

ASSESSMENT OF RURAL WOMEN'S KNOWLEDGE ON USAGE OF IMPROVED SHEA BUTTER PROCESSING TECHNOLOGIES IN ILORIN EAST LOCAL GOVERNMENT AREA, KWARA STATE, NIGERIA

Egbunonu, C.M., Ogunjimi, S.I.,*and Alabi O.O.

Department of Agricultural Economics and Extension,
Federal University Oye-Ekiti, Nigeria

sunday.ogunjimi@fuoye.edu.ng/jimisunday@yahoo.co.uk

+2348066187579

ABSTRACT

This paper assessed rural women knowledge level on usage of improved Shea butter processing technology in Ilorin East Local Government Area of Kwara State. Data were collected from 120 rural women in the area through structured interview schedule using multistage sampling technique. The findings revealed that majority (59.2%) were married and households depend on income realised from the sale of Shea-butter for livelihood. All the respondents used parboiling, a traditional method to soften Shea-butter fruits. The findings showed that 93.2% were knowledgeable on the use of grinding machine in processing Shea-butter. A greater percentage (62.5%) had low awareness on other improved technologies in processing Shea butter. Majority of respondents (90.0%) got information about improved Shea-butter processing from other processors. However, high cost of equipment was rated the major limiting constraint militating against the usage of improved Shea butter technologies in the area. The paper therefore highlights the need for government to create enabling environment through linking Shea butter processors with formal credit institutions and non-governmental organisations supporting rural women as a way of alleviating rural poverty.

Key words: *Processing technology, Shea butter, rural women*

INTRODUCTION

Shea butter is an oil extract processed from the seed in the fruit of a Shea tree (*VitellariaParadoxa*), an indigenous tree of sub-Saharan Africa that belongs to the family Sapotaceae (Senchi and Yakubu,2014).Shea trees are found in abundance in the Northern part of Nigeria. They grow naturally in the wild and its fruit are gathered by rural dwellers especially women. It takes about 20years for a Shea tree to reach maturity and 42 years old for full fruit production which has often discourage its planting in an organised

plantation (Garba, Nwawe and Oisakede, 2011). Shea tree remains an economic tree with a lot of potentials ranging from medicinal, nutritional and cosmetic values. Shea butter is naturally rich in Vitamin A,E, and F (Okullo, Omujal, Agea, Vuzi, Namutebi, Okello and Nyanzi, 2010). Sheabutter is widely utilized for domestic purposes such as cooking, skin moisturizer and commercially as ingredient in cosmetic industries(Alander,2004).The bark, roots and leaves are used in traditional medicine in rural communities where they are found (Issahaku *et al.*, (2011).

Shea butter is mostly processed manually by rural women in small villages in Nigeria (Ademola *et al.*, 2012). Oil is removed from the nut through wet extraction procedure. The outer pulp of the berries, the Shea fruit is eaten at harvest time or parboiled to remove the pulp. The nuts is removed by pounding and later roasted in a frying pot. The fried nuts are later pounded and ground in wooden mortars to a paste or milled using attrition mills. The milled Shea nut is now thoroughly stirred or mixed with water vigorously to break emulsion and separate the fat. By cooking the mixed paste the oil floats to the surface and then skimmed off. Traditional mixing takes place in a large pot strong enough to withstand the applied force through trampling that causes mixing or stirring of the milled Shea nut. The traditional Shea butter extracting technique is time consuming and produces low quality oil.

In an effort to assist rural women who engage in Shea butter processing at micro level as a source of livelihood diversification of the rural economy, the Federal Government of Nigeria on realising the potentials of Shea tree included it as one of the mandate crops of economic importance of Nigeria Institute for Oil Palm Research, this led to establishment of NIFOR Shea-nut house in Benin State (Olife *et al.*, 2013). In 2002, Raw Material Research and Development Council (RMRDC) initiated a project to upgrade the traditional method of Shea butter processing. This aims at upgrading the processing techniques employed by the local processors in order to enhance production in terms of quality and quantity, develop, design and fabricate machineries

to reduce drudgery, poor quality of butter and low profit margin.

The introduction of equipment can increase the yield as well as save energy by reducing the efforts and time involved in processing of Shea butter. Instead of pounding by hand in a mortar, a hand mill can be used. Oil can be extracted using a mechanical or hydraulic press. Hand operated roasters can be used rather than a traditional pot. The introduction of hammer mill for crushing instead of mortar and pestle in addition to adoption of disc mill to replace grinding stone in the milling of Shea butternut. Designing of kneading machine to reduce the use of legs and hands by processors as well as using decanting machine to replace manual scooping of oil. Despite all these efforts and expected benefits, these improved processing technologies has not been fully utilised by rural women who engage in Shea butter processing in the study area. This initiative has resulted in insignificant improvement in the production of quality Shea butter. Therefore, this study was conducted to assess the knowledge level on usage of improved processing technologies among rural women in the study area. The specific objectives were to:

- i. describe the socio-economic characteristics of rural women in the study area;
- ii. ascertain the usage of various stages of traditional method by rural women ;
- iii. examine the awareness level of rural women on improved Shea-butter technologies;
- iv. identify various sources of information on improved Shea butter technologies used by rural women; and

- v. identify constraints faced by rural women during Shea butter production.

HYPOTHESES OF THE STUDY

Based on the above stated objectives, the following hypotheses were formulated and tested

- i. There is no significant relationship between farmer's knowledge level of improved Shea butter processing technologies and socio-economic characteristics.
- ii. There is no significant relationship between farmer's knowledge level of improved Shea butter processing technologies and awareness level.

METHODOLOGY

The study was carried out in Ilorin East LGA of Kwara State, Nigeria because Kwara State is one of the major areas in Nigeria where Shea tree thrives well being part of Guinea and Savannah zone. Thus, there are lots of Shea butter processors in the area. Furthermore, Kwara State is one of States where the new improved Shea butter processing technologies was introduced by the Raw Material Research Council in 2002 to boost Shea-butter production. The target group for the study consisted of the members of the Shea butter Processors Association. Multistage sampling procedure was used to select the respondents. At the first stage, purposive sampling procedure was employed to select four communities from Ilorin East Local Government that were used for the study been an areas where processing of Shea-butter is source of livelihood. At the second stage, 30 rural women processors were

selected from each community using snow ball technique totally 120 respondents

The interview schedule was used to seek farmer's knowledge on Shea butter technologies using respondents mean test scores. Survey questions relating to their knowledge on various stages involved in using the traditional method of processing Shea-butter: parboiling, eating the fruit, breaking with mortar and pestle, grinding with stone or pestle, mixing with water to allow oil to float and heating the oil to remove impurities were asked. Using 'knowledge and not knowledgeable responses on Shea butter improved technology knowledge in the use of par boiler, roaster, disc mill and decanting vessels were scored on 4 Likert scale with 'highly knowledgeable' scored 3, 'moderately knowledgeable' scored as 2, 'low knowledgeable' scored as 1 and not knowledgeable scored as 0 (Vogt, 1999). The mean score with standard deviation was used to categorize the knowledge level into high, moderate and low levels. A score of mean plus standard deviation was considered as "high", mean minus standard deviation was considered as "Low" and the difference between high and low was considered as "moderate" knowledge level.

Awareness about the improved shea butter technology was determined through scoring each practice on a 4 Likert scale with "have experienced the use" scored 3, "have seen" scored 2 and "have heard" scored 1 and "never heard" about it scored 0. Source of information on improved processing technology was sorted from respondents by ticking appropriately either "Yes" that was scored 1 and "No" was scored 0. The data were processed using the SPSS package Version 16 (SPSS Inc). Descriptive statistics such as mean,

percentages and frequencies and Pearson correlation co-efficient were used to analyzed the data.

RESULT AND DISCUSSION

The socio economic characteristics of respondents presented in Table 1 showed that 51.7% were between the ages of 31 and 60 years .This indicates that majority of the Shea butter processors in the study area were within a productive age range. Furthermore, the majority (59.2%) of the respondents are married. This finding is inline with Onikoyi, et al., (2014); Gbolagade, *et al.*,(2015),who reported that majority of the Shea-butter processors in Nigeria, are females who are married and opined that this might be as a result of female farmer's responsibility in diversifying livelihood in the rural household. Thus, they engage more in Shea-butter processing to generate income which can be used to supply food and other basic needs to their house-hold. Further analysis shows that majority (60.8%) of the Shea butter processors realised annual income less than ₦50,000 per annum which is less than the World Bank Standard of US\$1 per day(US\$365 per annum) for people in developing countries. This is an indication that majority of the respondent

generated low income from the sale of Shea butter which might be as a result of small scale production and crude methods of production. If farmers expand their scope of production using improved technologies, income would likely increase.

The educational attainment of Shea butter processors plays an important role in their ability to acquire new technologies. The majority of the Shea-butter processors surveyed (70.8%) had at least primary school education, while only (29.2%) of the respondents had never been to school. This indicates that most farmers can read instructional manuals. High educational levels imply that Shea butter processors could easily be trained in improved Shea-butter processing technologies. This agrees with Natukunda, Kugonza and Kyarisiima, 2011 findings that education stimulate the acceptance of improved technology since education facilitates farmer's adoption of innovation.

Almost more than half (53.3%)of the respondents engaged in shea butter processing as full time business while the others (46.7%) engaged in shea butter processing as part time business. This indicates that shea butter processing is time consuming and laborious.

Table 1: Distribution of Shea-butter processors according to socio-economic characteristics n=120

Socio-economic characteristics	Frequency	Percentage	Mean(STD)
Age			
Less than 30	43	35.8	41.6(15.8)
31-60	62	51.7	
61 above	15	12.5	
Marital status			
Single	38	31.7	
Married	71	59.2	
Widow	8	6.7	
Separated	3	2.5	
Primary occupation			
Shea butter processing	64	53.3	
Farming	35	29.2	
Tailoring	6	5.0	
Trading	15	12.5	
Years of schooling			
Never	35	29.2	5.2(2.9)
1-6	51	42.5	
7-12	25	20.8	
13 and above	9	7.5	
Household size			
1-5	62	51.7	5.3(3.4)
6-10	48	40.0	
11 and above	10	8.3	
Income realized from Shea butter annually			
Less 50,000	73	60.8	
51,000-100,000	26	21.7	
Above 100,000	21	17.5	

Source: Field survey, 2017

Various stages involved in using the traditional method in Shea butter processing

Results in Table 2 revealed that majority (100%) of Shea butter processors uses parboiling to soften the fruit and to ease fermentation, (90.0%) uses roasting method by heating the Shea nut with fire while 87.5% uses pestle and mortar in

breaking the Shea nut. Also, all (100%) the respondent mixes Shea butter with water to allow oil to float. This result corresponded with the findings of Alonge *et.al.* (2007) that most Shea butter processors still use their traditional method in processing Shea butter. This implies that there will be low production in terms of yield produced and quality.

Table 2 Various stages involved in using the traditional (indigenous) method in Shea butter processing n=120

Stages of indigenous processing	Frequency	Percentage
Parboiling (to soften the fruit and to ease fermentation)	120	100
Eating the fruit to remove the flesh	105	87.5
Roasting(heating the Shea nut with fire)	108	90.0
Breaking the Shea nut with mortar and pestle	105	87.5
Grinding with stone or pestle into paste	87	72.5
Mixing paste with water to allow oil to float	120	100
Heating of the oil to remove water and impurities	107	89.1

*Multiple responses

Source: Field survey,2017

Shea butter processors awareness of improved processing technology

Results in Table 3 shows that majority(80.0%) of the respondents had experienced the use of grinding machine in making Shea into paste and 60.0 % of the respondents claimed to have seen roaster. On the level of awareness, Fig 1. depicts

that 62.5% had low level awareness of improved processing technologies,21.5% had moderate and (16.0%) had high level of awareness. The findings indicate that Shea butter processors had low awareness on improved processing technology except in the use of grinding machine with high level of awareness.

Table 3: Awareness on improved processing technology (conventional methods) of Shea butter n=120

List of machines	Never heard it (f)	(%)	Heard (f)	(%)	Seen (f)	(%)	Experience the use (f)	(%)
Par boiler	46	38.3	21	17.5	48	40.0	0	0.0
Roaster	33	27.5	72	60.0	15	12.5	0	0.0
Grinding	0	0.0	0	0.0	24	20.0	96	80.0
Decanting Vessel	67	55.8	53	44.2	0	0.0	0	0.0

Source: Field survey 2017

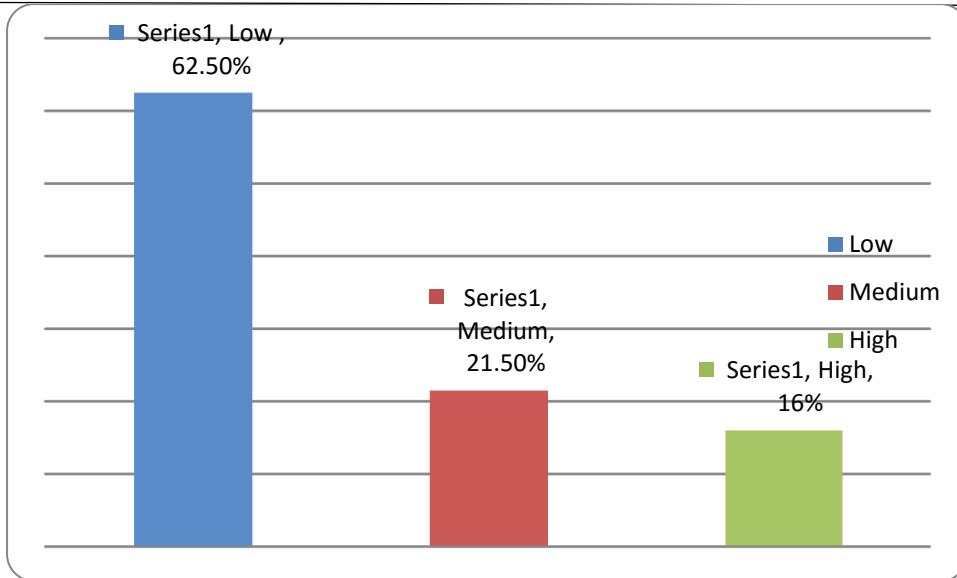


Fig 1: Bar chart of level of awareness of improved processing technologies

Knowledge level of sheabutter processor on usage of improved sheabutter processing technologies

Results in Table 4 shows that majority (93.2%) of the respondents were knowledgeable on the use grinding machine in processing Shea butter while majority (100%) were not knowledgeable decanting vessel, par boiler(96.7%) and roaster(93.3). Moreover, results on shea butter processors’ level on knowledge of improved shea butter processing technologies in Figure 2 indicated that almost all (91.60%) the respondents had

low knowledge, while 5.30% were moderately knowledgeable and only 3.10% had high knowledge in the usage of improved technologies. The lower the knowledge level, the lesser the skill and lower the productivity of shea butter processors. Low and moderate knowledge levels will have a negative impact on the adoption of improved sheabutter processing technologies and will in turn lead to low productivity so processing technology that increase output of farmers will lead to increase in income (Paschal,1978).

Table 4 Usage of improved shea butter processing technologies

n=120

List of machines	Always used	Occasionally Used	Not used
Par boiler	0.0	3.3	96.7
Roaster	0.0	6.7	93.3
Grinding	93.2	6.8	0.0
Decanting Vessel	0.0	0.0	100

Source: Field survey 2017

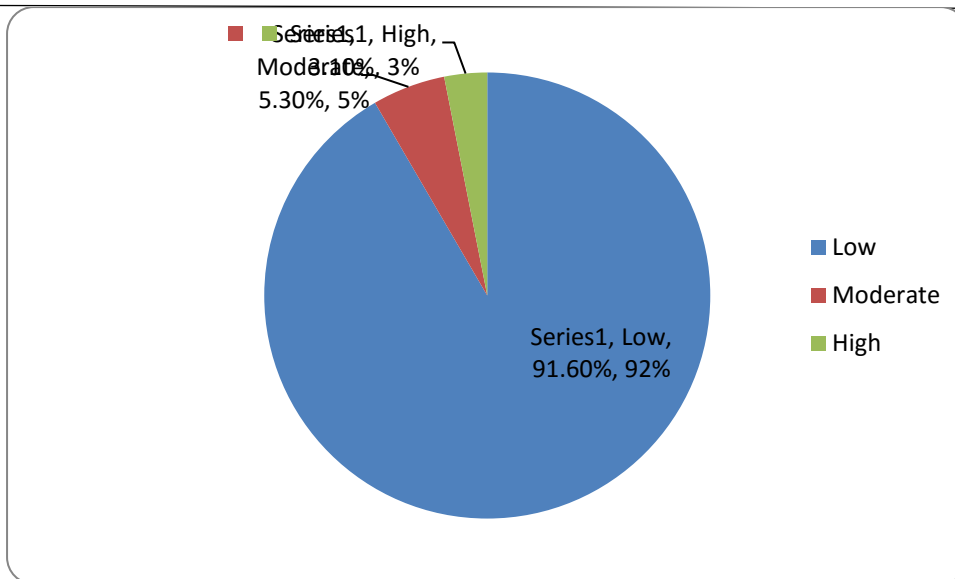


Fig 2: Knowledge level of usage of improved processing technologies

Sources of information on improved processing technology of shea butter

Results in Table 5 shows that (90.0%)majority of the respondents got information about improved Shea butter processing technology from other processors, co-operative societies(60.0%) and Non-Governmental Organisation(NGO)(55.3%) respectively. However, below average of Shea butter processors got information on improved

Shea butter processing from Agricultural Development Programme (ADP)(46.7%), Raw Material Development Research Council (RMDRC) (45.0%), and research institute(40.0%). This implies that there is still much gap need to be filled in disseminating information on improved Shea butter processing technologies if Shea butter is to realise its economic potential as one of the mandate crop of Nigerian Institute for Oil Palm Research(NIFOR).

Table 5 Sources of information on improved processing technology of Shea butter

*Source of information	Frequency	Percentage
Raw Material Development Research Council (RMDRC)	54	45.0
Agricultural Development Programme (ADP)	56	46.7
Research institute	48	40.0
Mass media	53	44.2
NGO	67	55.3
Other processors	108	90.0
Co-operative society	72	60.0

Source: Field survey, 2017

*Multiple responses

Constraints faced by respondents on the usage of the improved sheabutter processing technology

Table 6 shows the ranked mean scores of problems confronting Shea butter processors in descending order of severity. High cost of machine with mean 3.80 was ranked highest. This was followed by inadequate credit facilities (M=3.20), inadequate knowledge on operational skill (M=3.02), high maintenance cost (M=2.63), consumers' preference (M=2.20) and inadequate extension contact

(M=2.53). However, consumer's preference and unavailability of market (M=2.01) were ranked low. It could be inferred that most of the Shea butter processors surveyed encountered a lot of problems. The findings corroborated Onikoyi, *etal.*, (2014) submission that inadequate transportation facilities, high cost of modern processing equipment, inadequate extension services, lack of water, lack of credit facilities and uncoordinated marketing systems for products.

Table 6: Constraints faced by respondents on the usage of the improved technology

Constraint faced by respondent	Mean	Rank
High cost of machine	3.80	1 st
Inadequate credit facilities	3.20	2 nd
Inadequate knowledge on operational skill	3.02	3 rd
High maintenance cost	2.63	4 th
Inadequate extension support	2.53	5 th
Consumers' Preference	2.20	6 th
Unavailability of market	2.01	7 th

Grand mean= 2.51

Source: Field survey, 2017

Hypothesis testing

Table 7 shows the correlation coefficient, which establish at $P < 0.05$ level of significant. Positive and significant relationship between farmers' knowledge of usage of processing technology and socio-economic characteristics such as income ($r=0.494$), and years of schooling ($r=0.189$). However, negative and significant relationship existed between farmers' knowledge of usage of processing technology and socio-economic characteristics such as age ($r=-0.221$) and household size ($r=0.394$). This implies that

the higher the processor income and education the higher their level of knowledge on usage of processing technology. Mean-while, the higher their age and household size, the lower their level of knowledge. Moreover, there exist a positive and significant relationship between farmers' knowledge of usage of processing technology and level of awareness ($r=0.494$), which implies that the higher the processors' awareness level of the technologies usage, the higher their knowledge level of usage

Table 7 Correlation analysis of the awareness level and socio-economic characteristics and level of knowledge of usage of processing technology.

Variables	R
Level of awareness	0.494**
Income	0.394**
Year of schooling	0.189**
Household size	-0.318*
Age	-0.221*

* Positive Significant at $p \leq 0.05$ *Negative Significant at $p \leq 0.05$

CONCLUSION AND RECOMMENDATIONS

Shea butter processors in Kwara State, Nigeria have inadequate knowledge of improved processing technology in Shea butter production resulting to low skill in most practices. The major problems confronting Shea butter processors include high cost of machine, inadequate operational skill, maintenance cost and inadequate extension support. The result of correlation analysis shows that a unit increase in years of schooling, income, awareness are correlated with an increase in level of knowledge of improved processing technology. It is recommended that Nigerian government through its financial institution should provide loans with minimal interest charged so that farmers can purchase these machineries. Moreover, there should be a follow up visits by extension agents to ensure the desired results in Shea butter processors knowledge and skills are achieved. Nigerian agricultural engineers should be empowered to combine Shea butter indigenous knowledge with modern knowledge to devise appropriate adaptive technology. If these recommendations are put in place, an increase in Shea-butter production may be achieved.

REFERENCES

Ademola, A. O., Oyesola, O. B. and Osewa, S. O. (2012). Assessment of Shea butter processing among rural dwellers in Atiso Local Government area of Oyo state, Nigeria. *European Journal of Business and Social Sciences*, Vol. 1, No. 6, pp 1-08, October 2012

Alander, J. (2004). Shea butter-a multifunctional ingredient for food and cosmetics. *Lipid Technology* 16(9):202-205

Alonge A, F & Olaniyan (2007). Problem of Shea butter processing in Africa. *Internternational Conference on Crop Harvesting and process* pp1-23

Garba, I. D., Nwawe, C. N, & Oisakede, (2011) The Potentials of shea Nut tree to Nigerian Economy. *International Journal of economics and Rural Development*, 4(1):62-72

Gbolagade, B., Olaleye, D. & Komolafe, S. (2015). Assessment of indigenous methods of processing shea butter among women in Ilorin East local government Area of Kwara state, Nigeria. Available on line *Journal of Agricultural Sciences* Vol. 60, No. 2, 2015 Pages 199-210

Issahaku, H., Ramatu, A. and Sarpong, D. B. (2011). An analysis of allocative

- efficiency of shea butter processing methods in the northern region of Ghana. *Journal of Development and Agricultural Economics* Vol 3(4) pp165-173, April 2011
- Natukunda, K., Kugonza D. R., & Kyarisilima, C. C. (2011). Indigenous chickens of Kumuli Plains in Uganda: II. Factors affecting their marketing and profitability. *Livestock Research for Rural Development*, 23(10), Article#221. Retrieved online from <http://www.Irrd.org/Irrd23/8/muju24133.htm>
- Okullo, J.B.L., F. Omujal, J.G. Agea, P.C. Vuzi, A. Namutebi, J.B.A Okello and S.A. Nyanzi, (2010) Physico-chemical characteristics of shea butter (*Vitellaria paradoxa* C.F. Gaertn.) oil from the shea districts of Uganda. *Afr. J. Food Agric. Nutr. Dev.*, 10: 2070-2084.
- Olife, I., Onwualu, A. and Jolaoso, A. (2013). Developing the shea Value chain for Wealth Creation in Nigeria. *Journal of Biology, Agriculture and Healthcare* Vol.3, No 5, 45-53.
- Onikoyi, M. P., Tijani, S. A. and Oluwasusi, J. A. (2014). Factors Associated with Shea Butter Processing in Kwara State, Nigeria. *International Journal of Agriculture Innovations and Research* 2 (5): 2319-1473
- Pascal, B. (1978). "Shea-butter production in the Dagomba district". A dissertation submitted to the Department of Agric Economics & Agribusiness, University of Ghana.
- Senchi A. A1 .and Yakubu A. A. (2014) Assessment of Processors And Marketers of Sheabutter (*Vitellaria Paradoxa* C. F. Gaertn.) in Zuru Local Government Area, Kebbi State, Nigeria. *Journal of Research In Forestry, Wildlife And Environmental* Volume 6, No. 2 September, 2014. Retrieved from <file:///C:/Users/fup/Downloads/109111-299143-1-PB.pdf>. Accessed on 23/ 05/18
- Vogt, W. P (1999). *Dictionary of statistics and methodology*. Thousands Oaks, C. A: Sage