

Agripreneurial drive among women shea butter processors in Kwara State, Nigeria: motivating factors and efficiency

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Abstract

This study examined agricultural entrepreneurship among women shea butter processors in Kwara State Nigeria. It assessed their motivation factors, level of efficiencies, determinants of output and challenges faced in the entrepreneurial drive by the women. Primary data, collected using a semi-structured questionnaire, were collected from randomly selected 120 shea butter women processors. The data obtained were analysed with descriptive statistics, index ranking and the stochastic frontier function. The results showed that the motivating factors for agripreneurship among women were the quest to take care of the family, be financially independent, have increased income and be self-employed. The mean entrepreneurial, managerial and prudent efficiencies of the women were 0.78, 0.60 and 0.47, respectively. This indicates that there is still room for welfare gain by the women through improvement in their efficiency levels. The main determinants of output by the women were the quantity of shea nuts, water, and labour used. Meanwhile, educational status, access to extension services and membership in cooperatives had a direct effect on the level of entrepreneurial efficiency of the women, while their inefficiency increases with age. Entrepreneurial drive by the women was constrained by inadequate governmental and institutional support, poor credit facilities, lack of training on entrepreneurial development, poor potable water supply, and seasonality of the shea nuts. This study advocates efforts by the government and relevant stakeholders to support women to improve their agripreneurial efficiency. This could be achieved through the provision of processing technology, financial aid and training on entrepreneurial development.

Keywords: agripreneurship, women entrepreneur, motivating factors, efficiency, constraints

1 Introduction

Poverty is a major problem in many developing countries, including Nigeria. Meanwhile, it is more common among the womenfolk than in their male counterparts (Falola *et al.*, 2020; Ojogho & Ojo, 2017). This is partly because, in many developing countries, women are prevented from working outside their household for socio-cultural reasons (Falola *et al.*, 2020). There are 104 economies with labour laws that restrict the types of jobs women can do (World Economic Forum, 2018). These days, however, the scenario is changing with women engaging in various income-generating activities, including agripreneurship.

Agripreneurship is synonymous with agricultural entrepreneurship (Bairwa *et al.*, 2014). It involves applying the principles of entrepreneurship to identifying, developing, and managing viable agricultural projects or enterprises sustainably and optimally for making a profit and improving livelihoods (Mukembo & Edwards, 2016). It also involves creating an agricultural venture with the view to devoting required effort and time, assuming the accompanying financial, social and psychic risks with the view to making a profit and earning a living. Women agripreneurs are women who are involved in agricultural activities; they identify opportunities in agriculture and profitably combine resources. Women agripreneurs start and manage agricultural businesses independently and tactfully, combine factors of production, and take risks for the profit-making motive (Kaur *et al.*, 2018).

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One of the agripreneurship practises among Nigerian women is the processing of shea butter.

Shea butter processing is an important agripreneurial venture among women in Nigeria and serves as means of livelihood for many women. It involves processing the shea (*Vitellaria paradoxa*) nut into a fatty matter called ‘shea butter’ of high economic importance, especially in African countries. Shea butter is used for preparing food, making soap, and has medicinal values. It is also an important raw material in the manufacture of candles, cosmetics and pharmaceutical products. It is equally used to treat skin problems such as sunburn, dermatitis, ulcers, burns and dryness (Fakayode, 2013; Lin *et al.*, 2018). Given the benefits of shea butter in cooking, skincare, medicine and pharmaceuticals, there is a need for efficiency on the part of the women agripreneurs involved in shea butter processing.

The concept of efficiency is concerned with the relative performance of the process used in transforming given inputs into outputs. Rahji *et al.* (2011) identified three forms of agripreneurial efficiency – prudent, managerial and entrepreneurial efficiency – identical to the economic, allocative and technical efficiencies of the farm in the stochastic production literature (Bravo-Ureta & Pinheiro, 1993; Coelli, 1995; Takii, 2011). Entrepreneurial efficiency is about whether a firm uses the best available technology in its production process. Entrepreneurial efficiency determines whether the firm achieves optimum yield using some factors of production (Alao & Kuje, 2010). Managerial efficiency, sometimes called price efficiency, refers to the ability of the firm to choose its inputs in a manner that would minimize its costs. It measures how far the firm is from the point of maximum profitability given the existing market prices of inputs and products. Prudent efficiency is the product of both managerial and entrepreneurship efficiencies. It indicates the cost per unit of output for a firm that perfectly attains both entrepreneurial and managerial efficiencies. Thus, prudent efficiency determines if a firm uses the factors of production in proportions that ensure maximum output at given market prices. It also reflects whether a managerially efficient firm produces at the lowest possible cost (Rahji *et al.*, 2011).

The importance of measuring efficiency as it relates to women agripreneurs cannot be overemphasized. This is not only due to scarcity of resources but also to provide a guide in formulating relevant policies aimed at eradicating poverty among the womenfolk. Meanwhile, a lot of effort has been devoted to quantifying efficiency in agriculture. However, limited emphasis has been laid on assessing agripreneurial efficiency, especially as it relates to women in shea butter processing. Therefore, the main objective of this study is to assess agripreneurship among women shea butter processors

in Kwara State Nigeria. Specifically, the study identified the motivational factors that promote agripreneurial development among the women; measured the entrepreneurial efficiency of women shea butter processors; determined the managerial efficiency level of the women shea butter processors; quantified the prudent entrepreneurial efficiency of the women shea butter processors; examined the determinants of shea butter output by the processors, and identified the problems hindering agripreneurial development drive among the women.

2 Women in agricultural enterprise

The role of women in agricultural development cannot be underestimated, as they contribute to food security, nutrition and several areas of agriculture ranging from production to marketing and processing of agricultural produce (Kaur, 2018). Women provide food and serve as the link between farm and table due to their role as the primary caregivers to the family (Abdullahi *et al.*, 2015). In developing countries, women constitute the backbone of the rural economy and have increased their agricultural involvement over the last few decades (World Bank, 2017). In African countries, women play a significant role in the food cycle and rural development (UNDP, 2016; World Bank, 2017). Besides, women are vehicles for agricultural growth in sub-Saharan Africa as they contribute significantly to labour availability in agriculture. Studies have shown that rural women work longer hours than men on the farm (Alemayehu, 2014; World Bank, 2015; Sefer, 2020; Adeyeye *et al.*, 2021). Their involvement in agripreneurship and other income-earning activities is, therefore, very important to improve households’ economic status and reduce the poverty rate.

In spite of their role in agricultural and rural development, women are more vulnerable than their male counterparts (Rahaman, 2008; Adedayo & Tunde, 2013). They are faced with poor access to production resources and services (Jamali, 2009; FAO, 2016; World Bank, 2018). Women in most countries often do not have equal access to essential services with their male counterparts due to discrimination, legal barriers and restrictive cultural norms; thus, they are constrained with production resources, financial assets, business advisory services, and accessing market information (Dougherty, 2019). Gender roles, for instance, women’s roles in the family, impose a serious challenge to women’s entrepreneurship development (Leung, 2011; Bianco *et al.*, 2017). Also, women entrepreneurs are faced with educational constraints, low income and getting government support (Hossain *et al.*, 2009; Mukaila *et al.*, 2022). All these emphasize the need for efficiency in the management of the

(limited) resources available to them for entrepreneurial ventures.

3 Methodology

3.1 Study area

The study was conducted in Kwara State located in North-central Nigeria between latitudes 8°30' N and 8°50' N and longitude 4°20' E and 4°35' E. The state is divided into 16 Local Government Areas (LGAs) and has a total land size of 3,682,500 hectares with an annual rainfall range between 1,000 and 1,500 mm and the average temperature ranges between 30 °C and 35 °C (Falola *et al.*, 2022). Major food crops cultivated are cassava, yam, rice, maize, cowpea and vegetables, and as cash crop shea nut tree. As regards shea butter processing, this venture is much common in the communities of Asa, Baruteen, Ifelodun, Ilorin-South, Ilorin-West, Kaiama and Patigi LGAs.

3.2 Sampling procedure and data collection

The sampling frame was made up of the women involved in shea butter processing. A sample size of 120 respondents was selected using a three-stage sampling technique. The first stage involved a random sampling of four LGAs from the seven LGAs renowned for shea butter processing. The LGAs selected were Ifelodun, Ilorin-South, Kaima and Patigi. This was followed by a random selection of three communities from each LGA. Thus, Idofian, Ilofa and Share were selected from Ifelodun LGA; Fufu, Kajola and Omode were selected in Ilorin-South LGA; Banisulla, Gbettekuta and Kugiji were selected in Kaiama LGA while Muntekun, Lade and Tankpafu were selected in Patigi LGA. Thereafter, 10 processors were selected from each of the communities using a snowball procedure. The selection of the equal number of processors per community was due to the non-availability of a registered list of processors in the study area. This gave a sample size of 120 processors.

Primary data were used for the study. These were collected using a semi-structured questionnaire distributed between September and November 2019. Data collected included the socio-economic attributes of the respondents, information on the driving force for entrepreneurship among them as well as data on the number of inputs, their prices and quantity of shea butter produced.

3.3 Data analysis

The data obtained were analysed with descriptive statistics, index ranking and the stochastic frontier function. Descriptive statistics were used to profile the socio-economic

characteristics of the women. The index ranking technique was used to identify the motivational factors that promote agripreneurship among the shea butter processors as well as the problems hindering agripreneurial drive among them. Responses on these components were rated on a Likert point scale. A weighted average index was then obtained as follows:

$$WAI = \frac{\sum FiWi}{\sum Fi} = \frac{WI}{\sum Fi} \quad (1)$$

where: WAI = weighted average index, F = frequency; W = weight of each scale; i = ith household; WI = weighted index (Falola *et al.*, 2020). To categorise the constraints faced in agripreneurial drive as severe or not, a mean score of 2.0 (for a three points Likert scale) was used. Therefore, any constraint with a mean score higher than or equal to 2.0 was considered severe or major constraints while those with a mean score lower than 2.0 were considered not severe.

The entrepreneurial efficiency indices of the processors were generated using the Cobb Douglas production function. It was expressed as:

$$\ln SBP = \delta_0 + \delta_1 \ln WATP + \delta_2 \ln NUTS + \delta_3 \ln LABP + \delta_4 \ln FUEL + \delta_5 \ln DEPP + (V_i - U_i) \quad (2)$$

Where: SBP = Output of shea butter produced (kg), WAT = Quantity of water (litres), NUTS = Quantity of nuts processed (kg), LAB = Labour (person-days), FUEL = Quantity of fuel (litres), DEP = Depreciation value of processing assets as a proxy for farm capital (Naira) and $(V_i - U_i)$ = Composite error term.

The stochastic production function was used to generate the prudent efficiency indices of the women. Implicitly, the model was specified as:

$$\ln \pi = \delta_0 + \delta_1 \ln WATP + \delta_2 \ln NUTP + \delta_3 \ln LABP + \delta_4 \ln FUEL + \delta_5 \ln DEPP + (V_i - U_i) \quad (3)$$

Where: π = Normalized profit of women in shea butter processing, WATP = Price of water (N/litre), NUTP = Price of nuts processed (N/kg), LABP = Normalized wage rate of labour (N/person-day), FUEL = Price of fuel (N/litre), DEPP = Value of processing assets (Naira) and $(V_i - U_i)$ = Composite error term. It is worthy of note that all monetary variables were normalized using output price.

Following Kalirajan & Shand (1994), the managerial efficiency indices of the women were estimated from the estimated entrepreneurial efficiency and prudent efficiency, as:

$$ME = \frac{PE}{EE} \quad (4)$$

Where: ME = Managerial efficiency, PE = Prudent efficiency and EE = Entrepreneurial efficiency. The analyses were based on the assumption that the women were rational and would strive to maintain their production close to the frontier to achieve optimum profit in their entrepreneurial endeavours.

To investigate the productivity of shea butter processing and determinants of its efficiency, the Cobb-Douglas form of stochastic frontier production function was used. This was used because it meets the requirement of being self-dual and has been widely used by researchers (Amos, 2007; Balogun et al., 2012; Falola et al., 2014). The stochastic frontier production model used in this study is implicitly specified as:

$$Y = f(X_i, \beta_i) + V_i - \mu \quad (5)$$

The efficiency model is explicitly represented as:

$$\begin{aligned} \ln SBP = & \delta_0 + \delta_1 \ln WAT + \delta_2 \ln NUTS + \delta_3 \ln LAB \\ & + \delta_4 \ln FUEL + \delta_5 \ln DEP + (V_i - U_i) \end{aligned} \quad (6)$$

The inefficiency of shea butter processing is modelled in terms of the factors related to socioeconomic features of the shea butter processors that are assumed to affect the efficiency of production and the model was jointly estimated with equation (6) and is presented below as:

$$U_i = \delta_0 + \delta_1 Z_1 + \delta_2 Z_2 + \delta_3 Z_3 + \delta_4 Z_4 + \delta_5 Z_5 + \delta_6 Z_6 \quad (7)$$

Where: U_i = technical inefficiency, Z_1 = Age (years), Z_2 = Marital status, Z_3 = Farming experience (years), Z_4 = Level of education (years), Z_5 = Membership of cooperatives, Z_6 = Contact of extension agent (number of contacts), δ_0 (intercept) and δ_5 (coefficients) are parameters to be estimated along with the variance parameters (δ^2) and γ . The γ (γ) which gives the proportion of the deviation of the output from the frontier due to technical inefficiency was determined. The sigma square (δ^2) indicates the correctness of the distributional assumption and the goodness of fit of the model.

4 Results

4.1 Socio-economic characteristics of the respondents

Table 1 shows the distribution of the women agripreneur according to their socioeconomic characteristics. The women agripreneur were adults with a low level of education. The majority of them were married and had an average household size of seven persons. The majority of the women had shea butter processing as their only source of income with many years of experience in the venture. The average

monthly income of the women was USD 87.54 and around 75 % of the women were members of an agricultural-based association (cooperative societies). However, less than 10 % of the women had access to credit facilities. Similarly, only around 20 % of the women had access to extension services, which could lower their access to relevant information on innovation in the business.

4.2 Motivational factors influencing agripreneurial development by the women

Table 2 shows the motivational factors that promote agripreneurial development among the women shea butter processors. Results revealed that the most important factor that motivated the women to engage in agripreneurship was to take care of their families. This was closely followed by the quest to be financially independent. The third and the fourth motivational factors were to increase their income and to be self-employed, respectively. Some of the women engaged in agripreneurship to have a bright future (ranked fifth). Some were also motivated because they wanted to develop their entrepreneurship skills (ranked sixth), to continue the family business (ranked seventh) and for high self-esteem in the society (ranked eighth). The least motivational factors among the women were “for pleasure” and “for show-off to the society” which ranked 9th and 10th, respectively.

4.3 Analysis of efficiency levels of the women

Table 3 shows the distribution of the women shea butter processors according to their levels of entrepreneurial efficiency which ranged from 0.48 to 0.93. The modal entrepreneurial efficiency level was between 0.76 to 0.85. The average entrepreneurial efficiency of the women was 0.78. Further analysis revealed that 60.8 % of the women were operating above this average while 39.2 % were operating below it.

Table 4 shows the distribution of the women shea butter processors according to managerial efficiency which ranged from 0.23 to 0.99. The mean managerial efficiency of the women was 0.60. Forty per cent of the women were operating above this average while sixty percent were operating below it.

Table 5 shows the distribution of the women shea butter processors according to prudent efficiency which ranged from 0.12 to 0.94. The modal prudent efficiency level ranged from 0.41 to 0.50. The mean prudent efficiency was 0.47. Further analysis revealed that about 64 % of the women were operating above this average.

Table 1: Socio-economic characteristics of the women agripreneur (N = 120)

Variables	Category	Percentage	Mean
Age (years)	≤ 30	21.3	39.8
	31 – 40	28.3	
	41 – 50	25.8	
	51 – 60	13.4	
	> 60	8.1	
Educational qualification	No formal education	63.3	
	Adult education	4.2	
	Primary education	15.0	
	Secondary education	15.8	
	Tertiary education	1.7	
Marital status	Single	10.0	
	Married	73.3	
	Widowed	5.0	
	Divorced	11.7	
Household size	≤ 5	29.2	7
	6 – 10	63.3	
	11 – 15	7.5	
Processing experience	≤ 10	28.4	17
	11 – 20	41.7	
	21 – 30	16.6	
	> 30	13.2	
Shea butter producing as the only source of income	Yes	73.3	
	No	26.7	
Other sources of income	Farming	21.7	
	Petty trading	3.3	
	Artisan	1.7	
Average monthly income (₦)	10,001- 30,000	41.7	35,015
	30,001- 50,000	45.8	
	50,001- 70,000	9.2	
	70,001- 100,000	3.3	
Membership in agricultural-based association	Member	76.7	
	Non-member	23.3	
Access to credit facilities	Yes	6.7	
	No	93.3	
Access to extension services	Yes	20.0	
	No	80.0	

4.4 Determinants of shea butter output by the processors

Table 6 shows the maximum likelihood estimate of the Cobb-Douglas stochastic frontier production function of the shea butter processors. The estimated sigma square (δ^2) is significant ($p < 0.01$), thereby the model has a good fit. The coefficient of gamma (γ) implies that 78.77 per cent of the shortfall below the frontier output of the processors was due to technical inefficiency of the processors. The table shows

that the significant variables that influenced the output (efficiency) of the processors were water, shea nuts and labour. The coefficient of water had a positive and significant effect on shea butter output; suggesting that shea butter output increases alongside with increase in water availability and usage. Also, the coefficient of shea nut had a positive and significant influence in relation to shea butter yield. This suggests that the higher the quantity of nut processed, the

Table 2: Motivational factors that promote agripreneurship among women shea butter processors (N = 120)

Motivational Factors	Very important	Important	Less important	Not important	Weighted score	Mean score	Rank
To take care of my family	90.0	10.0	0	0	468	3.90	1 st
To be financially independent	88.4	9.2	2.5	0	467	3.89	2 nd
To increase my income	90.0	6.7	2.5	0.8	463	3.86	3 rd
To be self employed	70.0	26.7	2.5	0.8	439	3.66	4 th
For a bright future	74.2	16.7	9.2	0	438	3.65	5 th
For my own satisfaction and personal growth	50.0	29.2	13.3	7.5	386	3.22	6 th
To continue the family business	61.7	14.2	7.5	16.7	385	3.21	7 th
For high self esteem	47.5	27.5	15.0	10.0	375	3.13	8 th
For pleasure	11.7	9.2	23.3	55.8	212	1.77	9 th
To show-off to the society	2.5	8.3	42.5	46.7	200	1.67	10 th

Note: Figures are in percentage (%)

Table 3: Distribution of the women shea butter processor by entrepreneurial efficiency (N = 120)

Entrepreneurial efficiency	Percentage	Min	Max	Mean
0.46 – 0.55	3.3	0.48	0.54	0.51
0.56 – 0.65	9.2	0.57	0.65	0.60
0.66 – 0.75	20.8	0.67	0.75	0.71
0.76 – 0.85	37.5	0.77	0.85	0.82
0.86 – 0.95	29.2	0.87	0.93	0.89
Sample	100	0.48	0.93	0.78

higher the yield of shea butter. Labour was positive and significant concerning shea butter output production among the women. This suggests that the higher the labour utilised, the higher the output of shea butter.

Table 6 further shows the determinants of entrepreneurial (technical) inefficiency among women. The estimated coefficients of the inefficiency function provide some explanations for the relative efficiency levels of the individual's shea butter processing firms. Since the dependent variable of the inefficiency model represents the inefficiency, a non-negative coefficient implies that the associated variable has a negative

Table 4: Distribution of women shea butter processors by levels of managerial efficiency (N = 120)

Managerial efficiency	Percentage	Minimum	Maximum	Mean
0.21 – 0.30	1.7	0.23	0.30	0.26
0.31 – 0.40	8.3	0.31	0.39	0.34
0.41 – 0.50	10	0.43	0.48	0.46
0.51 – 0.60	40	0.51	0.60	0.55
0.61 – 0.70	9.2	0.62	0.65	0.63
0.71 – 0.80	17.5	0.71	0.77	0.72
0.81 – 0.90	10	0.87	0.90	0.88
0.91 – 1.00	3.3	0.97	0.99	0.98
Sample	100	0.23	0.99	0.60

effect on shea butter processing efficiency and vice-versa. The significant driving factors of inefficiency among shea butter processors were educational status, membership in co-operatives, access to extension services and age. The coefficient of educational status, membership of cooperatives and access to extension service had a negative sign which suggests that an increase in these variables would enhance shea

Table 5: Distribution of the women shea butter processor by prudent efficiency (N= 120)

Prudent efficiency	Percentage	Minimum	Maximum	Mean
0.11 - 0.20	2.5	0.12	0.18	0.16
0.21 - 0.30	5.8	0.22	0.27	0.25
0.31 - 0.40	11.7	0.32	0.40	0.38
0.41 - 0.50	32.5	0.42	0.50	0.48
0.51 - 0.60	20.0	0.51	0.60	0.56
0.61 - 0.70	12.5	0.63	0.69	0.67
> 0. 70	15.0	0.76	0.94	0.89
Total	100.0	0.12	0.94	0.47

Table 6: Maximum likelihood estimates of the stochastic production function

Variables	Coefficient	Standard error	t-value
Stochastic frontier			
Constant	-9.4839**	4.3905	2.1600
Water	0.0246**	0.0112	2.2031
Nuts	0.5414***	0.0692	7.8251
Fuel	0.0020	0.0024	0.8371
Labour	1.1265***	0.2385	4.7233
Depreciation	0.3458	0.2543	1.3598
Inefficiency mode			
Constant	1.4997	2.4064	0.6232
Age	1.0626**	0.4304	2.4688
Marital status	-0.8662	0.7695	-1.1257
Experience	-0.5958	0.3869	-1.5398
Education	-11.2470**	5.5275	-2.0347
Membership of cooperatives	-0.2613**	0.1313	-1.9908
Access to extension service	-2.7434**	1.2902	-2.1233
Variance			
Sigma-squared (δ^2)	48.3191***	1.8559	26.0354
Gamma (γ)	0.7877***	0.2623	3.0023
LR	11.9561		

** and *** represent significance at 5% and 1% respectively

butter productivity. Age had a positive sign in relation to technical inefficiency of shea butter production which suggests that an increase in age reduced the entrepreneurial efficiency of shea butter production.

4.5 Constraints to agripreneurial development drive in shea butter processing

Table 7 shows the problems hindering entrepreneurial drive by women. Poor government support for agribusiness entrepreneurs was ranked first among the constraints that hindered agripreneurial drive by the women. This was followed by the lack of credit facilities among the women. An-

other serious challenge identified by all the respondents was a lack of training in entrepreneurial development. The lack of potable water was also a major constraint to the entrepreneurial drive of the women shea butter processors in the study area. The seasonality of shea nuts was a major challenge to women shea butter processors' entrepreneurial spirit. Other major challenges that hindered agripreneurial drive among the processors were inadequate processing equipment and poor marketing outlet. Poor managerial skills, inability to withstand competition, inadequate labour, poor access to agricultural infrastructure, poor access to market information, a long distance from home to the market area and price fluctuations were not serious constraints hindering agripreneurial drive by the women.

5 Discussion

Regarding the socioeconomic characteristics of women agripreneur involved in shea butter processing, most of them were still in their economic active and productive age when they can effectively process shea butter. There was a low level of education among the women agripreneur. This could be due to the apathy exhibited by many highly educated people in developing countries toward agriculture. In Nigeria, for instance, women with high educational qualifications tend to prefer white-collar jobs to the agricultural sector (Jatto *et al.*, 2012; Tijani & Tijani, 2019; Ikuemonisan *et al.*, 2022). The majority were married and had a relatively large household size, which is common in the rural areas of developing countries. Rural dwellers see large household size as a necessity to look after them and serve as cheap family labour (Mukaila *et al.*, 2020). Shea butter processing is an age-long vocation in the study area and the women are well equipped with the skills and knowledge required in the venture. This is because the years or time spent in a business enterprise determines the skills acquired in it (Mukaila *et al.*, 2021a). Shea butter processing contributed immensely to the shea butter women agripreneur economic status as they had a higher monthly income compared with income reported among other rural women in Nigeria (e.g., Obetta *et al.*, 2020; Adeyeye *et al.*, 2021; Mukaila *et al.*, 2021b). The majority of the women were members of cooperative societies or agricultural-based associations, where they could enjoy economies of scale. This could be through reduced per-unit cost of operation of their venture by buying the inputs, especially the shea nuts in large quantity as well as bulk/group marketing of the shea butter. Women's membership in cooperative society has been recognised globally as a tool for women empowerment, reducing women's poverty and unemployment (Olabisi *et al.*, 2015; Lecoutere, 2017; Sefer,

Table 7: Reliability Analysis of Attitude Variables

Constraints	Very serious	Serious	Not serious	Weighted score	Mean	Rank
Inadequate government support for entrepreneurs	85.0	14.2	0.8	341	2.84	1 st
Lack of credit facilities	78.3	20.0	1.7	332	2.77	2 nd
Lack of training in entrepreneurship development	77.5	20.0	2.5	330	2.75	3 rd
Lack of potable water	74.2	21.7	4.2	324	2.70	4 th
Seasonality of shea nuts	55.9	38.3	5.8	300	2.50	5 th
Inadequate processing equipment	65.8	11.6	22.5	292	2.43	6 th
Poor marketing outlet	48.3	45.0	6.7	290	2.42	7 th
Poor managerial skills	17.5	64.2	18.3	239	1.99	8 th
Inability to withstand competition	11.7	34.2	54.1	189	1.58	9 th
Inadequate labour	10.0	20.0	70.0	168	1.40	10 th
Poor access to agricultural infrastructure	5.8	24.2	70.0	163	1.36	11 th
Poor access to market information	6.7	21.7	71.7	162	1.35	12 th
Long distance from home to market area	5.8	20.0	74.2	158	1.32	13 th
Price fluctuations	1.7	17.5	80.8	145	1.21	14 th

2020; Ezeokafor *et al.*, 2021). The low access to credit among the women agripreneur could be due to their inability to meet the loan requirements of commercial banks (Giglio, 2021). This could affect the fund security status of the enterprise. In the same vein, there was low access to extension services which could lower their access to relevant information on modern processing techniques.

Several factors motivated and promoted agripreneurship among the women shea butter processors. The women were motivated to engage in agripreneurship due to the need to take care of their families. This is in line with the position of Brush *et al.* (2009) that motherhood has a great impact on women's entrepreneurship. The quest to be financially independent by women also motivated them to engage in agripreneurship. This could be due to the daily revenue generated from selling processed shea butter by the women. This led to an increase in their income. Another motivating factor was to be self-employed, given the availability of shea nuts

in the study area. This corroborates the findings of Xheneti *et al.* (2019) that women engaged in entrepreneurship to meet family responsibilities through being self-employed. Having a bright future motivates women engagement in agripreneurship, as agripreneurship enhances farmers' savings behaviour for future purpose and enhance their self-esteem in society as they are referred to as business owners. These show that shea butter processing plays a significant role in rural women's livelihood and the welfare of their families. These findings agree with Falola *et al.* (2020) who recently reported that the major reason rural women engage in income-generating activities is to contribute meaningfully to the welfare of their immediate households.

Analysis of the efficiency of the women shows that they had reasonable levels of entrepreneurial and managerial efficiency compared to prudent efficiency. The results, however, indicate that they still had a gap to fill to attain the frontier level. This suggests that there is still room for welfare gains

by the women through increased efficiency in the use of existing technology and allocation of their (scarce) resources. These results agree with previous findings that women agribusinesses need to improve their efficiency (Adesina & Djato, 1997; Chopde & Kadam, 2019).

The positive effect of the quantity of water, shea nuts and labour used in production by the women is in line with a priori expectation, as more operations would be carried out with the availability of these resources. The very highly significant coefficient of shea nuts in the result confirms the fact that the nut is the major input in shea butter production (Salawu & Ayanda, 2014). Similarly, additional use of water increases the output of the women. Investigations during the fieldwork revealed that the production of 1 kg of shea butter requires about 4.7 – 5.9 litres of water. Similar findings were reported by Jibreel *et al.* (2013) and Jasaw *et al.* (2015). Meanwhile, labour had the highest coefficient and was very highly significant in the frontier model, suggesting that the highest impact on output would be experienced if additional labour is put in place by the women. Because the women processors did not use modern equipment or technology in processing shea butter, they require assistance (labour) to effectively process shea butter within a short period. This corroborates with previous studies that shea butter production is not only arduous but also labour-intensive. For instance, Bonkougou (2005) reported that the traditional processing of 1 kg of shea butter takes one person 20–30 hours from collection to the final product. It is also estimated that 8.5–10.0 kg of fuel-wood is needed to produce 1 kg of shea butter. Similar findings were also reported by Jibreel *et al.* (2013), Collins *et al.* (2014), and Salawu & Ayanda (2014).

As revealed in the inefficiency model, the fact that the women become less efficient as they grow older could be due to the tendency of older individuals to be less energetic, less innovative and thus less enterprising (Falola *et al.*, 2014; Oyetunde-Usman & Olagunju, 2019; Mukaila *et al.*, 2021b). The positive effect of the membership of cooperative societies on the efficiency of the women could be due to the service provision and skill development that members of such groups are likely to enjoy (Ferguson & Kepe, 2011; Dol & Hambly-Odame, 2013). Such services and skills may include help during production, common marketing of products and financial assistance (Ofuoku & Albert, 2014). Such societies can also serve as effective channels for disseminating processing and marketing information to their members (Meier zu Selhausen, 2016). The inverse relationship between education and inefficiency in this study could result from the fact that low educational attainment may impair the ability of the women to make better decisions that would enhance their venture (Salawu & Ayanda, 2014). In

the same vein, this study shows that effective extension services may promote the entrepreneurial efficiency of the shea butter processors.

A critical consideration of the challenges faced by the women shows that they range from institutional to personal problems. For instance, all the respondents lamented that they did not receive any assistance from the government in terms of modern processing equipment, technologies or money, to enhance their agribusiness in spite of the various agricultural development programmes in the country. They noted that shea butter processing was a capital-intensive venture and they lack adequate funds to acquire all the mechanical inputs needed for hitch-free processing activities. Similar findings were reported by Jamala *et al.* (2013) about the shea butter processors. Some of the women complained that they did not have the collateral which most of the formal financial institutions in the study area usually requested to be eligible for loans. Some reported that the problem was due to the high-interest rates being charged by banks, which they could not afford. Others lamented that the problem was due to the absence of financial institutions, like banks, in their area. This agrees with Adamu (2018), Michael *et al.* (2018) and Obetta *et al.* (2022) who observed poor access to agricultural finance, especially among rural women in Nigeria.

The lack of training on entrepreneurial development by the women could be a result of their poor access to extension services, especially on modern entrepreneurial skills (See Table 2). This may leave most of these women unaware of better skills in entrepreneurship that may be useful for shea butter processing. Besides, their lack of potable water could have had a direct effect on the quality of the shea butter produced as well as the income generated from the sale of the shea butter (Jibreel *et al.*, 2013; Salawu & Ayanda, 2014; Jasaw *et al.*, 2015).

Investigations during the fieldwork revealed that the problem of the seasonality of shea nuts had a direct effect on the entrepreneurial drive of the women, as they had to reduce their production level or stop processing until when the nuts were available again. Most of the women complained that they usually had the nuts in abundance during the rainy season while the nuts were usually scarce during the dry season. Some travel a long distance to get shea nut in other regions during the off season.

The absence of processing equipment and technology also lower the women's entrepreneurship drive as their production process was strictly manual which is labour intensive. They lamented that lack of processing equipment not only increases the time spent in shea butter processing but increases labour cost. Akinsokeji *et al.* (2017) posited that the manual processing of shea nuts into butter is a tedious task

due to drudgery and intensive physical labour involvement. The women shea butter processors' agripreneurial drive was also hindered by poor marketing outlets for their product.

6 Conclusions

It can be inferred from this study that the key motivating factors for entrepreneurship among women shea butter processors are the quest to take care of the family and be financially independent. This study reveals that there is still room for welfare gain by the women through improvement in their entrepreneurial, managerial and prudent efficiency levels. This study found that the output of the women will be enhanced if there is an increase in the quantity of the shea nuts, water and labour available to them. The entrepreneurial efficiency of the women will be enhanced if interventions that will encourage young women to engage in agripreneurship, improve their educational status, access to extension services and membership in cooperatives are put in place. Such interventions should also address the problems of inadequate support from the government, poor credit facilities, lack of training on entrepreneurial development, inadequate potable water supply and seasonality of shea nuts.

From the foregoing, there is a need for the government and other relevant agencies to encourage women agricultural entrepreneurs. Areas of support could include the provision of improved processing technologies, equipment and other inputs to the women at subsidized rates by the Ministry of Agriculture and Rural Development. These will not only ensure quality output (shea butter in this case) but also guarantee good income from their agricultural enterprise. Since labour had a positive effect on their entrepreneurial efficiency, the provision of modern processing equipment or technology for women will help reduce labour requirements for processing and increase their efficiency. Besides, agricultural extension services should be overhauled in the study area. In the same vein, the Ministry of Women Affairs and other agencies for women's affairs should organise training on entrepreneurship for the women as this will improve their efficiency. Also, the Ministry of Education could organise adult education programmes and scholarships for women, as this will improve their entrepreneurial efficiency also. Moreover, there should be the provision of credit facilities at low or no interest rates to willing women agricultural entrepreneurs by financial institutions as this will ensure proper funding of their processing ventures. Meanwhile, the processors should form cooperative societies to enjoy economies of scale and improve their efficiency.

Conflict of interest

The authors declare that they have no conflict of interest.

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