant at 0.05 level, USD$1=₦150

Average net income from sawn wood sales were ₦184,239.00 and ₦70,355.00 for Illabuchi and marine base plank markets respectively, while RORI was 78.7% and 30.2% for the two markets (Table 3). Higher net income was recorded at Illabuchi plank market in relation to net income at Marine Base market.

TABLE 3: Average net income and RORI of sawn wood marketing in Port Harcourt, Nigeria

Market	Total Revenue (₦)	Total Cost (₦)	Net Income (₦)	RORI (%)
Illabuchi	420,000.00	235,761.00	184,239.00	78.7
Marine Base	302,666.00	232,311.00	70,355.00	30.2

Benefit – Cost (B/C) analysis (Table 4) showed that sawn wood marketing is a viable investment in Port Harcourt; the (B/C) values are greater than one (1) in the two markets representing 1.81 and 1.33 for Illabuchi and Marine base markets respectively. Net Present Value (NPV), of a business indicates the present value of the net cash flow. Illabuchi has a higher NPV as result of its' higher numbers of marketers and active plank shops.

TABLE 4: Benefit- Cost analysis of sawn wood marketing in Port Harcourt Nigeria

Timber Market	Total Revenue (₦)	Total Cost (₦)	Discounted Cost (₦)	Discounted Revenue (₦)	Net Present Value ₦	B/C
Illabuchi	420,000.00	235,761.00	132,219.00	239,219.00	107,180.70	1.81
Marine Base	302,666.00	232,311.00	129,889.00	172,520.00	42,630.44	1.33

Sensitivity studies
Sensitivity analysis on the profitability shows that the business was viable for the two sites when average family size increased to 10 on USD $1 per capita daily. At Marine base market, when the family size increases to 11 the business was no longer viable (0.096), however, at Illabuchi, the business remained viable (0.022), but unviable (0.075) when the family size increased to 12, (Table 5).

TABLE 5: Sensitivity analysis on profitability of sawn wood marketing in Port Harcourt

Family size yearly	($1/Day) 8 People/yr	($1/Day) 9 People/yr	($1/Day) 10 People/yr	($1/Day) 11 People/yr	($1/Day) 12 People/yr	($2/Day) 5 People/yr
Illabuchi	.000*	.001*	0.05*	0.022*	0.075	0.05*
Marine Base	.001*	.005*	0.024*	0.096	0.297	0.24

P-level student t-test – 0.05 level of significant

Sensitivity on profitability indicates viability of the enterprises with the ability of lifting a standard family above poverty line. The sensitivity analysis on cost benefit ratio indicates that the business in both sites were viable when cost was increased to 20% (1.48 and 1.08 for Illabuchi and Marine Base respectively), but when the cost was increased to 40%, Marine base was no longer viable (0.93) while Illabuchi was still viable (1.11) when the cost rose to 60%. Sensitivity analysis on benefit-cost ratio at decreasing benefit shows that at 20% decreasing benefit,

the business remained viable in both sites. But the Marine base timber business became unviable (0.91) when benefit reduces to 30% while Illabuchi was not viable (0.89) at 50% reduced benefit.

Educational level of the marketers was significant in the regression functions tested (0.032, 0.018, 0.012, 0.024, $p \leq$ 0.05) on profitability of sawn wood marketing in Port Harcourt as shown in Table 6.

TABLE 6: Effect of demographic variables of marketers on profit in sawn wood marketing in Port Harcourt, Nigeria

Model	Variables	Parameter (B)	SEE	t	P level
Linear	Constant	-21139.233	43076.824	-.491	.627
	Age	817.266	8160.697	.100	.921
	Family size	4587.719	6045.481	.759	.453
	Education	16720.837	7500.876	2.229	.032*
	Experience	6188.618	8380.640	.738	.465
Exponential	Constant	9.589	.582	16.467	.000*
	Age	.053	.110	.481	.633
	Family size	.043	.082	.528	.601
	Education	.252	.101	2.484	.018*
	Experience	.098	.113	.862	.394
Reciprocal	Constant	4.921E-5	.000	4.083	.000*
	Age	-1.212E-6	.000	-.531	.599
	Family size	-5.091E-7	.000	-.301	.765
	Education	-5.567E-6	.000	-2.653	.012*
	Experience	-2.263E-6	.000	-.965	.341
Multiplicative	Constant	14217.618	8743.995	7.053	.000*
	Age	.170	.371	-.265	.869
	Family size	.285	.367	-.712	.413
	Education	.545	.204	-.667	.024*
	Experience	.263	.345	.170	.342

Buyers' preference of Tree species
Planks of tree species commonly preferred by buyers are mostly stocked in the marketers outlets in the two timber markets studied in Port Harcourt, the order of preference is *Khaya ivorensis* A. Chev. (Meliaceae)*, Khaya gradifoliola* A.Juss (Meliaceae)*, Entandrophragma cylindricum* Sprague (Meliaceae)*, Mansonia altissima* J.R Drum. ex Prain (Sterculiaceae)*, Terminalia superba* Engl.& Diels (Combretaceae) *and Triplochiton scleroxylon* Schumann (Sterculiaceae). Other wood species common in the market during this survey include *Milicia excelsa* (Welw.) Benth & Hook.f (Moraceae)*, Brachystegia erycoma* Harms. (Leguminosae - Caesalpinioideae)*, Terminalia ivorensis* A.Chev. (Combretaceae) *and Hallea ciliata* J. Leroy (Rubiaceae). Factors influencing buyers' preference were species quality, availability and price, (Fig. 1).
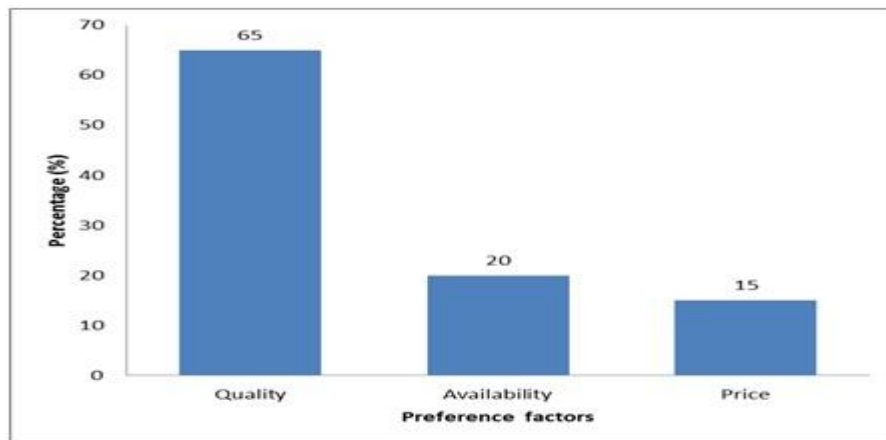

FIGURE 1: Factors influencing customers' preference of wood species in Port Harcourt, Nigeria

DISCUSSION
Gender analysis from the study showed that males constitute 100% of the surveyed sawn wood marketers, this may be as a result of the tedious nature of sorting and arranging planks in the outlets which require lots of energy, ability to stay longer at work and initiative, the findings agrees with the assertion of Sekumade and Oluwatayo, (2011) that in Nigerian economy, most capital intensive and arduous jobs tend to be male-dominated while Aiyeloja *et al*. (2012) also observed that men have been associated with strenuous jobs in the southeastern part of Nigeria. Individuals of different educational status are engaged in plank marketing, (Table 1), sawn wood business requires some degree of literacy due to

measurement and simple calculations involved in plank processing from round wood to different sizes, hence, about 56.67% and 10% of marketers in Illabuchi were high school leavers and tertiary education holders respectively. Also in Marine Base market 30% of the plank marketers possess high school and tertiary education respectively, this trend of educational status of plank dealers have been observed in Edo State of Nigeria, (Izekor and Izekor, 2011). Profit obtainable in the enterprise may have attracted individuals with higher educational status compared to income from white collar jobs that in most cases do not guarantee above average quality of life in Nigeria. Average age range of the plank marketers (30 – 60 years) indicate that plank markets in Port Harcourt metropolis are dominated by active and agile people who are capable of doing the strenuous activities of sawn wood business as observed by Izekor and Izekor, (2011).

The ability of an enterprise to yield profit will certainly keep the business going, the plank marketers are in business simply to earn an improved quality of life via profit on their investment. An enterprise is profitable when gross receipts exceed costs, the mean annual profit at Illabuchi (₦831,112.00) and Marine Base (₦745,063.67) were significant (0.000, $p \leq 0.05$) and able to lift a family size of six above poverty line based on a USD\$1 per capita daily in an extreme poverty situation, (World Bank and FOS,1996; Aiyeloja, 2007), however, the profit was unable to support same household size above poverty line in a moderate poverty level characterized by average of USD\$2 per capita daily, (Table 2). The average family size in Nigeria is about six people. People are considered poor when their measured standard of living in terms of income or consumption is below the poverty line which separate poor from the non-poor, (Osinubi, 2003). About 13.9 million people were estimated to be living in total extreme poverty in Nigeria as at 1995 and 69 million people lived in moderate poverty in 2004, (World Bank, 1995, Omonona, 2009).

Average net income from sawn wood marketing was higher in Illabuchi (₦184, 239.00) than Marine Base (₦70, 355.00), RORI values for the two market sites were positive (17.3% and 6.6%) for Illabuchi and Marine Base respectively, (Table 3). This is an indication that the enterprise is reasonably profitable; hence accruable income can be used to sustain household needs in providing food, shelter and children education. The benefit-Cost analysis was viable in both markets, Illabuchi (1.81) and Marine Base (1.33); these lend credence to the profitability of the enterprise, (Table 4). Also sensitivity analysis on profitability revealed that sawn wood marketing in Port Harcourt can support a household size of 11 people at USD\$1 per capita daily at Illabuchi market (0.022, $p \leq 0.05$) but cannot support a household of 12 people at the same rate. Marine base market can support a household size of not more than 10 people maximum, (0.024, $p \leq 0.05$), sensitivity is used to test the response of family income to changes in household size. The cost benefit ratio of both market site indicates the business is viable and can lift a family of six (standard family size) above poverty line. Ahmed, (2006) asserted that small and medium scale enterprises sub-sectors play crucial role in economic development by providing platform for employment creation, provision of goods and services, which consequently improve the quality of life, (Oni and Daniya, 2012). The main source of income for several thousands of households in Nigeria is from forest – based micro enterprise such as carpentry and furniture production which rely on sawn wood for raw material, (Onefeli, 2011). Sawn wood marketing play vital roles in sustaining livelihood of several thousands of households in Nigeria.

Regression results showed that age, experience and household size do not influence the profit margin of sawn wood marketers; however, educational status significantly affects the profit margin in sawn wood sales,(0.032, 0.018, 0.012, 0.024, $p \leq 0.05$) when subjected to four different regression functions shown (Table 6). Educational status affect skill acquisition and book keeping positively in small scale business, marketers education will help in calculations of standard measurements during plank processing and conversion in the sawmills.

Factors of wood preference by buyers include quality (durability, resistant to fire and insect attack, attractive and good grain), availability, and price, (Fig.1). This is in agreement with Aiyeloja *et al*., (2011) findings that durability, workability and availability influence buyers preference for wood species in Oyo and Osun states of Nigeria. Meliaceae family is prominent among the preferred species; this plant family is known to produce quality hard woods suitable for housing and industrial constructions globally. Some of the preferred species in Port Harcourt are also common among marketed timbers internationally, (Mabberly, 1987).

CONCLUSION

Findings from this study showed that sawn wood marketing has the prospects of sustaining livelihoods in a developing economy such as Nigeria. Forest based micro and small scale enterprise is one of the major employers of labour that generate income for households' upkeep both in the rural and urban centres across the country. Improved marketing efficiency is a panacea to increased and sustainable profit in sawn wood marketing, supply of timber sustainably remain an issue begging for attention, while policies for sustainable management of the forests is key against poverty in Nigeria.

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