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Socioeconomic characteristics, profitability, and contribution of shea butter processing to rural household income in Kwara State, Nigeria

Felicia Itunnu Wole-Alo[1]✉
Raimi Adebukola Aminat[2]


(✉ *Corresponding Author*)

[1,2]*Department of Agricultural Extension and Communication of Technology, Federal University of Technology Akure, Ondo State, Nigeria.*
[1]*Email: fiwolealo@futa.edu.ng*
[2]*Email: raimiadebukola16@gmail.com*

Abstract

This study assessed the contribution of shea butter processing to income generation among rural dwellers in Kwara State, Nigeria. It examined the socioeconomic characteristics of processors, determined profitability, identified factors influencing income, and investigated constraints faced by processors. A multistage sampling technique was used to select Ifelodun and Kaiama Local Government Areas of Kwara State. Ninety shea butter processors were selected using snowball sampling. Primary data were collected using a structured questionnaire and analyzed with descriptive statistics, chi-square analysis, linear regression, and gross margin analysis. The mean age of respondents was 61 years, with an average household size of seven persons and processing experience of 42 years. About 54.4% were literate, while the average monthly income was ₦32,500. All respondents financed processing through personal savings. Shea butter processing was profitable, with a gross margin of ₦56.68. Age significantly influenced the processing method adopted. Major constraints included inadequate extension services and poor access to improved processing technologies. Shea butter processing is a viable and profitable rural livelihood activity with strong potential to enhance household income despite production constraints. Strengthening extension services, improving training, promoting improved technologies and support will increase productivity, reduce drudgery, and improve rural livelihoods.

Keywords: Contribution, Income generation and rural dwellers, Processing, Shea butter.
JEL Classification: O13; Q12; Q13.

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Contents

Contribution of this paper to the literature
This study provides empirical evidence linking the profitability of shea butter processing with rural household income while identifying processing constraints and the role of extension services in Kwara State, Nigeria. It offers localized evidence to inform policies and interventions for strengthening rural livelihoods.

1. Introduction

Rural livelihoods in developing countries remain heavily dependent on agriculture and agro-based enterprises, which serve as major sources of employment and income. In sub-Saharan Africa, a large proportion of rural households engage in small-scale processing of agricultural and non-timber forest products to supplement declining farm incomes and improve welfare (FAO, 2023; World Bank, 2022). These activities are particularly important in areas with limited access to formal employment, infrastructure, and financial services.

Shea butter processing, derived from the nuts of *Vitellaria paradoxa*, is one of the most important rural agro-processing enterprises in West Africa. Nigeria is among the leading producers of shea nuts, and the crop plays a vital role in the livelihoods of women and rural households across the savannah regions (Elias & Carney, 2021; Lovett, 2020). Shea butter is widely used in food, cosmetic, and pharmaceutical industries, making it a high-value non-timber forest product with significant income-generating potential (UNCTAD, 2021).

The predominance of traditional processing methods, low mechanization, and limited value addition in shea butter production has been identified as a major constraint to productivity and rural industrial development in West Africa (Addaquay, 2004). Studies have shown that both processing and marketing constraints significantly affect income derived from agro-processing enterprises (Awo, Oladele, & Yusuf, 2019; Kanlisi, Amenga-Etego, Akomeah, Amoako, & Narh, 2014; Olagunju & Adeyemo, 2022).

Agricultural extension services are expected to improve rural agro-processing through the dissemination of improved technologies, training, and access to markets and credit (Anderson & Feder, 2004). However, extension coverage in many rural areas of Nigeria remains weak and inconsistent, resulting in poor knowledge transfer and low adoption of improved practices (Auta, Abdullahi, & Abubakar, 2020).

In Kwara State, shea butter processing is an important livelihood activity, particularly among women, contributing significantly to household income. However, processors continue to face challenges such as limited access to improved technologies, inadequate extension support, poor access to credit, and unstable markets (Ibrahim, Muhammad-Lawal, Adesina, Muhammed, & Ibrahim, 2016; Olagunju & Adeyemo, 2022). These constraints limit efficiency, output, and profitability.

Given the economic importance of shea butter processing, there is a need for empirical evidence on its socioeconomic characteristics, profitability, and contribution to rural household income in Kwara State. Such evidence is essential for informing policy interventions aimed at improving productivity, strengthening value chains, and enhancing rural livelihoods.

Therefore, this study examines the socioeconomic characteristics, profitability, and contribution of shea butter processing to rural household income in Kwara State, Nigeria.

1.1. Research Questions

This study was designed to answer the following research questions.
i. What are the socio-economic characteristics of the respondents in the study area?
ii. What are the factors affecting the processing of Shea butter in the study area?
iii. What are the processing techniques available among the respondents in the study area?
iv. Is the Shea butter product profitable in the study area?

1.2. Objectives of the Study

The general objectives of the study were to assess the Contribution of Shea Butter Processing to the Income Generation of Rural Dwellers in Kwara State, Nigeria, while the specific objectives were to:
i. Determine the socio-economic characteristics of the respondents in the study area.
ii. Determine the factors affecting the processing of Shea butter in the study area.
iii. Determine the processing techniques available among the respondents.
iv. Determine the profitability of Shea butter produced among the respondents.

1.3. Hypotheses of the Study

The hypotheses of the study were stated in null form as follows:
H_{01}: There is no significant relationship between profitability and various factors affecting the processing of Shea butter.

2. Methodology

2.1. The Study Area

The study was conducted in Kwara State, Nigeria, which was created on 27 May 1967 and comprises 16 Local Government Areas. It is located between latitude 8°30′N and longitude 5°00′E, sharing boundaries with Oyo, Ekiti, and Osun States to the south, the Benin Republic to the west, and the River Niger and Kogi State to the north and east. The state covers an estimated land area of 60,388 km². It experiences two distinct climatic seasons—rainy and dry—with temperatures ranging between 30°C and 35°C and annual rainfall of 1,000–1,500 mm, conditions that are favourable for shea nut tree growth. The vegetation is mainly rainforest and wooded savannah. The population is estimated at about 2.37 million based on the 2006 census. Agriculture and agro-processing constitute the major livelihood activities in the state, including shea butter, cotton, kolanut, beniseed, locust beans, and black soap production.

2.2. Sampling Techniques and Sample Size

Kwara State was selected for this study due to its significant contribution to shea butter processing in Nigeria. A multistage sampling technique was employed. In the first stage, two Local Government Areas (LGAs), Ifelodun and Kaiama, were purposively selected based on their prominence in shea butter processing activities. In the second stage, three communities were purposively selected from each LGA headquarters. In the final stage, a snowball sampling technique was used to select 15 respondents from each community, resulting in 45 respondents per LGA and a total sample size of 90 respondents for the study.

3. Result and Discussion

3.1. Socio-Economic Characteristics of the Respondents

The age distribution of shea butter processors shows that 21.1% of the respondents were between the age range of 20–40 years. The greatest proportion (32.2%) of the respondents were between the ages of 41–60 years. Twenty-five-point-six percent (25.6%) of the respondents were in the age range of 61–80 years, while 21.1% of the respondents were between the ages of 81–100 years. The mean age of the respondents was 61 years; this implies that the energy required to carry out various processing activities is low. This result agrees with the findings of Nwaru, Onyenweaku, and Nwosu (2006), who reported that the older the processors become, the more their efficiency drops.

From the field survey, it was shown that all the respondents involved in shea butter processing were females (100%). This indicates that women dominate shea butter processing activities in the study area and play a central role in the processing enterprise. This finding is consistent with Okolo, Omoregbee, and Alufohai (2018), who reported that women constitute the principal actors in shea butter production in North-Central Nigeria. It also agrees with Bwala, Yaru, and Alani (2019), who found that the majority of shea nut collectors and processors in Niger State, Nigeria, are women, underscoring the importance of the shea value chain as a source of livelihood and economic empowerment for rural women.

Entries in Table 1 show that 54.4% of the respondents had no formal education, while 27.8% of the respondents had primary education and 17.8% of the respondents had secondary school education. This implies that the majority of shea butter processors had no education, and this could affect, to a great extent, the efficiency of shea butter processing in terms of cost minimization and value addition to generate more profit.

This is in line with Kanlisi et al. (2014), who found that processors are often unable to keep simple records to determine the profit and loss of their activities. This is also in line with the Extension Farm Record Lecture (AEC 403) delivered by Alfred and Wole-Alo (2016), who found that keeping records helps identify the strengths and weaknesses involved in agricultural business. This is evident on the ground, as most processors interviewed were unable to give accurate records of their monetary flows. It is therefore imperative to initiate non-formal educational programs to help processors keep simple records and respond to accounting demands of their economic activities.

Fourteen-point-four percent (14.4%) of the respondents had a household size of 1–4, 36.7% had a household size of 5–7, 44.4% had a household size of 8–11, and 4.4% had a household size of 12–15. The mean household size was 7 persons, and this implies that larger household sizes will favour labour in the processing of shea butter.

According to Odetola and Etumnu (2013), intensified efforts in increasing productivity and developing the agricultural value chain in shea butter production can be achieved through large family size. This also agrees with the findings of Garba, Sanni, and Adebayo (2015) that larger household sizes are more able to cope with the rigour involved in processing shea butter due to the availability of cheap family labour, while smaller household sizes will require more hired labour.

The results in Table 1 show the marital status of the respondents. Only 1.1% of the respondents were single, 48.9% were married, 10.0% were divorced, 7.8% were separated, while 32.2% were widowed. This therefore implies that the majority of shea butter processors were married and therefore had larger families that enabled them to have sufficient family labour to effectively carry out the various processing activities.

According to Onikoyi, Tijani, and Oluwasusi (2014), shea butter processing contributes to household welfare and serves as a major source of labour, as processing comes from family and self.

Ninety-eight-point-nine percent (98.9%) of shea butter processors had a household income of ₦10,000 to ₦100,000. Only 1.1% of shea butter processors had a household income of ₦400,001 to ₦500,000 per month. This implies that the respondents can survive through the processing of shea butter. This is in line with Hurley, Duke, Francis, and Pratt (1990), who found that income generation intervention is only one of many ways of alleviating poverty.

Table 1 shows that 14.58% of the respondents had processing experience between 6–25 years, 41.55% between 26–40 years, 21.1% between 41–55 years, 18.9% between 56–70 years, while only 6% had 71–85 years of experience. The mean processing experience was 42 years; this implies that they have acquired basic knowledge needed in the processing of shea butter, ranging from gathering of shea nuts to processing of shea butter.

Alonge and Olaniyan (2007) supported this, stating that the more processors have years of experience, the more their production capacity increases.

From the field survey, the types of shea butter produced by the respondents were basically for cooking and body use, as the majority use it locally for fortifying food and as cream to enhance the skin. This is in line with the work of Okullo, Hall, and Obua (2010) who found that shea butter is widely utilized for domestic purposes such as cooking and skin moisturizer, and commercially as an ingredient in cosmetic, pharmaceutical, and edible products.

Table 1. Socio-economic characteristics of the respondents.

Socio-economic	Category	Frequency	Percentage	Mean
Name of village	Igbo-owu	15	16.7	NA
	Apa-ola	15	16.7	NA
	Joromo	15	16.7	NA
	Kaiama	15	16.7	NA
	Yoluwa	15	16.7	NA
	Gwanabe	15	16.7	NA
Local Government Area	Ifelodun	45	50.0	NA
	Kaiama	45	50.0	NA
Age	20-40	19	21.1	61
	41-60	29	32.2	NA
	61-80	23	25.6	NA
	81-100	19	21.1	NA
Sex	Female	90	100.0	NA
	Male	0	0.0	NA
Marital status	Single	1	1.1	NA
	Married	44	48.9	NA
	Divorced	9	10.0	NA
	Separated	7	7.8	NA
	Widowed	29	32.2	NA
Religion	Christianity	31	34.4	NA
	Islam	54	60.0	NA
	Traditional	5	5.6	NA
Educational level	No formal education	49	54.4	NA
	Primary education	25	27.8	NA
	Secondary education	16	17.8	NA
Household size	1 – 4	13	14.4	NA
	5 – 7	33	36.7	7
	8 – 11	40	44.4	NA
	12 - 15	4	4.4	NA
Household income	10,000 - 10,0000	89	98.9	₦59,389.
	40,0001 - 50,0000	1	1.1	NA
Processing experience	16 - 25	12	14.85	42
	26 - 40	36	41.55	NA
	41 - 55	19	21.1	NA
	56 - 70	17	18.9	NA
	71 - 85	6	6.7	NA
Type of Shea butter	Cooking	90	100.0	NA
	Body use	90	100.0	NA

Source: Field survey, 2021.

3.2. Processing Activity

3.2.1. Colour of Shea Butter

The colour of shea butter produced, according to the survey carried out, varied. About 58.9% of the shea butter was butter cream in colour, 33.3% was yellowish, 2.2% was creamy white, 1.1% was butter white, 2.2% was butter yellow, while 1.1% was whitish-grey in colour. This therefore implies that a larger proportion of the shea butter produced was butter cream in colour, as it is the most common type used for cooking and body applications.

Shea butter can last for many years if stored away from light and heat, as it is resistant to oxidative rancidity, with its stability partly influenced by its colour (Fleury, 2000).

3.2.2. Source of Finance for Running the Business

The survey showed that all respondents sourced their finance personally. They did not have access to loans from government or cooperative societies. This therefore implies that processing activities are carried out with limited financial capacity, thereby restricting production levels. According to Kanlisi et al. (2014), shea butter processors in rural areas often rely on personal funds due to price instability of shea nuts and the high interest rates associated with formal loans.

3.2.3. Measure used in Selling the Shea Butter

Table 2 shows the various measures used in selling shea butter by the processors. About 82.2% of the respondents measure shea butter using rubber containers, 4.4% use Congo (a local measurement unit in Nigeria), while 13.3% use calabash. This implies that rubber containers are the most commonly used measurement method due to their acceptability among customers and shea butter users.

3.2.4. Location where they sell their Shea Butter

Table 2 shows the various locations where shea butter processors sell their processed products. About 6.7% of the respondents indicated that they sell their products at home, while 93.3% indicated that they sell in the market. This therefore means that the majority of respondents sell their products in the market, which enhances their income-generating capacity. This agrees with the findings of Adeokun, Oladoja, and Adetunji (2002) who reported that rural populations tend to sell their products collectively in markets due to their dispersed settlement patterns.

3.2.5. Amount of Rubbers Obtained from a Bag of Shea Nut

Table 2 shows the amount of rubbers obtained from a bag of shea nuts. About 1.1% of the respondents obtained 2 rubbers from a bag of shea nuts, 12.2% obtained 3 rubbers, 30.0% obtained 4 rubbers, 12.2% obtained 5 rubbers, 27.8% obtained 6 rubbers, 8.9% obtained 7 rubbers, and 7.8% obtained 8 rubbers. The amount of shea butter obtained from a bag of shea nuts depends on the kneading process employed in each Local Government Area. In Ifelodun Local Government Area, kneading is done using the legs, while in Kaiama Local Government Area, kneading is carried out using the hands to extract shea butter from the nuts.

3.2.6. Source of Shea Nut

Table 2 indicates the various sources of shea nuts used for shea butter processing. It was observed from the survey that 5.6% of the respondents sourced shea nuts directly from the farm, while 94.4% sourced theirs from the market by purchasing from different sellers of shea nuts. This is in line with Alonge and Olaniyan (2007), who reported that shea nuts are mainly obtained from the market due to the pre-processing activities carried out before bagging for sale in order to ensure a refined and quality shea butter product, as well as the risk of snake bites during collection.

3.2.7. Prices of Shea Butter per Rubber Sold

Table 2 shows the various prices at which shea butter processors sold their products. The mean price of processed shea butter per rubber sold by the respondents is ₦1,700. This implies that a large proportion of respondents sold their processed shea butter between ₦1,000 and ₦1,900, as this represents a stable price range affordable to buyers. Onikoyi et al. (2014) reported that the amount of shea butter sold is dependent on the cost of labour and inputs utilized in the processing activities.

3.2.8. Total output of Shea Butter Per Rubber Per Month

Table 2 shows the total output of shea butter per rubber per month by the processors. It was observed that 62.2% of the respondents produced between 10–19 rubbers of shea butter, 37.7% produced between 20–29 rubbers, while 1.1% produced between 30–39 rubbers. The mean total output of shea butter per rubber per month was 19 rubbers. This therefore implies that the majority of respondents produced between 10–19 rubbers of shea butter, as a result of low processing capacity and limited access to modern processing techniques required for efficient production. This is in line with Ibrahim et al. (2016), who suggested that the maturity and seasonality of the shea tree influence the extraction of shea butter, thereby affecting the output of processors.

3.2.9. Average Monthly Income

Table 2 shows the average monthly income of the respondents. From the survey carried out, 8.9% of the shea butter processors earned between ₦5,000–₦9,000, 60.0% earned between ₦10,000–₦14,000, 24.4% earned between ₦15,000–₦19,000, while 3.3% earned between ₦20,000–₦24,000. The mean average monthly income was ₦12,000. This therefore implies that the major average income of the respondents falls within the ₦10,000–₦14,000 range. It further suggests that the income generated is used to cater for various household needs and responsibilities, including child upbringing and family care. This result supports the findings of Addaquay (2004), who reported that income generated from processing activities varies with the level and methods of processing employed.

Table 2. The processing activities involved in shea butter processing.

Processing Activities	Category	Frequency	Percentage	Mean
Colour	Butter cream	53	58.9	NA
	Yellowish	30	33.3	NA
	Creamy white	2	2.2	NA
	Butter white	1	1.1	NA
	Whitish yellow	1	1.1	NA
	Butter yellow	2	2.2	NA
	Whitish grey	1	1.1	NA
Source of finance for running business	Personal saving	90	100.0	NA
Measure used in selling the Shea butter	Per rubber	74	82.2	NA
	Per Congo	4	4.4	NA
	Calabash	12	13.3	NA
Location where they sell their Shea butter	Home	6	6.7	NA
	Market	84	93.3	NA
Amount of rubber obtained from a bag of shea nuts	2 rubber	1	1.1	NA
	3 rubber	11	12.2	NA
	4 rubber	27	30.0	NA
	5 rubber	11	12.2	NA
	6 rubber	25	27.8	NA
	7 rubber	8	8.9	NA
	8 rubber	7	7.8	NA
Source of Shea nut	Farm	5	5.6	NA
	Market	85	94.4	NA
Prices of Shea butter per rubber sold	N1,000-1,900	5	83.3	1700
	N2,000-2,900	2	2.2	NA
	N3,000-3,900	13	14.4	NA
Total output of Shea butter per rubber per month	10-19	56	62.2	NA
	20-29	33	36.7	19
	30-39	1	1.1	NA
Average monthly income	N5,000-9,000	8	8.9	12,000
	N10,000-14,000	54	60.0	NA
	N15,000-19,000	22	24.4	NA
	N20,000-24,000	3	3.3	NA

Source: Field Survey, 2021.

3.3. Factors Affecting Shea Butter Processing

Table 3 revealed that the general mean score is 2.5, and any value or mean greater than 2.5 is considered "Agreed," while values less than 2.5 are considered "Disagreed." This is presented in Table 3, which shows that rainfall in the two Local Government Areas surveyed had a favourable effect on shea butter processing, with an average mean score of 2.98. Sunshine, however, was not considered a major factor affecting shea butter processing in the study area. The expertise level of processors was also not a favourable factor, as it recorded a weak mean score of 1.23. Similarly, knowledge and availability of improved technology did not significantly influence shea butter processing in the study area. The price of shea butter also had little effect on processing activities, with an average mean score of 2.25.

In contrast, the availability of a market had a positive influence on shea butter processing, as it facilitates the distribution and marketing of products. Market accessibility also showed a favourable effect, as it enhances the movement and exchange of shea butter between processors and buyers. Strong wind was also considered a favourable factor affecting processing, as it aids the cooling and solidification of shea butter paste, thereby limiting oil extraction, especially during the dry season.

Table 3. Factors affecting shea butter processing.

Factor statement	VI F (%)	I F (%)	LI F (%)	NI F (%)	Mean	Remark
Rainfall	89(98.9)	1(1.1)	0(0.00)	0(0.00)	2.98	Agree
Sunshine	29(32.2)	56(62.2)	4(4.4)	1(1.1)	2.25	Disagree
Humidity	77(85.6)	12(13.3)	3(3.3)	0(0.00)	2.84	Agree
Strong wind	69(76.7)	18(20.0)	3(3.3)	0(0.00)	2.73	Agree
Expertise	3(3.3)	22(24.4)	58(64.4)	7(7.8)	1.23	Disagree
Improved facilities	3(3.3)	3(3.3)	26(25.6)	61(67.8)	0.42	Disagree
Knowledge and availability of improved technology	50(55.6)	18(20.0)	14(15.6)	8(8.8)	2.22	Disagree
Price	27(30.0)	60(66.7)	2(2.2)	1(1.1)	2.25	Disagree
Demand	45(50.0)	40(44.4)	5(5.6)	0(0.00)	2.44	Disagree
Income	16(17.8)	21(23.3)	53(58.9)	0(0.00)	1.58	Disagree
Credit facilities	16(17.8)	18(20.0)	54(60.0)	2(2.2)	1.55	Disagree
Costs	31(34.4)	50(55.6)	9(10.0)	0(0.00)	2.24	Disagree
Competition	39(43.3)	44(48.9)	7(7.8)	0(0.00)	2.35	Disagree
Availability of market	60(66.7)	25(25.7)	4(4.4)	1(1.1)	2.60	Agree
Accessibility of market	58(64.4)	30(33.3)	2(2.2)	0(0.00)	2.62	Agree
Transport facilities	39(43.3)	32(35.6)	19(21.1)	0(0.00)	2.22	Disagree
Water availability	5(5.6)	11(12.2)	70(77.8)	4(4.4)	1.18	Disagree

Source: Field survey, 2021.

3.4. Processing Methods Utilized in Shea Butter Processing

Table 4 shows the responses of shea butter processors recorded based on the use of manual methods, locally fabricated machines, and industrial machines. It was observed that 78.9% of the respondents preferred using manual methods of processing, while 21.1% preferred using locally fabricated machines for seed cracking. Also, 98.9% of the respondents used local methods for roasting the kernel, while 1.1% used alternative local processing methods for the same activity. Table 4 below presents the frequencies and percentages.

The majority of the shea butter processors utilize various methods in processing activities. From the survey, 100.0% of the respondents used manual methods for harvesting shea nuts, washing, drying, and seed selection, while none used locally fabricated or industrial machines for these processes. About 78.9% of the respondents used manual methods for cracking the seeds, while 21.1% used locally fabricated machines. Similarly, 98.9% of the respondents used manual methods for roasting the kernel, while 1.1% used locally fabricated machines.

Furthermore, all respondents used manual processing methods for solidification, filtration, and packaging of shea butter, while none used locally fabricated or industrial machines. Based on field information, the locally fabricated machines intended for these processes are not technically available, and those produced by local artisans were ineffective in extracting shea butter from the dough. The high cost of modern equipment also limits access, as most processors cannot afford machinery that would enhance output.

This finding supports Godfred, Saito, and Takeuchi (2015), who reported that processors had no machinery and manually executed all operations from pounding kernel nuts into grits through to final butter production. However, it contradicts Addaquay (2004), who noted that nut crushers, roasters, kneaders, or screw presses often complement manual processes and reduce the drudgery associated with traditional systems.

Table 4. Processing methods utilized in Shea butter processing.

Processing methods	Manually F (%)	Local fabricated machine F (%)	Industrial machine F (%)
Harvesting of Shea nuts	90(100.0)	0(0.00)	0(0.00)
Washing of Shea nuts	90(100.0)	0(0.00)	0(0.00)
Pre-treatment	90(100.0)	0(0.00)	0(0.00)
De-pulping	90(100.0)	0(0.00)	0(0.00)
Seed drying	90(100.0)	0(0.00)	0(0.00)
Seed selection	90(100.0)	0(0.00)	0(0.00)
Seed cracking	71(78.9)	19(21.1)	0(0.00)
Roasting of kernels	89(98.9)	1(1.1)	0(0.00)
Milling of kernels	90(100.0)	0(0.00)	0(0.00)
Boiling of ground kernels	90(100.0)	0(0.00)	0(0.00)
Kneading of dough	90(100.0)	0(0.00)	0(0.00)

Processing methods	Manually F (%)	Local fabricated machine F (%)	Industrial machine F (%)
Cold water mixing	90(100.0)	0(0.00)	0(0.00)
Cold press extraction	90(100.0)	0(0.00)	0(0.00)
Filtration	90(100.0)	0(0.00)	0(0.00)
Solidification	90(100.0)	0(0.00)	0(0.00)
Packaging	90(100.0)	0(0.00)	0(0.00)

Source: Field survey, 2021.

3.5. Profitability of Shea Butter Processing

Gross margin analysis was employed to determine the profitability of shea butter processing in the study area. The total revenue (TR) from the sales of shea butter was computed, along with the costs of variable inputs associated with production. The gross profit was obtained by subtracting the cost of goods sold from the total revenue. The price of shea butter per respondent was ₦151,400.00, while the total quantity of shea butter produced was 460 rubbers. The total revenue generated from shea butter production was ₦69,644,000, while the cost of goods sold amounted to ₦1,207,650, as presented in Table 5.

The decision rule for gross margin analysis states that when profitability is greater than zero (0), the enterprise is considered profitable. This implies that shea butter processing is profitable in Ifelodun and Kaiama Local Government Areas of Kwara State, Nigeria.

Gross margin ratio = (Gross profit / Cost of goods sold).

Table 5. Profitability of shea butter processing.

Item	Analysis	Value (₦)
Price of product per unit	Given	151,400.00
Quantity of product	Total rubbers obtained	460
Total Revenue (TR)	Price × Quantity	69,644,000.00
Cost of Goods Sold (COGS)	Given	1,207,650.00
Gross Profit	TR − COGS	68,436,350.00
Gross Margin Ratio	Gross Profit ÷ COGS	56.68

Source: Field survey, 2021.

Shea butter processing is profitable in the study area as gross margin ratio is greater than zero.

3.6. Hypothesis Testing

Ho: There is no significant relationship between profitability and the various factors affecting the processing of shea butter.

Table 6 shows that transport facilities, cost of inputs, rainfall, accessibility to market, prices of shea butter, credit facilities, and market accessibility had no significant relationship with profitability at $P < 0.05$, indicating a weak correlation. This implies that these factors do not have a significant effect on the income of respondents from shea butter processing. However, availability of market and improved storage facilities showed a significant relationship with profitability at $P < 0.05$, indicating a strong correlation. This implies that only availability of market and improved storage facilities are significantly related to profitability in the study area. It further suggests that these factors influence processors' income from shea butter processing.

Therefore, the null hypothesis was rejected, and the alternative hypothesis was accepted.

Table 6. The correlation between the profitability and the various factors affecting the processing of shea butter.

Variables	P	R	df	R^2	Decision
Transport	0.152	0.402^a	1	0.162	NS
Cost of input	0.197	0.464^b	2	0.215	NS
Rainfall	0.238	0.513^c	3	0.263	NS
Accessibility to market	0.268	0.548^d	4	0.301	NS
Price of Shea butter	0.279	0.243	1	0.238	NS
Transport facilities	0.282	0.475	3	0.152	NS
Availability of market	0.828	0.025	1	0.001	S
Credit facilities	0.234	0.083	1	0.007	NS
Improved storage facilities	0.325	0.014	1	0.004	S

Note: a, b, c, and d indicate statistical significance grouping among variables based on post-hoc comparison at the 5% level ($P < 0.05$). Variables with different superscript letters are significantly different from each other, while those sharing the same letter are not significantly different. NS-Not Significant, S-Significant

Source: Field Survey, 2021.

4. Conclusion

Shea butter processing is a profitable and lucrative enterprise in Ifelodun and Kaiama Local Government Areas of Kwara State. It contributes significantly to the income, welfare, and household needs of processors. The majority of respondents had no formal education. The primary source of income for most respondents was shea butter processing. Most respondents obtained information on shea butter processing through their membership in associations. The majority of processors operated at a subsistence level.

5. Recommendations

Based on the findings of this study, the following recommendations are made.

- Regular and timely training workshops on improved shea butter processing technologies and equipment maintenance should be organized for processors.
- Government should provide basic infrastructural facilities such as electricity, healthcare services, and rural feeder roads to enhance processing activities.

- Participation in cooperative societies should be encouraged through extension education to improve productivity and income generation.
- Government should improve access to shea nut collection and transportation by providing accessible rural roads and transport systems.
- Credit facilities should be made available to processors at low interest rates to enhance production capacity and meet both domestic and export demand.
- Provision of modern processing machines should be prioritized to reduce drudgery and improve efficiency in shea butter production.

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