EVALUATION OF CHARCOAL MARKETING IN IBARAPA CENTRAL LOCAL GOVERNMENT AREA OF OYO STATE

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ABSTRACT

The cry for alternative energy sources due to the effects of global warming has put charcoal in the forefront of the global market and the rate at which the prices of petrol, gasoline and gas are changing at geometric progression has made majority of low income earners to shift from all these expensive sources of energy to charcoal and this has made charcoal marketing to gain upper hand in the economy. The data for this research work was of primary source through the use of structure questionnaires and simple random sampling technique was used to select 100 charcoal marketers in Ibarapa Central Local Government Area of Oyo State. The data collected were subjected to descriptive statistics, double log functional form of ordinary least square, gross margin and gini coefficient techniques.

The result revealed that age, sex, educational level, household size and years of experience have great influence on the profitability of charcoal marketing. The adjusted R square reveals that the independent variables have explained 90.70% variation of the total revenue while the remaining 9.30% might be due to error term. Also, the acquisition and transportation costs gulped 60.44% and 34.79% of the total variable cost. Average total variable cost and average total revenue are ₦59,111 and ₦72,882.50 respectively. This indicates that an average marketer earned ₦13,770

as gross margin/truck suggesting that charcoal marketing is profitable in the study area. Gini-Coefficient of 0.3854 indicates high level of concentration and consequently high inefficiency in the market structure.

INTRODUCTION

Charcoal is a dark grey residue consisting of Carbon and any remaining ash, produced by the slow process of heating wood and other substances in the absence of oxygen, called Pyrolysis. It is an impure form of Carbon, which contains ash.

According to Anozie *et al*., (2006) the cry for alternative energy sources due to the impact of global warming has given charcoal an edge in the world market. Nonetheless, it is a splendid domestic fuel, and can be made from almost any organic material such as wood, coconut shells rice husks and bones. Usually hardwood species like Acacia, Mangroves, Oaks and Prosopis are promoted for the production of charcoal.

Energy from biomas, essentially fire wood and charcoal are the most essential sources of energy in developing countries (Ghilardi *et al.*, 2009; Arms, 2008 and Aweto, 1995). Even in urban areas where modern fuels are used especially fire wood and charcoal remains popular among the low income earners, due to the non-affordability of modern fuels, electric and gas cookers. While the use of fuel wood is very common in rural centers, charcoal utilization takes considerable importance among low-income earners in urban centers. Even in those developing countries that enjoy relatively high income levels, such as Botswana in Southern Africa, the use of biomass energy is popular among the poor in rural areas and in towns (Toteng, 1998). The application of charcoal, which is also referred to as biochar, to the soil has several beneficial effects. It has been reported to increase soil fertility and soil biota and hence, soil biological dynamics (Lehmann et

al., 2011 and Jin,2010) and to improve polluted soils, especially, those containing very high levels of heavy metals (Uchimiya et al., 2011). Nonetheless, the production of charcoal has several negative environmental effects. It was associated with deforestation in Brazil and in other parts of the tropics (Naughton-Treves et al., 2007 and Kohlhemp, 1995) and with soil deterioration and organic matter decline (Fontodji et al., 2009 and Foley, 1995). The process of charcoal production also enhances soil properties, especially in kiln sites, where dried felled trees are accumulated and burned. In West Africa, this is seriously dependent on biomass energy (Aweto, 1995).

Uganda's energy is dominated by fuel wood (firewood and charcoal), like most African countries. Firewood, petrol products and electricity contributes 88%, 6% and 1% respectively FAO-FOSA (2011). Uganda, therefore still depends mainly on biomass to satisfy its demand. More than 90% of the total energy consumption is still supplied by firewood and charcoal according to the Ugandan National Energy Balance 2003 FAO (2001).

In Uganda, firewood and charcoal are the important cooking fuel sources for the poor and middle income households. Above 90% of the population depends on these sources for heating and cooking. Charcoal is famous because it is affordable, sold at a relatively stable price, convenient to manufacture, accessible to all, and can be produced without external support. Urban populations commonly use the wood charcoal while farmers in rural area exclusively use firewood. This dependence on traditional charcoal and firewood is responsible for the prevailing deforestation and soil degradation which have impacted the environment adversely. The effects are shown in phenomena such as irregular precipitation, floods and violent storms (Uganda National Household survey, 2010).

There is a clear distinctive consumption pattern towards both sources. While firewood is mainly consumed in rural areas by the urban poor and in the outskirts of the cities, the urban population mainly consumes charcoal. The major reason for this is insufficient space in urban households, the higher standard of living on the average and also the transportation factors.

Charcoal has much more calorific value per kg than firewood. Charcoal is also easier to store, to handle and therefore easier to sell on markets by vendors. Charcoal is mainly bought at markets or through intermediaries whereas the end users themselves still collect firewood. This kind scenario is likely to continue for a long time because of lack of affordable alternatives. Even if sufficient resources were to be found to develop hydropower in the next 20 years, it will still only meet 5% of all the energy in the nation IUCN (2001).

Substituting kerosene for charcoal in urban household for example, would inflate the national import bill by US $ 180 million annually (Jacoveli, 2000). Such a move will furthermore lead to loss of jobs by the people on the lower end of the income scale and these are main social groups involved in the charcoal and firewood sector.

Charcoal though an old source of energy is as well still a modern source of energy for cooking in both rural and urban centers. Charcoal is an important household fuel and to a lesser extent, industrial fuel in many developing countries. It is mainly used in the urban areas where it eases for storage, high energy content (30mg/kg). Charcoal utilization assures considerable important among low income earners in urban centers. Charcoal in addition, is now an export commodity in Nigeria, with a large market in the EU, USA and Asia. The prices range from $170 -$300/ton depending on the packaging. The charcoal production industry is a multi-billion dollars industry and a money spinner for savvy investors to position themselves (Jamala *et al.*, 2013). Tropical

Africa accounts for 70% of the exports and the market is all year round with a slight drop between July and September because of the rainy season.

Indeed the charcoal industry is a multibillion dollar global industry. According to The Food and Agricultural Organization (FAO) of the United Nations, over 40 million metric tonnes of charcoal are consumed globally and approximately 2.4billion people rely on wood and charcoal for their daily fuel.

Nigeria currently ranks second to Brazil in the production of charcoal. The western countries particularly prefer Nigeria's charcoal, as the country is rich in tropical hardwood, which burns slower and is hotter. Nigeria currently exports 380,000 metric tonnes of charcoal annually. In view of the above, this paper would evaluate the marketing of charcoal in Ibarapa Central Local Government Area of Oyo State by addressing the following research questions:

(i) What are the socio-economic characteristics of charcoal marketers in the study area?

(ii) Is charcoal marketing profitable?

(iii) What is the market structure and conduct for charcoal in the study area?

METHODOLOGY

Study Area

The study was carried out in Ibarapa Central Local Government Area of Oyo State. There are ten political wards in Ibarapa Central with seven in Igboora and three in Idere. Farming and trading are the major occupations of the inhabitant. It is the trade centre region where charcoal, yam, cassava, maize and other agricultural products are being traded.

It is homogeneous mainly the people of the Yoruba ethnic group who speak the Yoruba language, located between 7^0 $15^/$ North and 3^0 $30^/$ East of the equator. The location enjoys the wet and dry seasons, average annual rainfall is estimated at 1,278mm while hours ranges from 2.4hours in August to 7hours in February, average temperature of 27^0C.

The area shares boundary with Abeokuta, Ogun State in the south and bounded in Ibarapa East Local Government Area in the west (Eruwa) and Benin Republic in the west.

Description of Techniques

Primary data were used through structured questionnaire to select charcoal marketers. It covers the socio-economic characteristics of the marketers like age, sex, level of education, marketing experience, occupation, and marketing characteristics such as price, cost and returns on sales, transportation cost and problem associated with charcoal marketing. A simple random sampling technique was employed to select 10 respondents from each ward making a total of 100 respondents.

The methods of data analysis adopted in this study include simple descriptive statistics such as tables, frequency distribution and percentages were used to analyse some socio-economic characteristics of the respondents. Gini coefficient was used to examine the market concentration of charcoal in the study area. Mathematically, It is represented by equation (1) i.e.

GC = 1 − ΣXY ……. (1)

Where

GC = Gini-Coefficient

X = Proportion of seller/ marketer

Y = Cumulative proportion of total sales

Gross margin analysis was used to determine the profitability of charcoal marketing in the study area. The gross margin is represented by equation (2) i.e.

GM = GI − TVC

Where

GM = Gross Margin

GI = Gross sales/ income

TVC = Total Variable Cost

Some of the factors that influence the sales revenue of charcoal marketer were determined quantitatively using marketing function analysis with the use of ordinary least square multiple regression analysis (OLS) under the assumption that data collected fulfilled the assumption of multiple regression model. The assumptions include absence of multicolinearity among the explanatory variables, normally distributed error term with zero mean and constant variance and non autoregression disturbance (Keutosyiannis, 1997). The marketing function postulated for charcoal marketing in the study area is implicitly presented by equation (3) i.e.

$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7 \ldots U_i)$ …….. (3)

Model Specification

Y = Sale revenue of respondents (₦)

X_1 = Cost per bag (₦)

X_2 = Transportation cost (₦)

X_3 = Education level

X_4 = Experience (Years)

X_5 = Storage cost/ Rent fee (₦)

X_6 = Initial capital outlay (₦)

X_7 = Selling price (₦)

U_i = Disturbance error term

RESULTS AND DISCUSSION

Socio-economic Characteristics

Table 1 shows that 44.0% of the respondents fell between 31-40 years of age, 31.0% fell between 21-30years of age, 15.0% fell between 41-50years of age while 9.0% and 1.0% fell between 51-60 years and 61years and above respectively. The mean age was 36.98. This implies that the marketers are in their active ages.

54.0% of the respondents were female while 46.0% were male. It implies that female were involved in charcoal marketing while majority of male deal with the transportation of charcoal.

24.0% of the respondents did not have any formal education while 76.0% had at least primary education as years of schooling.

56.0% have household size of 1-5 and 43.0% of the respondents have household size of 6-10 while 1.0% had household size of 11 and above. This might be traced to appellation of Igboora

township as “Home of Twins”, so the household tends to increase. 55.0% and 45.0% were Muslims and Christians respectively. There is no religious taboo in marketing charcoal. Majority (90.0%) of the respondents were married and there was no case of divorce among the marketers of charcoal. Majority of the respondents (64.0%) engaged themselves in the business as alternative means of livelihood. 70.0% had 1-10 years of experience while about 1.0% had at least 30years of experience in the business. 78.0% bought their charcoal directly from the farmers while 22.0% got it from rangeland. 17.0% started the business with less than ₦20,000, 28.0% had initial cost between ₦21,000 - ₦40,000, 21.0% had initial cost of ₦41,000 - ₦60,000. 58.0% paid ₦800 per month as rent, 20.0% and 22.0% paid ₦700 and ₦600 respectively as rent per month. This implies that it does not cost much to start the business.

Table 1: Socio-economic Characteristics of Respondents

Variable	Frequency	Percentage(%)
Age (years)		
21 – 30	31	31.0
31 – 40	44	44.0
41 – 50	15	15.0
51 -60	9	9.0
61 above	1	1.0
Sex		
Female	54	54.0

Male	46	46.0
Education level		
No formal	24	24.0
Primary	29	29.0
Secondary	37	37.0
Tertiary	10	10.0
Household Size		
1 – 5	56	56.0
6 – 10	43	43.0
11 above	1	1.0
Religion		
Islam	55	55.0
Christianity	45	45.0
Marital Status		
Married	90	90.0
Single	6	6.0
Widow(er)	4	4.0

Major Occupation		
Trading	42	42.0
Artisan	35	35.0
Farming	20	20.0
Civil Service	3	3.0
Secondary Occupation		
Trading	64	64.0
Farming	15	15.0
Artisan	19	19.0
Civil Service	2	2.0
Years of Experience		
1 – 10	70	70.0
11 – 20	20	20.0
21 – 30	9	9.0
31 above	1	1.0
Source of Charcoal		
Farmers	78	78.0

Rangeland	22	22.0
Initial Cost (₦)		
10,000 – 20,000	17	17.0
21,000 – 40,000	28	28.0
41,000 – 60,000	21	21.0
61,000 – 80,000	16	16.0
81 above	18	18.0
Rent (₦)		
600	22	22.0
700	20	20.0
800	58	58.0

Profitability Analysis

The result in table 2 reveals that acquisition cost gulped 60.44% of the total variable cost while transportation cost accounted for 34.79% of the total variable cost. Rent accounted for 1.25% of the total variable cost while charges (tax) accounted for 2.01% of the total variable cost. The cost of bags accounted for 3.53% of the total variable cost. Also, an average marketer incurred a total variable cost of ₦5,911,100 per trip but earned average total revenue of ₦7,288,250. Average total variable cost and average total revenue are ₦59,111 and ₦72,882.50 respectively. This

indicates that an average marketer earned ₦13,770 as gross margin/truck suggesting that charcoal marketing is a profitable venture in the study area.

Computation of Gini-Coefficient for Charcoal Marketing

Table 3 shows the market structure for charcoal in the study area. The value of Gini-Coefficient greater than 0.35 is a high indicating factor for equitable distribution income/sale (Dillion and Hardaker, 1993). Therfore, Gini-Coefficient of 0.3854 indicates high level of concentration and consequently high inefficiency in the market structure.

Table 2: Cost and Returns Analysis

Items	Amount (₦)	% of TVC	% of Total Sales
Acquisition Cost	3,572,500	60.44	49.02
Transportation Cost	2,056,500	43.79	28.22
Rent	73,000	1.25	1.01
Haulage Fee	119,000	2.01	1.63
Cost of Sack Bags	208,500	3.53	2.86
Total	5,911,100	100.00	81.10
Total Revenue	7,288,250		
TVC/Seller	59,111		
TR/Seller	72,882.50		

GM/Seller 13,770

Table 3: Computation of Gini-Coefficient for Charcoal Marketing

I/S(₦)	F	PS(X)	CF	TS	PTS	CFTS(Y)	XY
≤65,000	12	0.12	12	770,000	0.11	0.11	0.0132
66.000-70,000	48	0.48	60	3,359,000	0.46	0.57	0.2736
71,000-75,000	5	0.05	65	373,250	0.05	0.62	0.0310
76,000-80,000	21	0.21	86	1,617,000	0.22	0.84	0.1764
81,000-85,000	14	0.14	100	116,900	0.02	0.86	0.1204
Total	100	1.00		6,236,150	0.86		

0.6146s

Mean Value of Sales = ₦62,361.50

Gini- Coefficient = 1 − ΣXY

= 1 − 0.6146

= 0.3854

Factors Influencing the Charcoal Marketing

Table 4 shows the marketing function analysis. The linear, semi log and double log functional forms of the marketing function were run using ordinary least square technique. The estimated functions were evaluated in terms of statistical significance of the coefficients of multiple

determinations (R2) as indicating by F-value, the significance of the coefficients and the magnitude of the standard errors. Based on these statistical and economic criteria, the double log functional form was selected as the lead equation. The result shows that age, sex and educational level were significant at 1%. It implies that one unit increase in age would increase the profitability by 0.310 units and as the level of education increases there would be an increase in the level of profitability by 0.077 units. Years of experience are significant at 5% which implies that 1year increase in the years of experience would affect the level of profitability positively by 0.048 units. Also, household size is significant at 5% and it has negative implication. That is if the size of household increases by one the profit would be decreased by 0.077 units which might resulted from the consumption of the individual from the profit. The adjusted R square (R2) which is 0.907 means that the independent variables have explained 90.7% variation of the dependent variable (Total Revenue) while the remaining 9.30% would be due to error term.

Table 4: Regression Analysis

Variable	Coefficient	t-value
Age	0.310	6.017*
Sex	−0.060	−5.063*
Educational Level	0.077	8.682*
Household Size	−0.130	−1.973**
Religion	−0.003	−0.364
Marital Status	−0.012	−0.985

Years of Experience	0.048	2.595**
Total Cost	0.305	0.480
Total Variable Cost	−0.530	−0.866
Constant	12.360	17.372

Source: Field Survey, 2013

CONCLUSION

This research work was able to identify the various factors (age, sex, educational level, household size and years of experience that greatly influence the profitability of charcoal marketing in the study area. The result shows that age, sex and educational level were significant at 1%. It implies that one unit increase in age would increase the profitability by 0.310 units and as the level of education increases there would be an increase in the level of profitability by 0.077 units. Years of experience are significant at 5% which implies that 1year increase in the years of experience would affect the level of profitability positively by 0.048 units. Also, household size is significant at 5% and it has negative implication. That is if the size of household increases by one the profit would be decreased by 0.077 units which might resulted from the consumption of the individual from the profit. The adjusted R square (R2) which is 0.907 means that the independent variables have explained 90.7% variation of the dependent variable (Total Revenue) while the remaining 9.30% would be due to error term.

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