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

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ABSTRACT
The study examined the profitability and constraints to Shea butter processing in Mokwa local government area of Niger state. A multistage sampling technique was used to collect data from the 139 respondents. The data were analysed using descriptive statistics, budgeting analysis and five point likert scale. The results revealed that respondents mean age was 54years. Most of the respondents 87(67.58%) were married, very few 2(1.02%) had tertiary education. The cost and returns analysis revealed that an average processor earns about N38620 per month. Variable costs (N2899715) components accounted for about 98% of the total cost. The enterprise has an estimated Benefit Cost Ratio of about 2.82 and an Internal Rate of Returns on investment of about 1.82 indicating that the enterprise is profitable and worthwhile. Poor access to credit facilities and extension contacts were the major challenges facing the processors. The study recommends that the processors should organize themselves into associations and cooperative groups with a view to leverage on group actions to better their access to credit facilities. Also, Government and Research Institutes should ensure that extension activities directed at the Shea butter production and processing get to the end users.

Keywords: Profitability, Constraints Processing and Shea Butter

INTRODUCTION

The shea butter tree (*Viterllaria paradoxa*) is the source of shea butter; It is a perennial crop usually found in wild agro-forestry parklands across the semi-arid region of Africa, where annual rainfall ranges from 600 to 1500 mm). 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 Sahel 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 groups in remote rural areas, all combine to create a fashionable marketing scenario for high profile cosmetic products (Matanmi, Adesiji, Olasheinde and Oladipo (2011). Nigeria accounts for 62% of the 600,000 metric tons produced 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 shea nut 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 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.

According to the Nigeria Incentive Based Risk Sharing System for Agriculture (NIRSAL) (2018), Nigeria has an estimated gross shea value worth of $320 million which is equivalent to ₦115 billion Nigerian money. The economic potential of Shea butter is in its multiple uses, socio-culturally and medicinally. Shea is used in pharmaceuticals, food and cosmetic products which placed enormous economic value on its products. NIRSAL added that Nigeria currently produce about 425,000 metric tonnes of Shea kernels, which constitutes just approximately 40 percent of its full potential. 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 (Garba and Sanni, (2015).

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 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 constraints faced by shea butter processors in the study area.

METHODOLOGY

Area of Study

The study was carried out in Mokwa Local government Area Niger State. Niger State is located in the North Central agro-ecological zone of Nigeria with a land area of 74,244 square kilometres and a projected population of 5,556,247 in 2016 (National Bureau of Statistics, 2018). 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 Federal Capital Territory 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, Gold, and Igene, 2017).

Sampling Techniques

A multi stage sampling techniques was used 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 random selection of five (5) districts which includes Kudu, Gbajigbo, Nyako Eepa, Tatabu and Mokwa. The last stage involved random selection of processors from the selected districts.

Analytical Techniques and Model specification

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

Budgeting Technique: The 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). The specification is as shown below

$$NR = \Sigma TRi - \Sigma TC_i \quad 1$$

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

$$\Sigma TR_i = P_i Q_i \quad 3$$

where:

NR = net return (₦)
TR = total revenue (₦)
P_i = unit prices of Shea butter fruit (₦)/kg)
$\mathbf{Q_i}$ = quantity of Shea butter processed (kg)
TC = 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:

$$D = \frac{P-S}{N} \quad 4$$

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)

The prevailing market prices as at the time of the survey were used in computing both the costs and returns.

Measures of Profitability.

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

Benefit Cost Ratio (BCR) = TR/TC 5

Rate of Return (ROI) = NR/TC 6

RESULT AND DISCUSSION

Socio-economic Characteristics of Respondents.

Social-economic characteristics of individuals impacts on their livelihood issues; in this study Socio-economic variables examined includes age, marital status, level of education attained, years of experience in shea processing, other income generating activities and source of capital as well as household size. Table 1 below indicate that about 109 (78.42%) respondents' were aged between 51-60years. 23(16.54%) falls within 40-50years while about 7(5.04%) between 61-70years. The respondents mean age was about 54years 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. This result agrees with that of Solomon, *et al* (2017), Who observed in his study that 96.1% of shear butter processors were married. 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. The low level of education may have negative effect on their ability to readily adopt modern techniques, innovation or new ideas. 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 of the time these produce does not necessarily complete the cycle (Producer-Retailer-Consumers) but rather go directly to the final consumers.

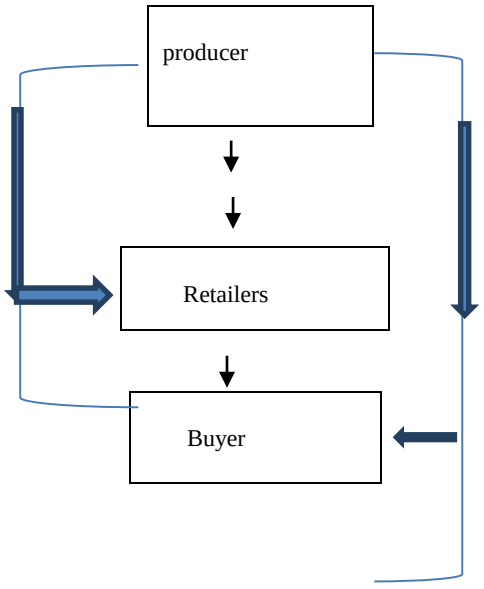

Fig. I .Adapted from findings from the study.

Systems of Shea Butter Processing

Table 2 below revealed that about 137(98.56)% sampled respondents used traditional method of Shea nut processing.. 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 adopted 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. According to Ani, Aondona and Soom (2012), the low yield of processed product can be traced to the crude methods of processing. Shea industry is primarily dominated by rural dwellers ditto smallholders and mainly dominated by women. The industry is still dominated by the use of crude implement in processing. According to Adeyemo, Oke, Owombo and. Lanlokun (2014), the fall in the production potential of shea butter in Nigeria is as a result of lack of efficiency of production through crude means of processing

Garba, and Sanni,. (2015) had also 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 using the budgeting technique approach. 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. Profit indicates 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 as an index of 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.. 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. However, an average processor makes about ₦ 38620 the positive financial return is an indication that the processing of Shea nut has potentials of increasing income of the rural dwellers. This findings are in line with those finding of (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 PER MONTH

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	
Return per processor	38620	

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 hinder them from accessing banking loans as majority of them had no-formal education.

Table 4. 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 5 below 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. In resent development however, research on the reduction of the gestation period and early fruiting of *Vitellaria paradoxa* to half the natural gestation and fruiting period through vegetative propagation is ongoing at the Forestry Research Institute of Nigeria (FRIN)., Akinyemi, Adepoju, Owombo and Jimoh (2018).

Table 5: 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 with an 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 credit facilities may also be due to the fact that most of the respondent are not educated thus do not have knowledge of banking operation. The implication of inadequate capital and credit facilities is that the processors cannot afford modern machineries. 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 there 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 equipment's For storing their products. This impacts negatively on the quality of products in the long run as quality reduces with time due to poor facilities. Other notable constraint includes 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 (0)	49 (98)	64 (64)	162	**6th**
High cost of Labour	2 (4)	11 (33)	58 (o)	63 (126)	5 (5)	168	**5th**
Inadequate Capital/credit	4 (16)	132 (396)	3 (0)	-	-	- 412	**1st**
Inadequate land to farm Shear tree	-	2 (6)	90 (0)	14 (28)	33 (33)	77	**7th**
Inadequate input	2 (8)	108 (324)	22 (0)	-	7 7	336	**4th**
Poor Extension services	3 (12)	133 (399)	3 (0)	-	-	411	**2nd**
Storage Problem	-	109 (327)	25 (0)	7 (14)	-	341	**3rd**

Source: field survey 2018

SUMMARY, 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 were adults and 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.

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 cost and returns analysis revealed that an average processor makes about ₦38620 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 shear butter processors in the area might not be having good 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 help 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.

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