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# **Profitability Analysis of Fuelwood Marketing in Yewa North Local Government Area of Ogun State**

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**By**

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## **Abstract**

*This research work was undertaken to analyze the economic profitability of fuelwood marketing in Yewa North Local Government Area of Ogun State. A total of one hundred and twenty marketers (120) structured questionnaires were administered by personal contact on the fuelwood marketers in selected villages of which they fully used. Descriptive, marketing margins and regression analysis were used to analyze the data collected. The result of the descriptive analysis revealed that females were mostly found in fuelwood business as compared to their male counterparts. The result also shows that many of the marketers have formal education while only few (31.7%) were illiterates. Profitability (Budgetary) analysis was carried out to determine the profitability level of fuel wood products in the study area. The fuelwood marketers were divided into two categories, viz. firewood marketers and charcoal marketers and profitability analysis was carried out for each category. The result of the analysis showed that profitability level depends on the number of loads of fuelwood per month giving the net income per respondent for the two categories of fuelwood marketers respectively. Budgetary analysis was used to estimate the total cost, total revenue and the gross margin. Regression analysis revealed that cost of hired labour and distance of fuelwood have negative impact on demand correlates of fuelwood. The study further revealed the problems faced by the fuelwood marketers such as theft, lack of technical assistance or information, incessant hike in price, credit size, poor patronage, unauthorized taxes collection and bad road during the raining season. It is therefore recommended that government and private individuals should give*

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*priority to fuelwood in alleviating and combating the problems highlighted above for smooth and better performance.*

Fuelwood plays a major role in supplying energy to the rural masses and the poorest groups in the towns. Fuelwood occupies a special place in rural energy systems owing to the importance of the domestic consumption for which it is mainly used and the fact that it is produced within the system itself. This reflects the extent of the demand for warmth in the traditional rural energy system as compared with that of propulsive energy. Wood is the fuel customarily preferred by rural people both because its decentralized method of production is suited to the scattered nature of rural habitation and usually make it possible to obtain the fuel without added cost, and because production can be maintained on the basis of sustained yield and in combination with other goods and services. Fuelwood is thus pre-eminently a renewable source of energy whose decentralized nature is particularly suited to the characteristics of rural energy systems. In a rural community, the energy system reflects an integrated structure of relationship between resources and activities, and the role of fuelwood must be seen as a complex function with many connections with the land tenure and land use systems, agricultural practices, the machinery for allocating resources, social structures e.t.c. (Hoister, 1993 and Netting, 1993).

Domestic requirements of fuelwood are essentially used for cooking food and heating the homes. Fuelwood usually accounts for the biggest percentage of overall energy consumption in developing countries. This is even more marked for rural populations and poor households. Fuelwood is usually the fuel preferred by rural people who have very little access to other forms of energy. Wood therefore, played an essential role in meeting the elementary energy requirement connected with the very subsistence of these people.

In addition to its renewable and decentralized nature, fuelwood can be gathered and used by simple techniques. Without recourse to expensive equipment and is therefore, particularly suited to the requirement of its users. Minimum energy requirement for cooking and heating may be estimated at 6 – 10 GJ, or 0.5 m – 1m<sup>3</sup> of fuelwood per person per year, and under the present condition considerable variations are possible according to cooking habits, climate, way of life and social structure, and also the efficiency of the cooking equipment. (Maserra and Nava, 1996). If account is taken of the amount of heating necessary in cold mountain climate, total energy requirement for domestic purpose may reach 25 – 30 GJ, the equivalent of about 3m<sup>3</sup> if wood, per person per year. Seasonal climatic variations, the nature of the wood and its availability may considerably modify effective consumption levels. (World Resources Institute, 1996 and Vander Plas (1995).

The contribution of fuelwood as a source of energy is not limited to rural energy systems or to subsistence sectors. In many countries, urban areas account for an increasing share of fuel wood consumption, owing to both the migration of country

people who conserve a rural way of life, and to the dependence of the poorest families, who continue to rely on wood for their needs. Fuelwood then often tends to be replaced by its derivative, charcoal, which is easy to transport, store and use, but the production of which entails considerable loss of the energy contained in the raw material. In the absence of control, urban demand signifies a concentration of consumption leading not only to localized over-cutting of resources around the town, but also to diversion to the town of supplies is indispensable for the people living in rural areas; the effects are felt for more than 100km around the town, and the distance is constantly increasing. Urban demand for fuelwood, therefore, may also constitute an important factor in disrupting rural energy supplies. (Karekezy, 2002).

In emphasizing on the importance of fuelwood in the rural energy system, attention must be drawn to the role played by this fuel in meeting such essential energy needs as cooking, heating and rural industries in the developing countries. Its growing scarcity is making it more difficult for a great many people to subsist and is breaking up their energy system; in extreme cases, it is upsetting the balance of the environment as a result of deforestation and the cutting of all woody vegetation. The problem of fuelwood, thus, has three important dimensions: forestry, energy and environment. That is why its role in the rural energy systems must be clearly perceived as a problem not only of subsistence but also of development (Fillipinn and Pachauri, 2004).

With the recent economic situation in the marketing and consumption of fuelwood in the study area, it will be interesting to ask and find answers to questions like: What are factor(s) affecting the demand of fuelwood? What are the problems faced by the fuelwood marketer? What are the economic effects of fuelwood marketing in the study area? What are the cost return and revenue structure of fuelwood marketing? The attempt to critically examine the questions with the aim of providing answers to them in relation to economic analysis of fuelwood marketing informs the objectives of this study which are to analyze the profitability of marketing fuelwood and examine the cost and return structure of fuelwood in the study area.

## **Methodology**

### **Study Area and Methods of Data Collection**

The area of study is the Yewa North Local Government Area of Ogun State. Primary data were sourced and used for this research work. The required information were obtained through structured and validated questionnaires administered personally on the target fuelwood marketers. While, secondary data were sourced from journals, bulletins and statistical reports.

### **Sampling Techniques**

Multistage sampling technique was employed in this study. Out of the eleven (11) political wards in Yewa North Local Government Area, 6 were randomly

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selected and 20 fuelwood marketers were also randomly selected from each political ward to make up a total of 120 respondents used.

**Methods of Data Analysis**

Both descriptive and inferential statistics were employed in the analysis of the survey data. The socio-economic characteristics of fuelwood marketers were analyzed using descriptive statistics such as frequency table and percentage. While, inferential statistics were used in estimating marketing margin of fuelwood retailers and budgetary analysis for the profitability of fuelwood marketers. Marketing margin is the difference between the price paid by the retailer as a percentage of the price paid at the retail end by the consumer (Kohls, 1985).

Mathematically,

$$\text{Marketing margin (mm)} = \frac{P_c - P_r \times 100}{P_c}$$

Where:  $P_c$  = price paid by the consumer

$P_r$  = price paid by the retailer

This was estimated for all categories of fuelwood marketers and the result was compared to determine the consumers' profitability. Budgetary analysis was used to determine the profitability of the fuelwood in the study area.

Specifically,

$$\text{GM} = \text{TR} - \text{TVC} \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad (\text{ii})$$

$$\text{NI} = \text{GM} - \text{TFC} \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad (\text{iii})$$

$$\text{Profitability Index or Ratio on Sales (PI)} = \text{NI/TR} \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad (\text{iv})$$

$$\text{The Rate of Return on Investment (\%)} \text{ RRI} = \text{NI/TC} \times 100 \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad (\text{v})$$

$$\text{Operating Ratio} = \quad \text{TVC/TR} \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad (\text{vi})$$

- Where:
- GM = Gross Margin
  - TVC = Total Variable Cost
  - PI = Profitability Index
  - TC = Total Cost
  - TR = Total Revenue
  - NI = Net Income
  - TFC = Total Fixed Cost
  - RRI = Rate of Return On Investment
  - RRVC = Rate of Return on Variable Cost

The T – statistics was used to test whether the obtained ratio was statistically different from one (1) or not.

The hypothesis as thus,

$$H_o: \frac{UP}{UC} = 1$$

$$H_a: \frac{UP}{UC} \neq 1$$

$H_o$ : Null hypothesis

$H_a$ : Alternative hypothesis

We failed to reject H<sub>0</sub>, if tabulated value was not significantly different from one; and if otherwise, we have rejected H<sub>0</sub>.

**Multiple Regressions Model**

The regression model of the form below was specified:

$$Y = f(X_1, X_2, \dots, X_6) \quad \dots \quad \dots \quad (xi).$$

$$Y = a_0 + \beta_i X_i + U_i$$

Where Y = Dependent Variable

X<sub>i</sub> = Independent Variables

a<sub>0</sub> and b<sub>i</sub> are the parameters that were estimated

a<sub>0</sub> = Intercept parameter

b<sub>i</sub> = Slope parameter/coefficient of X<sub>i</sub>

U<sub>i</sub> = Error term

$$D = a_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + \dots + b_6 X_6 + U_6(x)$$

Where: D = Quantity of fuelwood marketed by marketers (kg)

X = factors that determined the quantity of fuelwood marketed by marketers

(kg)

Where: X<sub>1</sub> = year of experience (years)

X<sub>2</sub> = fuelwood types (firewood, charcoal etc)

X<sub>3</sub> = marketing cost (₦)

X<sub>4</sub> = mode of supply (wholesale, retail, sub-retail, consumer)

X<sub>5</sub> = education status (primary, secondary, tertiary)

X<sub>6</sub> = sex of the marketers (male = 0; female = 1)

U<sub>i</sub> = error term

**Results and Discussion**

**Table 1: Socio-Economic Characteristics of the Respondents**

| Variables                | Frequency | Percentage |
|--------------------------|-----------|------------|
| <b>Age (years)</b>       |           |            |
| ≤ 30                     | 6         | 5.0        |
| 31-40                    | 22        | 18.3       |
| 41-50                    | 36        | 30.0       |
| 51-60                    | 35        | 29.2       |
| ≥ 60                     | 21        | 17.5       |
| <b>Sex</b>               | 40        | 33.3       |
| Male                     | 80        | 66.7       |
| Female                   |           |            |
| <b>Marital Status</b>    |           |            |
| Single                   | 5         | 4.2        |
| Married                  | 65        | 54.2       |
| Divorced                 | 20        | 16.7       |
| Widow                    | 21        | 17.5       |
| Separated                | 9         | 7.5        |
| <b>Educational Level</b> |           |            |

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|                               |     |      |
|-------------------------------|-----|------|
| No formal schooling           | 38  | 31.7 |
| Primary education             | 48  | 40.0 |
| Secondary education           | 21  | 17.5 |
| Tertiary education            | 13  | 10.8 |
| <b>Household Size</b>         |     |      |
| 1-5                           | 45  | 37.5 |
| 6-10                          | 71  | 59.2 |
| 11-15                         | 4   | 3.3  |
| <b>Religion</b>               |     |      |
| Christian                     | 64  | 53.3 |
| Islam                         | 47  | 39.2 |
| Traditional                   | 9   | 7.5  |
| <b>Years of Experience</b>    |     |      |
| (years)                       | 5.4 | 45.5 |
| 1-5                           | 40  | 33.3 |
| 6-10                          | 18  | 15.0 |
| 11-15                         | 6   | 5.0  |
| 16-20                         | 2   | 1.7  |
| Above 20                      |     |      |
| <b>Occupation</b>             |     |      |
| Marketers                     | 19  | 15.8 |
| Trading                       | 37  | 30.8 |
| Artisan                       | 33  | 27.5 |
| Farming                       | 21  | 17.5 |
| Transporter                   | 1   | 0.8  |
| Paid servant                  | 9   | 7.5  |
| <b>Member of Association</b>  |     |      |
| Yes                           | 106 | 88.3 |
| No                            | 14  | 11.7 |
| <b>Labour Source</b>          |     |      |
| Family labour                 | 15  | 12.5 |
| Hired labour                  | 41  | 34.2 |
| Self labour                   | 28  | 23.3 |
| Family and hired labour       | 36  | 30.0 |
| <b>Sources of Capital</b>     |     |      |
| Cooperative loan              | 56  | 46.7 |
| Gifts from friend & relatives | 18  | 15.0 |
| Personal saving               | 46  | 38.3 |
| <b>Fuelwood types</b>         |     |      |
| Fire wood                     | 45  | 37.5 |
| Charcoal                      | 75  | 62.5 |
| <b>Buyers</b>                 |     |      |
| Marketers                     | 1   | 0.8  |
| Consumers                     | 76  | 63.3 |

|                             |     |        |
|-----------------------------|-----|--------|
| Retailers                   | 43  | 35.8   |
| <b>Standard Measurement</b> |     |        |
| Yes                         | 76  | 63.3   |
| No                          | 44  | 36.7   |
| <b>Unit of Measurement</b>  |     |        |
| Otherwise                   | 43  | 35.8   |
| Bag                         | 77  | 64.2   |
| Total                       | 120 | 100.00 |

Source: Field Survey, 2008

Data in Table 1 above show the distribution of fuelwood marketers by age. From the survey findings, the minimum age range is less than 30 years, while the maximum age range is greater than 60 years. The result shows vividly that majority of the fuelwood marketers are in their active age, that is, between age of 41-50 years. The sex distribution of the respondents showed that 33.3 percent were male household heads while 66.7 percent were female heads. This result shows with the prevailing situation of the study area where most households are female headed. The distribution of respondents by marital status of household heads showed that majority (54.2 percent) are married, which implies that the respondents have family responsibility. The bulk of the fuelwood marketers 40.0 percent have primary education, this implies that there is an appreciable level of literacy among the survey respondents. 75 percent of the survey household heads have more than 6 persons; this has consequence on household welfare and standard of living.

Most of the respondents 53.3 percent households practiced Christianity showing that the household heads are highly religious and dedicated to their beliefs. Some of the fuelwood marketers 45.0 percent have less than 5 years fuel wood experience, indicating that many of the respondents are green horns in the business. 30.8 percent of the household heads engaged in trading and 17.5 percent are involved in farming, this reinforces the important role of fuel wood in the Nigeria economy.

The distribution of household heads on the basis of association showed that 88.3 percent of the household head belong to an association of fuelwood marketers. The implication of this finding reveals that there is a greater population of the respondents in the marketing association, which was to promote economical links among members' towns and villages. The results indicate that 34.2 percent involved in hired labour, this means that the labour source used were mostly hired labour which provides job opportunities for such categories of people. Some of the respondents have access to loan as 46.7 percent of the household heads received cooperative loan, which pivoted them against financial crisis.

The distribution of major fuelwood products by the fuelwood marketers revealed that 62.5 percent fuelwood types are charcoal. This result indicates that

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majority of the respondents were involved in charcoal marketing as a result of high demand and substitute to kerosene for an average consumer.

The buyers of the fuelwood products of the respondents 63.3 percent are consumers while 35.8 percent are retailers. This confirms that the buyers are mainly the consumers, which means that the respondents have buyers for their output. The unit measurement of the product of the respondents revealed that 64.2 percent used bags as their measurements especially fuelwood (charcoal) marketers.

**Table 2: Distribution of Respondents by Problems Encountered**

| <b>Problems</b>                             | <b>Frequency</b> | <b>Percentage</b> |
|---|------------------|-------------------|
| Theft                                       | 15               | 12.5              |
| Lack of technical assistance or information | 13               | 10.9              |
| Incessant hike in price                     | 30               | 25.0              |
| Credit size                                 | 57               | 47.5              |
| Others                                      | 5                | 4.2               |
| <b>Total</b>                                | <b>120</b>       | <b>100.0</b>      |

**Source: Field Survey, 2008.**

Data in Table 2 shows the number of problems encountered by the fuelwood marketers, 5.0 percent of respondents have theft as a problem, 10.9 percent have lack of technical assistance or information, 25.0 percent have incessant hike in price, 47.5 percent credit size while 4.2 percent of the respondents encountered other problems such as: poor patronage, unauthorized tax collectors and bad road network especially during the rainy seasons. The implication of this is that except for a few of them (i.e. marketers) who have access to cooperative loans, many of them are still operating below their business capacities due to inaccessibility to loans from banks for business expansion.

## **Cost and Return Structure of Fuelwood Marketing**

**Table 3: Budgeting Analysis for Fuelwood Marketers**

| <b>Items amount(□)</b>     | <b>Mean</b>      | <b>Percentage of mean/Total Cost</b> |
|----------------------------|------------------|--------------------------------------|
| <b>Total Revenue</b>       | 128240.02        |                                      |
| <b>Variable Cost</b>       |                  |                                      |
| Transportation cost        | 1661.0833        | 18.47                                |
| Cost of labour             | 5635.7916        | 62.69                                |
| Cost of carriage           | 223.4205         | 2.48                                 |
| <b>Total Variable Cost</b> | <b>7520.2954</b> | <b>83.67</b>                         |



|  |                   |       |
|--|-------------------|-------|
| <b>Gross Margin</b>                      | <b>120,719.72</b> |       |
| Marketing margin                         | 56841.936         | 16.33 |
| Fixed Cost (Dep. Valve)                  | 1468.5946         | 100.0 |
| <b>Total Cost (TVC + TFC)</b>            | <b>8988.89</b>    |       |
| <b>Net Income</b>                        | <b>119,251.13</b> |       |
| Profitability Index % (NI/TR)            | 0.8988            |       |
| RRVC (%) $\frac{TR-TFC}{TVC} \times 100$ | 1685.7            |       |
| OR = TVC/TR                              | 0.0114            |       |
| Value of fuelwood used at home           | 91.31             | Total |
| Value of Product                         | 44018.250         |       |

Source: Field Survey, 2008

From Table 3 above, the numbers of fuelwood marketers that were into fuelwood marketing alone were one hundred and twenty (120). The total cost for an average fuelwood marketer is ₦ 8,988.89, while the gross margin is ₦120,719.72. From the table also, other profitability indices calculated revealed that fuelwood alone is very profitable. The profitability index is ₦ 0.8988, which is an index that attempts to identify the relationship between the net income and total revenue of a proposed project through the use of a ratio.

Also, the rate of investment (RRI), rate of return on variable cost (RRVC), operating cost (OR) are ₦ 1,326.6502 and ₦ 1685.7 and ₦ 0.0114 respectively.

### Factors Influencing the Demand of Fuelwood

This is to identify the factors that militate against the demand of fuelwood in the study area.

**Table 4: Factors Influencing the Demand Correlates of Fuelwood**

| Variables                 | Parameters | Regression Coefficient(β) | T-value |
|---------------------------|------------|---------------------------|---------|
| Constant                  | $\beta_0$  | -45175.342                | -1.251  |
| Distance of fuelwood      | $X_1$      | -458.596                  | -0.553  |
| Value of last season      | $X_2$      | 0.435***                  | 4.640   |
| Cost of hired labour      | $X_3$      | -0.579                    | -0.826  |
| Family labour             | $X_4$      | 2679.852                  | 0.660   |
| Education level           | $X_5$      | 7995.782***               | 1.700   |
| Household size            | $X_6$      | 115.633                   | 0.061   |
| Experience                | $X_7$      | 3815.614***               | 2.980   |
| Amount borrowed           | $X_8$      | 0.795***                  | 3.702   |
| Age                       | $X_9$      | 353.269                   | 0.781   |
| Source of initial capital | $X_{10}$   | 11350.811***              | 1.603   |
| Sex                       | $X_{11}$   | 21.665***                 | 0.789   |
| Annual Income             | $X_{12}$   | 0.635***                  | 1.240   |
| Adjusted R <sup>2</sup>   | 63.5       |                           |         |
| F – value                 | 288.54*    |                           |         |

Source: Field Survey, 2008

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The variability in Y (dependent variable) can be explained by the independent variables ( $X_i$ ) up to 63.5 percent. The sign of the coefficient revealed the relationship between dependent and independent variable(s) and it showed that an increase in family labour used by the fuelwood to the marketing destination the lesser the quantity purchased. The result revealed that a naira increase in amount borrowed increased the output by 0.795tons/bag. In addition, as business experience increases (i.e. age spent in business), so the income increases by 3815.614tons/bag in the study area. The source of initial capital has significant impact on the marketers' income, and thus shows that source of initial capital of the marketers is the major determinant of the level of income. There will be appreciable increase in the level of income in the following season. From the result, most of the variables tested significantly determine the level of fuelwood income by the marketers.

### **Conclusion and Recommendations**

This study was to identify the problems of fuelwood marketing, examine the cost and return structure of fuelwood marketing and identify the factors influencing economic analysis of fuelwood marketing in the study area. Result from the study revealed that marketers' involvement in the venture is based on the following factors, such as value of last season of fuelwood products, educational level, experience, amount borrowed and source of initial capital with which the business took off. It is, therefore, recommended that the government should ensure the rehabilitation of roads leading to the forests so that fuelwood products are made available at the right time. The citizen also should be educated on why they need to cooperate with the government to protect the forest by avoiding bush burning and illegal tree felling.

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