PROSPECT OF SAWMILL WOOD WASTES UTILIZATION AS HOUSEHOLD ENERGY SOURCE IN ISHIAGU, IVO LOCAL GOVERNMENT AREA OF EBONYI STATE.

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ABSTRACT
Prospects of Sawmill wood wastes utilization as household energy source in Ishiagu, Ebonyi State, Nigeria was undertaken in the year 2021 with a view to identify the importance of sawmill wood wastes utilization to rural livelihood. Data were collected through the use of structured questionnaires supplemented with oral interview and observation via on-the-spot assessment. A multi-stage sampling technique was employed for this research, the first stage was the purposive selection of Ishiagu Town. The second stage involved total selection of all the communities in the town while the third stage was random selection of twenty (20) households from each community. The A total of 200 Questionnaires were randomly administered on in the study area. Data generated was analyzed using descriptive statistics. The result showed that 56% and 23.5% of the respondent use sawmill wood wastes for cooking and for processing of farm produce respectively. It was observed in the study that 37.5 % of the household spend an average of ₦450 on sawmill wood wastes utilization weekly while 4.5% of them spend above ₦600 within the same period. The significance of the results found in this study is that effective usage of the sawmill wood residues should be encouraged so as to reduce wastage. This may also boost the local economy of the rural dwellers.

Key words: *Household energy, Ishiagu, Sawmill, Wood utilization, Wood wastes.*

INTRODUCTION

Forest plays integral role in supporting rural livelihoods especially in developing countries because it is blessed with wide range of resources. The performance of the forest industry in Nigeria has been evaluated by various authors, among which are Kukogho *et al* (2011), Ogunwusi *et al* (2013), Larinde (2010) and Ogunsanwo (2010). From the different analyses carried out, it can be deduced that the forest industry has contributed significantly to local and international trade. The wood industry can be divided into formal and informal sectors, both have witnessed serious anomalies dictated by sub-optimal deployment of raw materials. The formal sector includes the organized wood-based industries such as the pulp and paper mills, sawmills, plymills, particles board mills and furniture factories. The informal enterprises are the small wood-based enterprises operating without formal corporate entity and include enterprises that engaged in production of firewood, charcoal, chewing sticks, sculptured wood and in some cases, artisanal cabinet markers and lumber converters. The informal sector which is often downplayed in reporting activities in the wood industry dominate the industry in terms of number, and is involved in activities which directly and indirectly influenced trade volume in the formal sector (Ogunsanwo, 2010).

Sawmill wood wastes are residues from log conversions and lumber processing. They include saw dusts, slabs, flakes, off cuts, barks, wanes, planner shavings, and wood rejects. Wood wastes have been broadly classified into avoidable and unavoidable wastes (Aina, 2006). While the latter (unavoidable waste) are majorly residues from sawmills, the former (avoidable waste) results from lack of precision in harvesting and processing of logs. Other causes of waste may be related to the conditions of the band mill used. Wood wastes are often used in making briquette, poultry beds, and charcoal. This represents a relatively insignificant utilization of generated waste (Omoniyi et al., 2013). Better utilization of our forest resources is inevitable because of decreasing quality timber on a declining land base (Omoniyi et al., 2013). The enormous waste generated during processing can be utilized in wood-based composites industries, or harnessed towards the co-generation of power and heat. In contemporary civil engineering, mortar/concrete can be reinforced with wood waste to enhance the properties of the basic material (Babalola *et al.* 2011).

Large volumes of wood waste are generated annually from timber processing industries in Nigeria. It *was* estimated that about 1.72million m^3 of wood waste generated in Nigeria in 1998 and 2.87 million m^3 in 1992 (Rabiu, 2001). Daramola and Aiyeju (2002) reported that

about 2286 m^3 is generated daily in Abeokuta. However, as generated *wood waste increases beyond its present utilization, it therefore becomes important to find safer means of reducing and disposing wood waste. These means should conform to environmental regulations and one of the best ways of reducing wood waste is improved utilization of avoidable wood waste.*

The continued increase in the global consumption of industrial wood products would deplete forest and woodland resources and experts are concerned about the additional pressure this will put on the world's forests. (FAO 2010). This additional pressure on the world's forests calls for sustainable utilization and efficient usage of wood in its production. Sustainable development is a key issue for governmental bodies, industries, and other stakeholders, particularly in the timber production sector in improving the efficiency of primary wood utilization, which could help to reduce the rate of harvesting and hence a reduction in the annual allowable cut and to meet the increasing demand for wood without further impacting the world's forests. Better recovery also provides a high volume of secondary resources (offcuts, broken timber, and slabs) for recycling into new advanced materials (Asamoah, *et al*., 2020). This will further enhance the environmental profile of wood.

MATERIALS AND METHODS

Study Area

This project was carried out at Ishiagu, Ivo Local Government of Ebonyi State in 2020. Ishiagu is located at longitude $07^0$46'E and Latitude $05^0$45'N with a mean annual temperature of 29^0C and mean annual rainfall of 1350mm. The area lies within

derived savannah vegetation zone of South Eastern Nigeria with grassland and shrub tree combined together. There are two reported distinct seasons, the dry season which spans November to March, a times extend to April and the rainy season which spans April to October (Nwite *et al*., 2008). It is made up of ten (10) autonomous communities: Amaeke, Amaeze, Amagu, Amata, Ihie, Okue, Amaonye, Amaokwe, Ngwogwo, Ogwor. All the communities were selected for this research work.

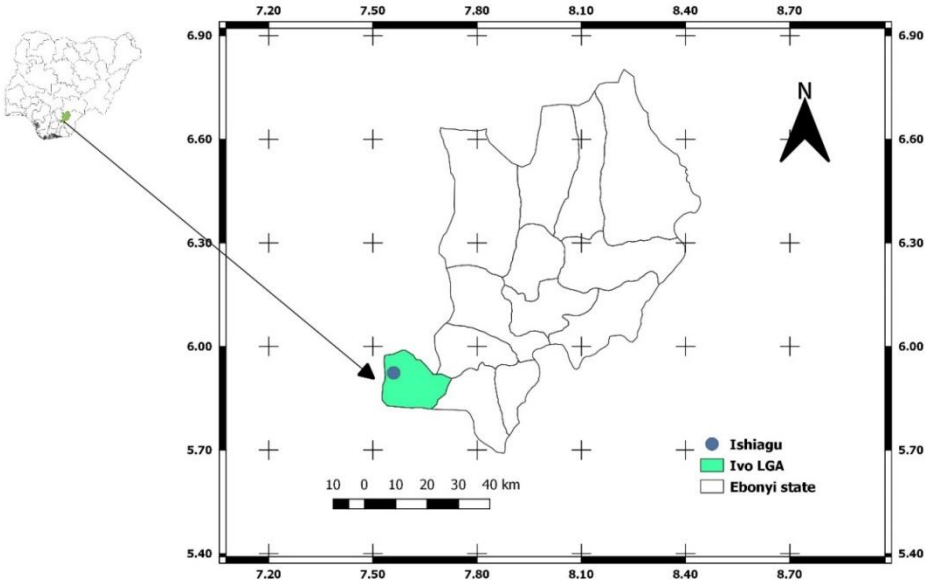

Figure 1: Map of Ishiagu community

Data Collection and Analysis

A multi-stage sampling technique was employed in the selection of the respondents for this study. The first stage is the purposive selection of Ishiagu town. The second stage involved total selection of all the communities in the town. The third stage was random selection of twenty (20) households from each community. In all, a total of 200 respondents were therefore sampled and used for the analysis. This study employed descriptive statistics such as percentages and frequency distribution. The parameters surveyed include demographic size of the household, household usage of sawmill wood wastes, weekly expense, choices and types of sawmill wood wastes used by household in Ishiagu, Ivo local Government area of Ebonyi state.

RESULTS AND DISCUSSION

Demographic Data of Respondents

The results of the demographic data of respondents are presented in Table 1. Most of the respondents are in their active ages, as 43.5% are between the ages of 45- 60 years, while 37% are between the ages of 31-45 years. In terms of household size, the average family sizes of the respondents was found to be six persons (47%) within the communities. Respondent's literacy level revealed that 1.5% as having had tertiary education, 50.5% had secondary school certification while 30.5% of the respondents had primary school leaving certificate and 17.5% had no formal education. Also, 61.5% of the respondents were female while 38.5% were males, an indication that majority of those using sawmill wood waste as household energy were females. Marital status distribution showed that 22.5% of were single, 67% married, 6 % divorced while 4.5% were widowed.

Table 1: Demographic Data of the Respondents

Ages	**Frequency**	**Percentage**
18-30	31	15.5
31-45	74	37
45-60	87	43.5
60 and Above	8	4
Total	200	100
Family Sizes		
1-4 persons	27	13.5

5-8 persons	68	34
9-12 persons	94	47
12 and Above	11	5.5
Total	200	100
Level of Education		
Non-formal	35	17.5
Primary Education	61	30.5
Secondary Education	101	50.5
Tertiary Education	3	1.5
Total	200	100
Sex		
Female	123	61.5
Male	77	38.5
Total	200	100
Marital Status		
Single	45	22.5
Married	134	67
Divorced	12	6
Widowed	9	4.5
Total	200	100

Utilization of major types of Sawmill wood waste

The results showed that timber offcuts were the most common and frequently used sawmill wood wastes as attested to by 42.5% of the respondents. This was followed by wood slabs 21.5%. The utilization of the sawdust was 16.5% of the respondent while wood barks was used by 14.5% of them. The least utilized sawmill wood wastes were the planner shavings by 5.0% of the respondent. Table 2. The high preference of the timber offcuts and wood slabs by households could be traced to its relatively large size and thus its economic use. It also has a relative high combustion rate and provides satisfactory heat energy to its users

Table 2: Major types of sawmill wood wastes utilized.

Variables	Frequency	Percentage
Sawdust	33	16.5
Slabs	43	21.5
Offcut	85	42.5
Barks	29	14.5
Planner shavings	10	5
Total	200	100

Table 3: Reasons for choices of Sawmill wood wastes by the Respondent.

Variables	Frequency	Percentage
Readily available	74	37.0
Relative cheap	63	31.5
User-Friendly	39	19.5
Economics of use	24	12.0

Total	200	100

The respondents also gave reasons for the high preference of sawmill wood wastes to other sources of household energy Table 3 to include that it was readily available (37.0%), relative cheapness (31.50%), user-friendly (19.5%), economics of use (12.0%).

Uses and Quantity of sawmill wood wastes for energy utilization

Majority of the respondent (56%) use sawmill wood wastes for cooking, 23.5% for processing of farm produce, 16.0% for processing forest fruits while 4.5% uses it to cure tobacco as presented in Table 4. This is an indication that a high percentage of sawmill wood wastes is utilized for cooking purposes. This result agrees with the earlier submission of Sodimu *et al* (2003), who observed that majority of households in Nigeria especially among the rural dwellers, depends greatly on fuelwood as their main source of cooking energy.

Table 4: Household usage of Sawmill wood wastes.

Uses of Sawmill Wood Wastes	Frequency	Percentage
Cooking	112	56
Processing of Farm produces	47	23.5
Processing of Forest fruits	32	16
Curing of tobacco	9	4.5
Total	**200**	**100**

Table 5: Weekly usage of Sawmill wood wastes.

Quantity (Kg)	Frequency	Percentage (%)
1 - 6	19	9.5
7 - 12	48	24
13-18	93	46.5
19-24	24	12
> 24	16	8
Total	**200**	**100**

Weekly expense on Sawmill wood wastes utilization.

The weekly expense on sawmill wood wastes utilization (Table 6) showed that some of the respondent 37.5% spend between

sawmill wood wastes utilization. The variations recorded in the amount spent on sawmill wood waste utilization depends on some socio-economic variables which includes size of the household, level of income, category of food consumed and reason for usage.

The result presented in Table 5 showed the weekly usage range in the study area. 46.5% of the respondent use between 13-18kg, 24% use 7-12kg, 12% use 19-24kg while about 9.5% utilizes 1-6kg of sawmill wood wastes weekly. However, a small percent of them (8%) use above 24kg of sawmill wood wastes weekly in meeting their household energy commitment. The high percentage of the respondents utilizing 13-18kg of sawmill wood waste weekly is due to the number of persons per household, since majority of the products are utilized as domestic energy source for cooking purposes. This observation agrees with the earlier report by Izekor and Osayimwen (2010) that most household depends largely on firewood as their main source of energy for cooking and other domestic energy needs.

Table 6: Weekly expense on Sawmill wood wastes.

Amount (Naira)	Frequency	Percentage
200- 300	24	12
300-400	37	18.5
400-500	75	37.5
500-600	55	27.5
>600	9	4.5
Total	**200**	**100**

CONCLUSION

The result of the study has shown that the usage of sawmill wood wastes adds considerably to household energy needs of people of Ishiagu. The study also revealed the different types of wood wastes produced from sawmills and its mode of utilization in meeting their various domestic energy needs. The amount of sawmill wood wastes utilized by household size, level of income and reason for usage are due to the widespread socio–economic characteristics of the sampled respondents in the study area. It is therefore imperative for member of the forestry professional and other relevant government agencies to promote policies and strategies aimed at increasing the usage of sawmill wood wastes in the provision of energy for both household and industrial use. Utilization of sawmill woodwastes will reduce pressure on the forest for fuelwood and thereby improve conservation.

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