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Socio- Economic Contributions and Marketing of Charcoal in Igbo-Ora, Oyo State

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Abstract
Charcoal is a major forest product that serves as vital source of livelihood for large proportion of the poor and middle-class people living in or close to the forest in most tropical countries. This study specifically examines the socio-demographic properties, profitability and market structure in the study areas. Simple random sampling technique was used to select 120 charcoal businesses, which was split on market chain whether they were producers, wholesalers or retailers. 40 copies of questionnaires were administered on each market chain. Descriptive statistical tools, profitability analysis, gross margin and Gini coefficient were used to analyze the data collected. Profitability analysis showed that the producers, wholesalers and retailers incurred ₦15,100.00, ₦55,675.00 and ₦1,715.00 respectively as total cost but earned ₦52,675.00, ₦78,750.00 and ₦2,312.50 respectively as revenue implying that each earned ₦37,575.00, ₦23,075.00 and ₦597.50 respectively as gross profit. Also, benefit cost ratio was recorded to be 3.49, 1.41 and 1.35 respectively. Gini-Coefficient of 0.4932 obtained in this study showed that the market is tilting away from equality, also among the market participants, and prices were determined at the production level of the chain, although the business was lucrative. It is therefore recommended that government should create structural frameworks that allows for planting of more trees by charcoal producers in other to ensure maximum sustainability of the resource, more so, policies that checkmate charcoal producers should be implemented by the Forestry governing body as most exploit woods unsustainably.
Keywords: Market chain, Profitability, Sustainability, Charcoal, Benefit Cost Ratio, Marketing

Introduction

Non-Timber Forest products (NTFPs) have been defined as all biological and non-biological materials gathered from the forests which are useful for socio-economic well-being of the people (Etukudo, 2000). Charcoal is an example of NTFP which is the solid residue remaining when wood is “Carbonized” or “Pyrolyzed”. It is one of the oldest of man-made fuels and has been prepared under the ground for a thousand years. Charcoal in lump form is still a major source of energy throughout the world. Most charcoal manufacturers sell their product as a briquette. They do not make "lump" charcoal which is an alternate product that has some advantages and has potential as a small start-up business. In the last few years, economic hardship, poverty, unemployment and increase in the price of oil have necessitated the need for people to find alternative means of making a living in respect of domestic cooking energy in Nigeria. During the colonial periods, large number of people used firewood as domestic energy fuel, after the colonial era; there was a change in status quo, people embarked more on the use of electricity, fossil fuels such as kerosene and gas as cooking energy. At present, millions of households now use charcoal as domestic and outdoor recreational cooking energy as a result of epileptic power supply, scarcity and increase in the price of oil and gas. According to UNDP (2004), an estimate of 2.5 billion people lack access to modern energy services. This has constrained their opportunities for economic development and improved living standards. They rely on traditional biomass sources such as wood fuel, agricultural residues, and animal dung to meet their basic energy needs (WHO, 2006). The growth of towns and cities in most developing countries of Africa necessitated the need for more charcoal. The estimation therefore is for each 1% increase in urbanization, there is a 14% increase in charcoal consumption (Hosier, 1993). Urban population is increasing on daily basis than the rural areas to the extent that getting fuel energy to use daily is a problem since most of these people are poor and cannot afford modern cooking fuel. Hence the significance of this study which examines the socio-demographic properties, profitability and market structure of charcoal in the study area.

METHODOLOGY

The study was carried out at Igbo-Ora in Ifeloju, Oyo State Nigeria. Data were collected using a semi-structured and pretested questionnaire assisted with an interview schedule. Simple random sampling procedure was used in selecting the number of respondents in the study area. Different charcoal producers, wholesalers and retailers were selected in the study area, and one hundred and twenty (120) copies of questionnaire were administered to the randomly selected respondents.

Data analysis
Descriptive statistical tools, profitability analysis, gross margin and Gini coefficient were used to analyze the data collected.

Cost and Return
This was used to determine the profitability.
Gross revenue (GR) = Total output × unit price
Gross profit (GP) = GR - VC
Net profit (NP) = GP- FC
Rate of return (ROR) = $\frac{TR}{TC} \times 100$
Profit = TR – TC
Rate of Return on Investment (RORI) = $\frac{Profit}{TC} \times 100$
Profitability index (PI) = $\frac{GP}{GR}$
Where;
TR = Total revenue TC = Total cost
TVC = Total variable cost TFC = Total fixed cost

GINI COEFFICIENT
This was used to determine the market structure.
$G = 1 - \Sigma XY$
Where;
G = Gini coefficient
X = Percentages of sellers per period of study.
Y = Cumulative percentage of total sales (revenue)

RESULTS
Table 1: Demographic Characteristics of the producers

Categories	Variables	Frequency	%
Village	Irepodun babanla	12	30.0
	Apata	12	30.0
	Igbo iyangi	4	10.0
	Igbole	1	2.50
	Akeroro	5	12.5
	Odofin	6	15.0
LGA	Ibarapa central	13	32.5
	Ibarapa north	27	67.5
Sex	Male	37	92.5
	Female	3	7.50
Age	25 - 35	8	20.0
	35 - 45	22	55.0
	46 - 55	10	25.0
Marital Status	Married	30	75.0
	Single	5	12.5
	Widow/Widower	5	12.5
Level of Education	No formal Education	60	60.0
	Primary	17.5	17.5
	Secondary	22.5	22.5
Ethnic Group	Igbo	8	20.0
	Hausa	4	10.0
	Yoruba	28	70.0
Religion	Christainity	22	55.0
	Islam	17	42.5
	Traditional	1	2.50
Family size	2 - 4	12	34.3
	5 - 7	22	62.9
	8 - 10	1	2.90
How did you come about the occupation?	Inheritance	16	40.0
	Apprentice	24	60.0
How long have you been in business	0 - 5 yrs	7	17.5
	6 - 10 yrs	16	40.0
	11 - 15 yrs	15	37.5
	15 - 20 yrs	2	5.00
Do you have other occupations apart from production	Yes	40	100.0
	No	0	0

Source: Field Survey, 2016

Table 2: Demographic Characteristics of the wholesalers

Categories	Independent Variables	Frequency	%
Village	Igbole	40	100.0
LGA	Ibarapa central	40	100.0
	Ibarapa north	0	0.00
Sex	Male	0	0.00
	Female	40	100.0
Age	25 - 35	11	27.5
	35 - 45	20	50.0
	46 - 55	9	22.5
Marital Status	Married	36	90.0
	Single	2	5.00
	Widow/Widower	2	5.00
Level of Education	No formal Education	12	30.0
	Primary	14	35.0
	Secondary	14	35.0
Ethnic Group	Igbo	0	0.00
	Hausa	0	0.00
	Yoruba	40	100.0
Religion	Christianity	19	47.5
	Islam	21	52.5
Family size	2 - 4	20	50.0
	5 - 7	20	50.0
Occupation	Inheritance	12	30.0
	Apprentiship	2	5.00
	Others	26	65.0
How long have you been in business	0 - 5 yrs	1	2.50
	6 - 10 yrs	9	22.5
	11 - 15 yrs	17	42.5
	15 - 20 yrs	13	32.5
Do you have other occupations apart from production	No	40	100.0
	Yes	0	0

Source: Field Survey, 2016

Table 3: Demographic Characteristics of the retailers

	Independent Variables	Frequency	%
Village	Igbole	40	100
LGA	Ibarapa central	40	100
	Ibarapa north	0	0.00
Sex	Male	0	0.00
	Female	40	100
Age	25 - 35	11	27.5
	35 - 45	17	42.5
	46 - 55	12	30.0
Marital Status	Married	38	95.0
	Single	0	0.00
	Widow/Widower	2	5.00
Level of Education	No formal Education	7	17.5
	Primary	24	60.0
	Secondary	9	22.5
Ethnic Group	Igbo	0	0.00
	Hausa	0	0.00
	Yoruba	40	100.0
Religion	Christainity	24	60.0
	Islam	16	40.0
Family size	2 - 4	22	55.0
	5 - 7	18	45.0
Occupation	Inheritance	5	12.5
	Others	35	87.5
How long have you been in business	0 - 5 yrs	15	37.5
	6 - 10 yrs	21	52.5
	11 - 15 yrs	3	7.50
	15 - 20 yrs	1	2.50
Do you have other occupations apart from production	Yes	40	100.0
	No	0	0

Source: Field Survey, 2016

Table 4: Average profitability and budgetary analysis for producers per truckload of Charcoal

PRODUCERS	
Fixed input	Price (₦)
Sack	3,500
Total Fixed Cost	3,500
Variable inputs	
Cost of the preferred species	3,500
Cost of felling	1,200
Cost of de-limbing	700
Tax	4,500
Cooperative fee (monthly)	200
Cost of covering	1,500
Total Variable Cost	11,600
Total Revenue	52,675
Total Cost	15,100
Gross Profit	37,575
Rate of Return	348.84
Rate of Return on Investment	248.84
Benefit Cost Ratio	3.49
Profitability Index	0.71

Source: Field Survey, 2016

Table 5: Average profitability and budgetary analysis of wholesaler per truckload of Charcoal

WHOLESALERS	
Fixed inputs	**Price (₦)**
Rent	300
Total Fixed Cost	300
Variable inputs	
Cost of buying	53375
Cost of transportation	2000
Total Variable Cost	55375
Total Revenue	78750
Total Cost	55675
Gross Profit	23075
Rate of Return	141.45
Rate of Return on Investment	41.45
Benefit Cost Ratio	1.42
Profitability Index	0.29

Source: Field Survey, 2016

Table 6: Average profitability and budgetary analysis of retailers per bag

RETAILERS	
Fixed inputs	**Price (₦)**
Rent	410
Total Fixed Cost	410
Variable inputs	
Packaging	200
Cost of buying	1105
Total Variable Cost	1305
Total Revenue	2312.5
Total Cost	1715
Gross Profit	597.5
Rate of Return	134.84
Rate of Return on Investment	34.84
Benefit Cost Ratio	1.35
Profitability Index	0.26

Source: Field Survey, 2016

Table 7: Average Profitability and budgetary analysis of the producers, wholesalers and retailers per truck load

	PRODUCERS	WHOLESALERS	RETAILERS
Total Fixed Cost (₦)	3,500	300	28,700
Total Variable Cost (₦)	11,600	55,375	91,350
Total Revenue (₦)	52,675	78,750	161,875
Total Cost (₦)	15,100	55,675	120,050
Gross Profit (₦)	37,575	23,075	41,825
Rate of Return	348.84	141.45	134.84
Rate of Return on Investment	248.84	41.45	34.84
Benefit Cost Ratio	3.49	1.41	1.35
Profitability Index	0.71	0.29	0.26

Source: Field Survey (2016)

Table 8: Gini Co-efficient of the charcoal market

Market Chain	Frequency	(X) % of Sellers	Cumulative %	GP	% of Income	(Y) Cumulative %	(XY)
Retailers	30	27%	0.27	41,825	0.01	0.01	0.0027
Wholesalers	40	36%	0.64	23,075	0.38	0.39	0.1405
Producers	40	36%	1.00	37,575	0.61	1.00	0.3636
TOTAL	110	100%		61247.5			0.5068
						GINI COEFFICIENT	0.4932

Source: Field Survey, 2016

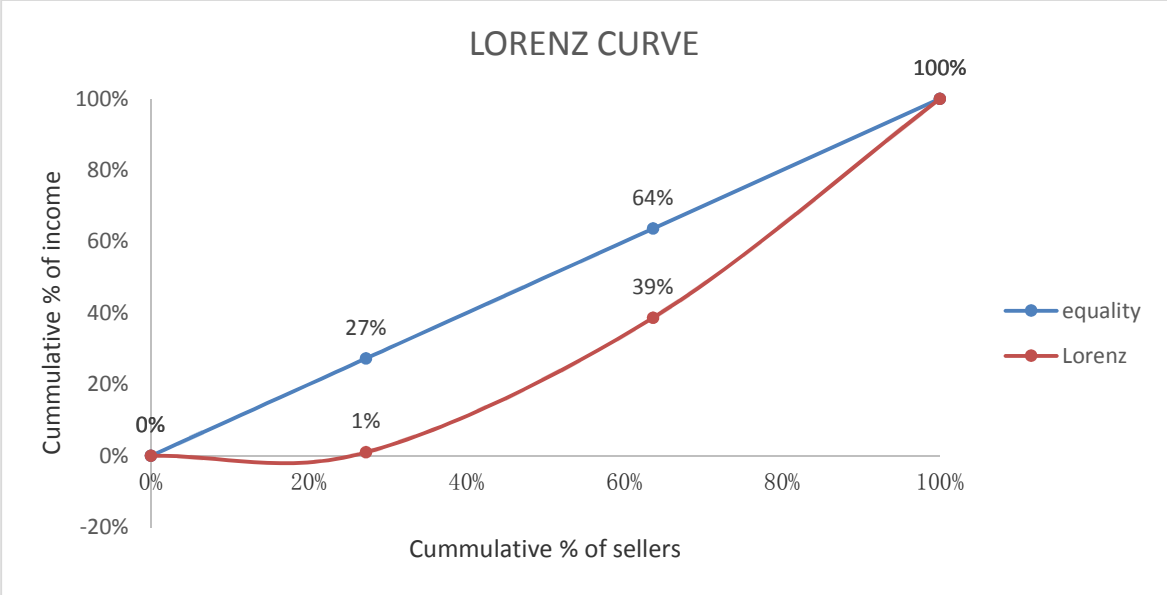

Plate 1: The Lorenz curve for producers, wholesalers and retailers in the charcoal market
Source: Field Survey, 2016

DISCUSSION

The respondent within the age bracket of 35 – 45 years had the highest percentages in the study area. This implies that the majority were still active and physically capable of working on their marketing activities. This finding agrees with Alabi *et al*. (2015) that described persons in the age range of between 20 and 50 years as the active age group, because individuals within this age bracket were able to withstand the vigor involved in the marketing of the product. Majority of the respondents (75%) were married, this agrees with the findings of Taphone (2009) who reported that married persons have more responsibility taking care of their families, hence are always making effort to involve in business that will increase their financial prowess. The largest family size recorded in this study for producers (62.9%) could imply that respondents had family labour to assist them in their businesses therefore reducing amount spent on hired labour, the reverse was however observed for retailers implying a lesser input of their household in the business. Distribution based on educational status of respondents implies that charcoal production, wholesale and retail is majorly (60%) for the less educated groups. Though, lack of formal education is not a barrier in the business of charcoal. This confirmed the study of Ogunjinmi *et al*., (2009) who reported that

rural production and sale are characterized by low level of educational background. The highest percentage involvement of Yoruba's in the business (70%) corroborates the findings of Kalu and Izekor (2007) who stated that the environs in which a particular resource is found has great influence on the ethnicity of persons that would engage in its business. This finding is also in line with Sekunmade and Oluwatayo (2011) which asserted that the location of most forest resources has great influence on the group of people that engage in its business. Majority of respondents in this study has more than 5 years' experience (82%), this implies that most of the respondents have adequate knowledge and exposure concerning the enterprise. The lengthy years of experience could stand as an added advantage in terms of efficiency in converting marketing inputs into output and could as well be added advantage in strategizing market situations to make more profit (Garba *et al*., 2015). The highest population of male producers (92.5%), recorded in this study could be due to the nature of charcoal production which involves vigorous processes and requires heavy duty machines that females might not be able to cope with. According to Brieland (2015) women expressed that they feel dizzy, lightheaded and nauseated while engaging in charcoal production tasks. In this study, all of wholesalers and retailers (100%) used the open display method to attract customers implying that charcoal is a ready to buy product, this findings agree with Larinde and Olasupo (2011), that fuel wood has ready buyers as large number of food vendors such as restaurants, vendors of barbecue (Suya) and party outfit served at celebrations, and bakeries are regular customers of fuel wood sellers, hence, charcoal need no special advertisement. In this study, the highest percentage of retailers preferred selling charcoal in their home rather than paying extra for shop rent, this agree with the findings of Afolabi (2009) which states that most retailers prefer to sell their products in an open spaces along the road and thus pay less storage cost. The importance of market structure for pricing and competition has been emphasized in the literature (Sayaka, 2006; Ugwumba, *et al*., 2011; Obaji, 2011). How the different levels of action in the chain are related with one another is crucial both for the ease with which the commodity can be accessed and the size of the earnings that producers, wholesalers and retailers realize for their efforts. Since poverty reduction is one key goal of the involvement in production and marketing of wood charcoal, analyzing the market sufficiently to understand the nature competition and the extent of market concentration was pertinent. Among the various approaches for measuring the degree of competition and market concentration, the Gini Coefficients for wood charcoal were calculated for the producers, wholesalers and retailers. The Gini coefficient of 0.4932 recorded in this study was closer to the range of 0.5 and 0.7 suggested by the United Nations Development Programme (UNDP) to yield a greater inequality within the market, such that there are some substantially influential entities as well as those that command visibly insignificant volumes and therefore least influential (UNDP, 1992). From this result it was concluded that in the market chain, the producers control largest shares of wood charcoal supply in the study area and would further influence supplies by increasing or decreasing the quantity produced or sold. This is evident of the producers because they recorded a largest gross profit (₦37,575) than the wholesalers or retailers combined. Consequently, output from producers might later be a significant part of volume of trade in the market such that it could affect the market price (Oladejo and Oladiran, 2014). The higher the rate of return on capital, the better the business (Olukosi and Erhabor, 2005), RORI recorded for the producers in this study was higher than the combined RORI recorded for the wholesalers and retailers, implying that, the producing business was the most lucrative of the three chains. The analysis of benefit-cost ratio for all the market forces gave values greater than 1 (BCR > 1). This shows that the charcoal business is viable on all market fronts (producing, wholesale or retail). This confirms the findings of Adegeye and Dittoh (1985) that investment criteria require that BCR should be greater than one (BCR > 1) before a business can be termed profitable. The BCR for the producers was 3.49, implying that for every ₦100 invested in the business, there is a return of ₦349, the wholesalers had a return of ₦41 and retailers ₦ 35 for every ₦ 100 invested in the business. This substantiated the previous claim that the business is a profitable venture. Previously stated reports by Larinde and Olasupo (2011) had shown that the wood fuel trade is very profitable as an average wood fuel marketer is able to recoup his or her investment with better returns in short period of time. The type of market structure observed in this study was a monopolistic nature, because the producing agents have influence on the market and determine market prices.

CONCLUSION

The positive return reported in this study implies that all the participants were able to cover the costs incurred in carrying out the marketing services and made some profit. Also, there is a clear indication that charcoal is very efficient and has the potentials of increasing the rural income; this can induce the market chain to move into large scale commercial production sale giving reliable information on how efficient and profitable the marketing of the business is. The study also will serve as a guide for further research in charcoal value chain and will serve as a base line for policy makers to intervene in designing changes and formulating a more effective market policy for the growth and development of the charcoal industry. The result revealed a monopolistic market structure for wood charcoal in the study area. Prices were determined at the production level of the chain, but producers were asymmetric in their price transmissions to the wholesale level. Government should look into creating policies that checkmate charcoal producers as they exploit woods without deferring to the right source. Government should

also look into creating a structural framework for the cultivation of fast growing trees, and such policies should be geared towards personal ownership rather than state ownership of planted trees. It is imperative that government review their forest policy based on the condition of the present market conditions such that more individuals can benefit from the income generating opportunities the charcoal market offers.

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