Profitability of shea butter processing business for rural women in Borgu LGA, Niger State, Nigeria

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ABSTRACT

This study investigated the profitability of small-scale shea butter processing enterprises in Borgu Local Government Area, Nigeria. It examined the socio-economic characteristics of processors (n=120), their processing methods, as well as the factors influencing profitability. A multi-stage sampling procedure was employed. Three wards and two villages were selected in each Local Government Area, followed by a random selection of 50% of identified shea nut processors. The findings revealed that the majority of processors were women (93%) with an average age of 39 years. Most had basic education or Qur'anic education only and relied on traditional processing methods. The results showed an average weekly gross margin of ₦2,237.78. However, considering the imputed cost of Shea nuts (gathered wild), the actual gross margin could be much higher at ₦6,665, resulting in a return on investment exceeding 58%. Years of experience and age were positively associated with profit margin, indicating that more experienced and older processors earned more. Conversely, educational level and household size had a negative association with profit margin although at the 10 level of significance. It can be concluded that Shea butter processing offers a significant income-generating opportunity for rural women in Nigeria. However, traditional methods and limited knowledge restrict profitability. It is hereby recommended that interventions are needed to improve processing techniques, empower processors through education and training, and address constraints like unstable prices and inadequate storage facilities. This could significantly enhance the sector's contribution to rural livelihoods and women's economic empowerment.

Keywords: Gross margin; profitability; Borgu; rural women empowerment

INTRODUCTION

The Shea tree grows mostly in Africa and is found in the dry savannah belt of West Africa which encompasses the north central region of Nigeria (Garba and Sanni, 2015). Shea is mainly a wild fruit that is seasonally gathered by the local community especially women groups, for consumption and processing (Suleiman, 2008). The fruit of the Shea tree ripens during the annual hunger season when food supplies are at their lowest level and agricultural labour requirements are at their peak (Ruiz-Perez *et al.,* 2004). 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, minerals and protein (Suleiman, 2008).

Saka *et al.* (2004) reported that the Shea business is largely an opportunistic trade, in that no one has ownership rights over the trees and gathering is equally open to all. (Ruiz-Perez *et al.*, 2004) noted that the Shea nut is processed primarily through the traditional methods mostly by the women of the community and that the processing activities can substantially boost rural income and employment opportunities with mostly women and children being the major beneficiaries.

Rural-based women using manual traditional methods extract about 60% of all the crude butter produced in West Africa at an extraction rate of about 20%. Basil (2023) reported that Nigeria is one of the largest producers of Shea butter in the world. It is estimated that around 70-80% of the Shea butter produced in the world comes from West Africa, with about 39% of that total coming from Nigeria alone. According to Amuge (2020) Niger State is renowned to possess the highest production capacity in the country, while Kwara, Kebbi, Kaduna, Benue, Ogun and Oyo states also join in the rank of top producing states of the Shea tree.

Meanwhile, according to report by Custom Market Insights (CMI, 2022), the Global Shea Butter Market was estimated at USD 2.5 billion in 2021 and is anticipated to reach around USD 5.2 billion by 2030. The report classifies the Global Shea Butter market into two categories, namely, By Product (Raw and Unrefined, Refined) and By Application (Food and Beverage, Cosmetics and Personal Care, Others).

The Shea butter value chain is a critical source of income for many rural women in West Africa, including Nigeria. The processing of Shea nuts and butter are among the most accessible income-generating activities for rural women and contribute immensely to household food security. The Shea butter value chain provides many families a supplementary household income between the harvests of staple crops.

Basil (2023) noted that the Shea butter is widely used in cooking, cosmetics, and traditional African medicine. Due to its numerous health advantages, such as its capacity to protect and moisturize the skin, heal cracked lips, lessen inflammation, and aid in the treatment of skin disorders like eczema and psoriasis, it is a highly valued item in Nigeria. Shea butter can be used to delay the effects of aging and acts as a natural sunscreen.

Most importantly, the small-scale local Shea butter sector in Nigeria has been identified as a tool for poverty alleviation and women empowerment. The Shea butter value-chain has also created a sense of empowerment and economic stability for many rural women in the country. This is especially important in a country like Nigeria, where women are traditionally underrepresented in the workforce. The Shea butter industry in Nigeria also has very promising potential for social impact investing. It has been shown to improve living conditions in rural communities as it has been shown that women in Shea-producing communities report increased access to education, health care, and other essential services in addition to reducing poverty, improve food security, and create jobs.

However, the processing of Shea nut into butter is one of the most challenging stages in the Shea butter value chain. Processing is done mostly by traditional method using crude processing equipment (Al-Hassan, 2012). These include trampling, pounding using mortar and pestle, and cracking between two stones. It is estimated that the *production* of small kilograms of Shea butter takes one person several hours and that reasonable kilograms of wood fuel are needed to produce it, which means that the labor and energy inputs are quite high (Garba and Sanni, 2015).

It is therefore imperative to assess the performance of the sector, hence this, research aims to assess the small-scale Shea butter processing industry in Borgu, Nigeria.

METHODOLOGY

The Study Area

This study was carried out in Borgu Local Government area due to the high proportion of Shea nut processors in the area. Borgu local government area with headquarters in the town of New Bussa lies between latitude 10.3232° N, 4.1514° E (Latitude.to, 2024). The local government area lies predominantly in the guinea savannah climatic zone, where all deciduous trees, associated with grasses, characterize the vegetation. The people in this area are predominantly farmers (Ogunjinmi *et al.*, 2009).

Sampling Procedure and Sample Size

Multi-stage sampling procedure was used to select the respondents for this study. In the first stage, three (3) wards were randomly selected in Borgu LGA. In each of the selected ward, two (2) villages were also randomly selected. The villages selected were: Karabonde, Kurwasa, Gada Oli, Yangba, Wawa and Dogongari. A sample frame of Shea nut processors in each village was obtained from their association and thereafter 50% of the sample frame was selected to arrive at the sample size of 120 respondents (Table 1).

Table 1: Showing the sampling procedure

L G A	Wards	Villages	Sample Frame	Sample Size (50%)
Borgu	Karanbode	Karabonde,	32	16
		Kurwasa	42	21
	Rafi	Gada Oli	38	19
		Yangba	42	21
	Wawa	Wawa	38	19
		Dogongari	48	24
Total			240	120

Method of Data Collection

Primary data and secondary information were used in this study. The primary data were obtained by administering interview schedule whereas the secondary information was obtained from journals, articles, relevant literatures, and internet materials.

Analytical Tools

Data collected were analyzed using Descriptive statistics, Gross margin analysis, and multiple regression analysis.

Model Specifications

GM = TR – TVC _____ (1)

Where:
GM = Gross margin
TR = Total revenue
TVC = Total variable cost

The variable cost items considered here are costs of Shea nuts, cost of fuel wood, labour, water, milling cost, storage, rent, and transfer cost.

Multiple Regression Analysis

Multiple regression analysis was used to analyze the influence of socio-economic factors of Shea processors on the profit margin. The socioeconomic variables hypothesized to influence the profit margin of Shea processors in this study include age, sex, educational level, years of experience in processing and access to improved processing technology. The explicit form of the multiple regression analysis of factors influencing the profit margin of Shea processors can therefore be expressed as:

$$Y = \alpha + \beta_1 X_1, \beta_2 X_2 \ \beta_3 X_3 \ \beta_4 X_4 \ \beta_5 X_5 + \mu \ _____ (2)$$

Where:
Y = Net Profit
α = intercept or constant
$\beta_1 - \beta_5$ = parameters to estimated/coefficient
X_1 = educational level (no of years spent in school)
X_2 = number of years of experience in processing
X_3 = sex of respondent
X_4 = age of respondent (years)
X_5 = access to improve technology
μ = Error term

RESULTS AND DISCUSSIONS

Socio Economic Characteristic of the Respondents

The results in Table 1 show that 93% of the respondents are female, with a mean age of 39, overwhelmingly married (76%), average household size of 9, having a mean processing experience of 15 years with about half of them having either of Qur'anic or basic education only as their highest educational qualifications.

From the results it can be surmised that in the study area, Shea nut processing is mainly a female dominated enterprise. This could be attributed to the fact that Shea nut processing involves such domestic chores as cooking, drying, and grinding, which have been culturally a preserve of women. This agrees with the findings of Saka et al. (2014) who also reported high involvement of women in Shea nut processing.

The mean age of 39 years depicts that the Shea nut processors fall within the active age group of agricultural practices. This should be expected considering that the high energy inputs and length of time required during the Shea nut processing activities could be strenuous for the very young and the elderly. This finding agrees with that of Suleiman (2008) who reported unsuitability of Shea nut processing for the aged people.

Table 2: Socio-economic characteristics of the respondents

Categories	Sub-Categories	Freq.	%	Min.	Max.	Mean
Sex	Female	112	93.33			
	Male	8	6.67			
		120	100			
Age (years)	18-25	12	10.00	18	65	39.275
	26-35	34	28.33			
	36-45	36	30.00			
	46-55	28	23.33			
	>55	10	8.33			
		120	100			
Marital Status	Single	18	15.00			
	Married	92	76.67			
	Widowed//Divorced	10	8.33			
		120	100			
Household Size	< 5	29	24.17	3	22	9
	6---10	47	39.17			
	11---15	17	14.17			
	>15	27	22.50			
		120	100			
Business Experience	3---10	17	14.17	3	34	15.62
	11---15	39	32.5			
	16---20	42	35			
	>20	22	18.33			
		120	100			
Primary Occupation	Shea processing	104	86.66			
	Teaching	8	6.67			
	Trading	8	6.66			
		120	100			
Educational Level	Quranic	61	50.83			
	Basic	56	46.67			
	Tertiary	3	2.50			
		120	100			

The results of the study show that more than 76% of the respondents are married. This can be explained in two ways. One, the fact that Shea nut processing makes use of domestics processing tools that are commonly available in a family household means that only established households can embark on She nut processing. Secondly, the labour-intensive nature of Shea nut processing means that only household having large family members can carry the activities. This can be seen by the fact the average household sizes of the respondents are 9 with a minimum of 3 members. Processing of Shea nut requires a lot of labour, particularly the traditional processing method that is predominant in the study area. Thus, respondents with larger household size are more able to cope with the rigor involve in the processing of Shea nut due to the availability of cheap family labour. This assertion is further corroborated by the number of years of processing experience of the respondents which is an average of 15 years. Years of experience could stand as an added advantage in

terms of efficiency in converting inputs into output and could be added advantage in strategizing processing methods to make more profit (Garba and Sani 2015).

Although over 80% of the respondents considers Shea nut processing as their main occupation, it is ironic that not many investments have been carried towards adoption of modern methods of processing. This to a large extent can be explain by the low literacy level of the respondents. It has been reported by Olayemi *et al.* (2020) that adoption of modern methods as well as the efficiencies of agricultural practices is significantly influence by the educational levels of the practitioners.

Techniques of Shea nuts Processing by the Respondents

The result for Shea nut processing methods used by the respondents is presented in Table 3. It shows that more than 90% of the sampled respondents used the traditional method of Shea nut processing as described in Figure 1.

Table 3: Distribution of respondent based on techniques of shea processing

Shea nut Processing Methods	Freq.	%
Traditional	109	90.83
Semi--Mechanical	11	9.17
TOTAL	120	100

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 stages as indicated by the respondents, includes: the collection of fresh fruits from the wild, (sometimes additional Shea nut are purchased from local collectors), storage, fermentation, drying under the sun, shelling (using mortar and pestle or cracking between stones or beating the nuts in a sack with stick), winnowing (cleaning), roasting, pounding/crushing, milling, mixing and cooking to extract the oil. This conform to the findings of Schreckenberg (2004) and Suleiman (2008), who found that the traditional method of Shea nut processing is the most prevalent method used in Shea processing in Nigeria.

The disadvantages of the traditional method of Shea nut processing are labour intensive and arduousness as it requires high energy inputs and is not efficient considering the quantity and quality of butter being produced with only about 25% extraction rate. On the other hand, the mechanical method of processing Shea nut has the advantage of being less tedious, more effective in processing and time saving compared to the traditional method of processing. The mechanical method also produces more quality butter, and the extraction efficiency was 40 – 45%. This is in line with the findings of Niess (2003) who reported the extraction rates of traditional and mechanical methods to be 25% and 40-45% respectively.

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│ Picking of Nuts Kernel from the │
│              wild               │
└─────────────────────────────────┘
              ↓
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       │   Storage    │
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 │ Cooking to extract the oil│
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Figure 1: showing the steps in the traditional Shea nuts processing by the respondents

Mode of Ownership of Shea Processing Enterprises

The analysis of the results shows that although the Shea nut processing activities are jointly performed by most of the household members, the ownership of the business is however not jointly owned by household members (Table 4).

Table 4: Distribution of respondent based on ownership of enterprises

Mode of Ownership	Frequency	Percentage
Sole Proprietorships	110	91.67
Partnerships	9	8.83
TOTAL	120	100

It can be seen that over 91% of the Shea nut processing enterprises are sole proprietorship with less than 9% as partnerships. The preponderance of sole proprietorships in agribusiness in Nigeria has been reported by Osotimehin *et al* (2012).

The positive financial return is an indication that the processing of Shea nut has potentials for increasing rural income. This finding is in line with the findings of Schrenchembarck (2004), which recorded positive financial returns in Shea nut processing and reported that the returns from its sale help rural households to feed themselves, to invest in livestock and other income-generating activities and to meet cash requirements of the rural households.

Socio-Economic Determinants of Factors Affecting Profit Margin of the Respondents

All the functional forms of the linear regression models were estimated whereas the Double-log model was chosen as the lead equation (Table 7). The model had adjusted R^2 value of 0.92 which implies that about 92% of the variation in gross margin of the respondents was explained by the independent variables included in the regression model. The F-statistic was also significant at the 0.05 level which implies that the independent variables adequately explained the variation in the dependent variable.

Table 7: Regression estimates of the socio-economic variables influencing profit

Variables	Coefficient	t. ratio	Standard Error
Age	3.623	5.151**	2.51
Education level	-0.597	-2.382*	0.43
Years of experience	1.105	3.301*	0.92
Household size	-1.81	-3.334*	1.00
Access to improve Technology	-0.885	-1.895	1.36
Constant	-23.613	-4.67**	5.06
Adj. R-Square	0.922		
F-Value	17.56**		

Computed from field survey data: 2018. Note: **=significant at 5%, *=significant at 10%

The regression coefficients of years of experience and age were found to be positive and statistically significant at 10% and 5% levels respectively; indicating that any increment in years of experience in Shea nut processing and the age of the respondents, while holding other factors constant will lead to an increase in the profit margin of the processors. This is in line with the findings of Theophilus (2018) who reported a significant positive relationship between experience of Shea butter processors and their profit. While the regression coefficients of educational level and household sizes were negative and statistically significant at the 10% levels respectively. This implies that there is an inverse relationship between profit margin of Shea nut processors and their educational level as well as their household size. This is however contrary to the findings of Theophilus (2018) who reported a significant positive relationship between education, household sizes of Shea butter processors and their profit.

The implication of this is that the higher the level of education of the processors the lower the profit margin. This could be attributed to the fact that more than 50 and 32% of Shea butter processors had only Quranic training and primary education respectively. It can therefore be deduced that the Quranic training and primary education received by the

respondents is not related to Shea nut processing activities and even then, the few educated processors are operating on part time basis and therefore used more of hired labour which tend to increase their total costs thereby reducing their profit margin.

Constraints faced by the Respondents

The perceptions of respondents on the problems associated with the processing of Shea nut within the study locations are presented in Table 8. More than half of the processors indicated unstable prices and transportation as their major problems. Similarly, poor quality nut, lack of standard unit of measurements and lack of storage facilities were each noted by about one third of the respondents respectively.

Table 8: Distribution of the constraints faced by shea butter processors

Problems	Freq.	%
Unstable prices	63	26.92
Transportation problem	61	26.07
Poor quality nut	38	16.25
Lack of standard unit of measurements	36	15.38
Lack of storage facilities	36	15.38
TOTAL	234*	100

*Multiple responses

This conforms with the findings of Schrenchembarck (2004) and Nosiru *et al* (2022) who reported that the shea nut processors complained of unstable price and lack of standard measurement of Shea products as well as the high cost of processing equipment.

CONCLUSION

Shea butter processing presents a significant income-generating opportunity for rural women in Nigeria. However, traditional methods and limited knowledge hinder profitability. This study recommends the need for interventions to improve processing techniques, empower processors through education and training, and address constraints like unstable prices and inadequate storage facilities.

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