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ASSESSMENT OF PROFITABILITY OF SHEA BUTTER (*VITELLARIA PARADOXA*) PROCESSING IN NORTH CENTRAL NIGERIA

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ABSTRACT
The study examined the profitability and constraints to Shea butter in Makwa local government area of Niger state. A multistage sampling technique was used to collect information from the 139 respondents. The data collected were analysed using descriptive statistics, budgeting analysis and five point likert scale. The results show that respondents mean age was 54years. Most of the respondents 87(67.58%) were married, and 2(1.02%) had tertiary education. The profitability analysis shows that the variable costs cost (VC) of (₦2899715) accounted for more than 98% of the total cost. (TC) cost for the respondents was ₦2953359 with an estimated fixed cost (FC) of ₦53644.72. The total revenue accrued to the enterprise was estimated at ₦8321582 per month with a net return of about ₦ 5368222.28. The enterprise has an estimated Benefit cost ratio of 2.82 and a rate of returns on investment of about 1.82 indicating that the enterprise is profitable and worthwhile. Poor access to credit facilities and poor extension services were the most serious challenges of the enterprise with an aggregate mean score of 412 and 411 respectively. Also, inadequate inputs (341) was ranked third most important constraints as most processors still rely on traditional equipment for storing their products. The study recommended that respondents should form associations and cooperative societies to enable them take advantage of group actions for better access to credit facilities. Also, the government, research institutes and Non-Governmental organisations should step up action on extension activities directed at the Shea butter enterprise.

Keywords: Profitability, Constraints Processing, Marketing and Shea Butter

INTRODUCTION

The shea butter tree (*Viterllaria paradoxa*) is the source of shea butter (Peter, 2005) It is a perennial crop that is usually found in the wild agro-forestry parklands across the semi-arid region of Africa, where annual rainfall ranges from 600 to 1500 mm (Enaberue *et al*., 2011). It occurs on an estimated 1,000,000 km^2 area between western Senegal and north-western Uganda. Shea trees also occur in all the States within the Sudan Sahelia region of Nigeria. In Niger State, the trees are found in all the agricultural zones, it is a wilderness crop that is produced naturally, it has cultural and medicinal qualities and is collected and processed by women's groups in remote rural areas, all combine to create a fashionable marketing scenario for high profile cosmetics products (Matanmi *et al.,* 2011). Nigeria accounts for 62% of the 600,000 metric tons produce in West Africa. Shea nuts play important socio-economic role in Nigeria in terms of employment and income generation to a significant proportion of rural population especially women who are, directly involved in sheanut collection and butter extraction (Matanmi, *et al*., 2011).

In Nigeria, direct cultivation of shea tree is not common because of slow initial growth. However, farmers preserved shea trees in the wild forest when cultivating other crops and the shea plantation is restricted to avoid shading of other crops when clearing land for other agricultural activities. The shea nut tree bears fruit when it is about 15 years old, reaching full bearing capacity at 25 years and has a useful fruit bearing life span of 150 to 200 years (Anon, 2012). The fruit of the Shea tree ripens during the annual hunger season when food supplies are at their lowest ebb and agricultural labour requirements are at their peak. When the Shea fruits ripen, they fall to the floor and are gathered by hand. The fruit, which is green in colour, has a fleshy edible pulp rich in vitamins and minerals and not lacking in protein too. Shea fruits are normally obtained in the wild and are processed primarily through the traditional methods in the study area. It is a major occupation of women in the communities where wild harvesting and processing of Shea nut from forests and semi domesticated trees growing on-farm and homesteads substantially boost rural income and employment opportunities (Ruiz *et al.,* 2004).

Over the years, processed Shea butter has become a valued ingredient in the natural cosmetics industries. The cosmetic and pharmaceutical industries alone consume an estimated 2,000 to 8,000MT of Shea butter each year, and this figure is expected to rise with growing demand in the world's markets (Fintrace Corporation, 1999). Due to poor awareness of profitability and market structure of Shea butter in Nigeria, most prospective investors do not consider Shea butter marketing as an option;while much of the crops where left uncollected, unutilized and left to decay in the wild totally inaccessible as unemployment plague the nation. Though much research has been carried out on production of Shea butter, yet there is knowledge gap about the state of Shea butter marketing in Nigeria (Walters *et al*, 2009).

Furthermore, there still a wide variation between the physical input level used and the potential output level realised during processing of the fruit. Therefore, the study seeks to describe the socio-economics characteristics of the respondents, describe the marketing channel of processed shea butter, determine the profitability and identify the constrains faced by shea butter marketers in the study area.

METHODOLOGY

Area of Study

The study was carried out in Niger State of Nigeria. Niger State is located in the North Central agro-ecological zone of Nigeria with a land area of 74,244 square kilometres and a population of 3,950,249(National Population Commission, 2006). The State lies between latitudes 8°20'N and 11°30'N and longitude 3°30'E and 7°20'E. Niger State is bounded by Kaduna State and FCT in the North-East and South-East respectively; Zamfara State to the North, Kebbi State in the West, Kogi State in the South and Kwara State in the South West, while the Republic of Benin boarders the State in the North West. Niger State experiences distinct dry and wet seasons with annual rainfall varying from 1,100mm in the northern parts to 1,600mm in the southern parts. Generally, the fertile soil and hydrology of the State permits the cultivation of most of Nigeria's staple crops and still allows sufficient opportunities for grazing, fresh water fishing and forestry development. Niger State has the highest natural grove of the Shea tree in Nigeria Solomon *et al* (2017).

Mokwa is the headquarters of Mokwa Local Government Area, Niger state where the study was carried out. It has an area of about 4338km2 and an estimated population of 244,937 (2006). The long southern border of the LGA is formed by the Niger river from Jebba Lake in the West beyond the confluence of the Kaduna river in the east. It consists of sub-districts such as Muwo, Bokani. Kudu, Kpaki, Jebba, Rabba, Jaagi etc. These towns are known for their traditional crafts, notably hoes, cutlass and melon processing especially at Makwa town. Makwa is made up of vast tribes like Yoruba, Igbo, Gbagi and others (Wikipedi, 2010).

Sampling Techniques

A multi stage sampling techniques was use to select 150 Shea butter processors/marketers in the local government area. Only hundred (139) questionnaire were retrieved and used for the study. The first stage of sampling involved a purposive selection of Mokwa Local Government Area of Niger State based on predominance of processing and marketing of Shea butter. The second stage involved a purposive selection of five (5) districts namely; Kudu, Gbajigbo, Nyako, Eepa and Tatabu and Makwa. The last stage involved random selection of processors from each districts

Analytical Techniques and Model specification

Descriptive statistics such as frequency count percentage and mean was used to analyse some socio- economic characteristics which include, age marital status, household size, educational level, occupation, years of experience.

Budgeting Technique: Budgetary analyses was used to evaluate the cost and returns to shea processing, this involved the use of net return (NR). The NR indicates how much profit an enterprise makes after paying off its operating and fixed costs (Garba and Sanni, 2017). In budgetary analysis, The fixed cost especially in small scale farming may be assumed to be non-existent because the fixed items are basically rudimentary (Odiba, 1990, Balogun *et al*., 2017).

$NR = \sum TRi - \sum TCi$ .....(1)

$\sum TC_i = (\sum TVC_i + \sum TFC_i)$ .....(2)

$\sum TRi = P_i Q_i$ .....(3)

Where:

Σ = summation sign

NR = net return (₦)

TR = total revenue (₦)

P = unit prices of Shea butter (₦)/kg)

Q = quantity of Shea butter processed (kg)

TVC = total variable cost (₦)

TFC = total fixed costs (₦)

The straight line method was used in computing depreciation on the capital items that were included in fixed cost. The specification given by:

$D = \frac{P-S}{N}$ ..... (4)

Where;

D = depreciation (₦)

P = Purchase value of the asset (₦)

S = salvage value, which is the value of the asset after its expected year of usage (₦),

N = life span of the asset (years)

Measures of Profitability.

The performance and economic worth of the respondents was examined using the following profitability ratios.

Benefit Cost Ratio $(BCR) = \frac{TR}{TC}$ .....(5)

Rate of Return$(ROI) = \frac{NR}{TC}$ .....(6)

RESULT AND DISCUSSION

Socio-Economic Characteristics of Respondents. Social-economic characteristics of individuals play vital role in determining approaches to livelihood issues; in this study Socio-economic variables examined includes age, marital status, level of education attained, years of experience in shear processing, other income generating activities and source of capital as well as household size. Table 1below indicate that about 109 (78.42 %) respondents' wereaged between 51-60 years. 23(16.54 %) falls within 40-50 years while about 7(5.04 %) between 61-70 years. The respondents mean age is about 54yrs indicating that majority of shear butter processors are not young. Results of marital status of respondents in the study revealed that 120 (86.33 %) were married, 11(7.91 %) divorced with about 4(2.88 %) single and widow. This implies that quite a good number of the respondents are not only old but responsibly married. According to Olarinde *et al*., (2008) marital status is one of the most important factors that determine efficiency of businesses, this is because married people tend to worked hard in order to meet up with the demand of the family members. Moreover, it is possible that

greater percentage of married persons in the processing of Shea butter derive cheap labour from family members.

Furthermore, respondents Level of Education in the study revealed that majority 87(62.58 %) had no formal education, about 26(18.71 %) had primary education and 4 % attained secondary school and above. This means that shea butter business is a business of illiterates in the study area. The low level of education is likely to have a negative influence on their ability to readily adopt modern techniques, innovation or new ideas. Farinde *et al. (*2005) noted that education influences the adoption of new innovations and ideas in businesses, noting that the level of education is positively related to the adoption of innovation.

The results further revealed that most 108(77.7 %) of the respondents had household size ranging between 6 to10 persons. These findings suggest that processing of Shea butter may require a lot of labour which are cheaply obtained from the home front especially for the traditional processing method that is predominant in the study area. About 59 (42.45 %) of respondents have spent 22-31years in production of Shea butter, 47(33.81%) have spent 11-20 years in the industry, These years of experience means that the respondents are vast in their traditional processing methods. Other income sources for the respondents are weaving trading and tailoring. Personal savings 98(70.50 %) forms their major source of capital with very little involvement of respondents in cooperative activities 8(5.75 %). This means the processors are not exploring cooperative societies to better their production.

Table 1: Respondents Socio-economic variable

VARIABLE	FREQUENCY	PERCENTAGE (%)
Age		
40-50	23	16.54
51-60	109	78.42
61-70	7	5.04
Marital Status		
Single	4	2.88
Married	120	86.33
Divorced	11	7.91
Widow	4	2.88
Level of Education		
Non formal education	87	62.58
Qur'anic education	22	15.83
Primary education	26	18.71
Secondary education	2	1.44
Tertiary education	2	1.44
Household size		
1-5	31	22.30
6-10	108	77.70
Processing Experience		
1-10	4	2.8
11-20	47	33.81
21-30	59	42.45
31-40	28	20.28
Other Income Activities		
Trading	54	38.84
Weaving	78	56.11
Tailoring	7	5.03
Source of Capital		
Family	28	20.14
Personal savings	98	70.50
Friends	5	3.60
Cooperative	8	5.75

Source: Field survey, 2018

Shea Butter Marketing Channel

Figure 1 below is a flow chart showing the marketing channel of Shea butter. The product moves from the producer to the retailers before reaching buyers. However, most times these produce does not necessarily complete these cycle but through this channels as buyers go directly to the producer to obtain products.

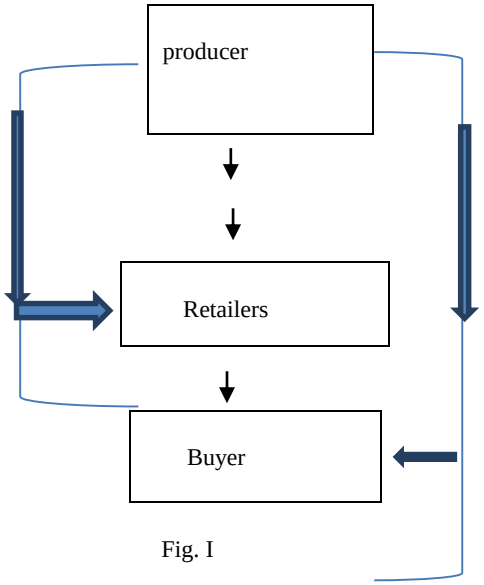

Fig. I

Systems of Shea Butter Processing

Table 2 below revealed that about 137(98.56 %) sampled respondents used traditional method of Shea nut processing. These findings conforms with the those of Schreckenberg *et al.,* (2004), Suleiman *et al., (*2008) Adgidzi *et al.,* (2008) and the Nigerian export promotion council, NEPC 2006, who observed that the traditional method of Shea nut processing is the most prevalent method used in Shea processing in Nigeria. This study further proved that despite the potentials associated with shea butter in terms of foreign exchange earnings, not much has been done to improve on the method of possessing in the study area as at the time of this study. Few 2(1.44 %) of the respondent had access to modern method of Shea nut processing. The low level of adoption of mechanical method of processing may be attributed to the high cost of the equipment. Processing of Shea nut is mostly done with crude processing materials such as mortar and pestle, baskets, sacks, clay pot, buckets, jerry cans, cups, sticks stones, calabash, mats. The processing method and the quantity of Shea nut seed has negative impact on the quantity and quality of butter produced. Niess had observed that traditional method of butter extraction efficiency is about 25 % noting that, improved mechanical methods has the advantage of being less tedious, more effective (with an extraction efficiency of about (40-45 %) and time saving compared to the traditional method, stressing that mechanical method produces better quality butter.

Table 2: System of producing Shea butter by respondents

System of Processing	Frequency	Percentage
Traditional/local	137	98.56
Modern method	2	1.44
Total	94	100

Source: field survey 2018

Profit analysis

The cost and return to Shea butter processing and marketing was estimated. According to Adegeye and Dittoh *et al.,* (1985) define profit as the net flow of income. In essence profit indicate whether a business is worthwhile or not. Benefit cost ratio (BCR), expense structure ratio (ESR) and rate of return on investment (ROI) are among the most commonly used measures in literature Ayodele *et al*., (2018). In this study, rate of return on investment (ROI) and Benefit cost ratio were used to measure the profitability. By interpretation, the rate of return has a direct relation with net gain. The higher the rate of return of and investment the more profitable the business. Table 3 below presents the results of the cost and returns to shea Butter processing in the study area. The analysis show that variable costs components accounted for more than 98% of the total costs these includes cost of rentals, processing cost, transportation cost of labour fuel and milling cost. Shea butter processors profitability was analysed using budgeting analysis method. The total cost of each respondent was computed and total revenue was also estimated to determine the profitability of processing shea butter to the enterprise. From the result of the analysis, the total (TC) cost for the respondents was ₦2953359. The total variable cost (VC) of (₦2899715) comprised the summation of all costs that change with respect to production. The fixed cost (FC) of ₦53644.72 was obtained after depreciation on fixed cost items was done. Considering the total processed Shea butter output per month the cost of processing a kilogram of Shea butter was estimated at about ₦500.The total revenue accrued to the processed business of Shea butter was calculated to be ₦8321582 for the respondents per month. An estimated net return of about ₦ 5368222. 28 was obtained for study area. This findings is in line with the finding of Ibrahim *et al* 2010., Garba and sanni, 2017,

Solomon *et al* .,2017). The enterprise has an estimated Benefit cost ratio of about 2.82 and a rate of returns on investment of about 1.82 indicating that the enterprise is profitable and worthwhile.

Table 3: COST AND RETURN ANALYSIS

Cost items	Amount (₦)	Percentage (%)
A. Variable cost		
Cost of renting shop	192515	6.64
Processing cost	422282	14.56
Transportation cost	1197485	41.30
Cost of fuel(wood)	475380	16.39
Milling cost	612053	21.10
Total variable cost (TVC)	2899715	
B. fixed cost		
Depreciated Capital items	53644.72	
∑ Cost	2953359.72	
Total Revenue(TR)	8321582	
Net Returns (NR)	5368222.28	
Profitability		
Benefit cost ratio (BCR)	2.82	
Rate of Returns(ROI)	1.82	

Source. Field Survey 2018

Accessibility to Credit

Table 4 below shows that majority of Shea butter processors/marketers do not have access to credit most likely because of their level of education which hinders them from accessing banking privileges as majority of them had no-formal education.

Table4.Access to credit for respondents

Response	Frequency	Percentage (%)
Yes	3	3.0
No	97	97.0
Total	139	100

Source: field survey 2018

Sources of Shea Nut of Respondents

Table 5below revealed that majority 115(82.73%) of the respondent derive Shea nut from the wild. This implies that the trees are not cultivated by farmers, thus productivity cannot be manipulated and can lead to erroneous production fluctuation as minimal input is employed by the farmers. The trees productivity depends exclusively on nature. It also implies that productivity of Shea butter in the study area may not meet the demands international market. Only twenty-four (24) respondent accounting for 17.26% of the sampled farmers owned shea butter trees in their farms from where they augment for their production.

Table 4: Sources of Shea nut of respondents

Sources	Frequency	percentage (%)
Owned tree	24	17.26
Wild	115	82.73
Total	139	100

Source: field survey 2018

Constraints to Shear Butter Processors

The perceptions of respondents on the constraints associated with the processing of Shea butter within the study are presented in Table 5 below. It was evident that inadequate capital and credit facilities was considered and ranked as the most prioritized challenge withan aggregate score of 412. Inadequate capital could be due to lack of financial institutions that are ready to grant small loans to the prospective Shea butter processors and marketers in the area. Inadequate and credit facilities may also due to the fact that most of the respondent are not educated thus do not have access to banking operation. The implication of inadequate capital and credit facilities is that the processors would not be able to afford modern machinery. This development will hinder their capacity to meet the international standard. Furthermore, poor extension services ranked as second most important (411) implying that the area might have been lacking extension visits, this will further complicate their problems with regards to access to information new technologies and dissemination of new research findings in

the industry. Also, inadequate inputs with an aggregate score of (341) was ranked as the third most important constraints as most processors still rely on traditional equipments for storing their products. This impacts negatively on the quality of products in the long run as quality reduces with time with the available facilities. Other notable constraints are and high cost of labour with Aggregate scores of (168) and (162) respectively.

Table 5. Constraints to Shea Processing

	Very Serious (VS)	Serious (S)	Undecided (UD)	Less Serious (LS)	Not a Constraints (NC)	Aggregate Score	Rank
Constraints	**4**	**3**	**0**	**2**	**1**		
High Cost of Nuts	-	-	26	49	64		
			(0)	(98)	(64)	162	**6th**
High cost of Labour	2	11	58	63	5		
	(4)	(33)	(o)	(126)	(5)	168	**5th**
Inadequate	4	132	3	-	-	-	
Capital/credit	(16)	(396)	(0)			412	**1st**
Inadequate land to farm Shear tree	-	2	90	14	33		
		(6)	(0)	(28)	(33)	77	**7th**
Inadequate input	2	108	22	-	7		
	(8)	(324)	(0)		7	336	**4th**
Poor Extension services	3	133	3	-	-		**2nd**
	(12)	(399)	(0)			411	
Storage Problem	-	109	25	7	-		
		(327)	(0)	(14)		341	**3rd**

Source: field survey 2018

CONCLUSION AND RECOMMENDATION

The study revealed respondents mean age is about 54years indicating that majority of shear butter processors are not young. Marital status of respondents in the study showed that 120(86.33 %) were married implying that quite a good number of the respondents are not only adults but responsibly married. Furthermore, respondents Level of Education in the study revealed that about 87(62.58%) had no formal education, about 26(18.71 %) had primary education and 4% attained secondary school and above. This means that shea butter business is a business of illiterates in the study area. Majority 108(77.7 %) of the respondents had household size ranging between 6 to10 persons with reasonable years of experience in shear fruit processing. The study shows that Shea butter product moves from the producer to the retailers before reaching buyers but may sometimes go directly to the final consumers.

This study further revealed that despite the potentials associated with shea butter in terms of foreign exchange earnings, not much has been done to improve on the method of possessing in the study area as at the time of this study. Few 2(1.44%) of the respondent had access to modern method of Shea nut processing.

The analysis show that variable costs components accounted for more than 98% of the total costs The enterprise has an estimated Benefit cost ratio of about 2.82 and a rate of returns on investment of about 1.82 indicating that the enterprise is profitable and worthwhile. Inadequate capital and credit facilities were ranked the most prioritized challenge with an aggregate score of 412. Also, poor extension services ranked as second most important (411) implying that the area might have been lacking extension visits. Since the shear fruit processing/marketing enterprise is highly profitable and worthwhile, it was recommended that enlightenment should be done among the stake holders on the need for group formation especially cooperatives, associations that can help harness group action to access credit to further boast their production. Moreover, research institutes, government and Non-Governmental organisation should ensure that extension activities on modern shear processing are promptly disseminated to the study area to ease the problems of storage, input

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