



Comparative Analysis of Shea-butter Production Techniques Used among Women Processors in Baruten and Ilorin-Soth Areas, Kwara State, Nigeria

Daudu, A.K. *, Oladipo, F.O., and Awosusi, F.S

Department of Agricultural Extension and Rural development, University of Ilorin, P.M.B. 1515, Ilorin, Nigeria

*Corresponding author e-mail: kamal_4real@yahoo.com

Abstract

Keywords:

Comparative, analysis, shea butter, production techniques, processors

The study compared the shea-butter production techniques used among women processors in Baruten and Ilorin-South Local Government Areas of Kwara State, Nigeria. A multistage sampling technique was used to elicit information from 120 respondents through a structured interview schedule with questionnaire. Data were analyzed with both descriptive and inferential statistics. The mean age of the respondents in Baruten and Ilorin-South were 38.4 years and 37.9 years respectively. Some 58.0% and 50.3% of the respondents had no formal education in Baruten and Ilorin-South respectively. Findings revealed that about 76.7% and 95.0% of respondents in Baruten and Ilorin-South respectively used traditional method, 16.7% and 5.0% of respondents in Baruten and Ilorin-South respectively used modern method while 6.6% of respondents used both methods. However, both respondents in Baruten (63.3%) and Ilorin-South (66.7%) considered modern method as the best shea butter processing technique that is efficient and reduces drudgery. Also, majority (68.3) of respondents in Baruten LGA earned above N20,000 monthly while 56.7% of respondents in Ilorin-South earned less. Further results revealed that inadequate credit facilities were the major constraint of the processors in Baruten and Ilorin-South. It was concluded that the quantity of Shea butter produce in Baruten was more than their counterparts in Ilorin-South and this may be due to abundant of Shea nuts in Baruten. It is recommended that modern techniques of Shea butter processing should be encouraged and planting of more Shea tree is practiced among the processors and thus increasing Shea butter production.

1. Introduction

Shea butter oil is one of the important derivatives from Shea butter tree (*Vitellaria paradoxia*). Other names are Karite (French), Nku (Ghana), Emi (Yoruba). The plant grows in the wild and widely distributed around the Sub-Saharan Africa belonging to the family *Sapotaceae*. It has a huge economic and ecological potential and is naturally rich in Vitamins A, E, and F (Okullo *et al.*, 2010). Shea butter is widely utilized for domestic purposes such as cooking, skin moisturizer and commercially as an ingredient in cosmetic, pharmaceutical and edible products (Alander, 2004).

Nigerian agriculture is an important sector of notable relevance in economic development and

growth. Presently Shea nut tree has gained importance as an economic crop because of the heavy demand for its butter, both locally and internationally, following increasing international interest in Shea butter as a cocoa butter equivalent in confectioneries, pharmaceutical and cosmetic industries. Shea butter is a useful cocoa butter substitute because it has a similar melting point (32–45°C) and high amounts of di-stearin (30%) and some stearo-palmitine (6.5%) which makes it blend with cocoa butter without altering flow properties. The high proportion of unsaponifiable matter, consisting of 60–70% triterpene alcohols, gives Shea butter creams good penetrative properties that are

particularly useful in cosmetics (Nikiema and Umali, 2007).

Shea nut products are used domestically and exported especially to Europe. Presently Shea is exported to France, Great Britain, the Netherlands, Denmark, North America and Japan (Elias and Carney, 2007). In these countries it is processed in a wide range of food products including chocolate and it is also becoming more popular in the cosmetic industry (Schreckenber, 2004). Shea butter has lately assumed an unprecedented height in international trade more so because the western world has recognized the considerable health and beauty enhancing benefits of Shea butter. Shea nut and butter are value added products with outstanding export growth potentials, especially for West Africa. Shea butter is mostly processed manually in small villages in Nigeria. Shea butter processing is done by village women, and the method which they use is one passed down through generations. Moreover, there is no estimate of the overall balance between cost of input and the economic output of Shea butter, as the processing is not only arduous, labour-intensive and time consuming, it also requires large amounts of water and firewood. Bonkougou (2005) estimated that the traditional processing of 1kg of Shea butter takes one person 20-30 hours, from collection to final product. It is also estimated that 8.5-10.0kg of fuel-wood is needed to produce 1kg of Shea butter.

The traditional method involves the following activities: harvest the nuts from the farm, accumulate in piles or pits, heat the nuts – boil (preferred) or roast, dry the whole nuts (if boiled), de-husk the nuts to get kernels (usually cracked by hand), dry the kernels, crush the kernels, dry roast the crushed kernels, mill or pounded/grind into a paste, kneaded (water-boiled or pressed) to form an emulsion to separate fats, boil the oil (fat) to dry and clean by decanting to clarify the butter, prepare for use, sale, or storage (cooled oil will congeal into solid white/cream colored butter). The semi-mechanized method involves the use of grinders to take the place of pestle and mortars and these hand operated machinery reduce the amounts of firewood and water required. A nut crusher, roaster, a kneader or a hydraulic/screw press oftentimes complements the manual process and reduces drudgery of the traditional system. Fully-mechanized Shea butter processing

method involves the – use of fermentation/parboiling tank, parboiled Shea fruit digester, bed drier, cracker/shell separator, roaster, milling machine, oven, basket oil presser, warehouses and/or chemical solvents to extract the oil. Comparatively, the extraction rate of Shea butter from *Vitellaria paradoxa* using the traditional method

is about 20%, 35% to 40% using semi-mechanized method, and 42% to 50% using the fully mechanized method (Addaquay, 2004).

Despite the huge and wide usage, Shea butter being processed in Nigeria is characterized by low quality and quantity. The inefficiency of the processing techniques lowers the quantity of Shea butter available in the market. Shea butter processing in West Africa involves minimum mechanical input, heavy drudgery and high input of firewood, which has a direct effect on the quality of Shea butter (Carette *et al.*, 2009). Eneh (2010) reports that most of the Shea butter (products) produced in Nigeria are of very low market value compared to cocoa butter due to very poor quality. Quality is critical to the trade at the upstream end of the supply chain. The shea butter thus produced is considered unsuitable for export, because it is difficult and expensive to store as it deteriorates very rapidly. The locally produced butter is therefore consumed locally thereby fetching low price for the producers. Equally, the demand for locally and mechanically extracted shea butter for the edible market depends on the demand for locally and traditionally extracted shea butter for the cosmetics export market.

Also, in spite of the high demand for domestic consumption, lubrications, pharmaceutical and confectionary industries, the Shea butter sold is still of low quality to meet both local and international market standard (Suleiman, 2008 and GTC, 2010), and that there still exist a wide variation/gap between the physical input level, potential output that is available for sale and the market price of the Shea butter. No estimates exist of the overall balance between cost of input energy and the economic profit from the sale of Shea butter. The income generated is generally low (Adgidzi, 2008). Therefore, it becomes important to increase the capacity of women as Shea butter processors so that they can produce innovative products of Shea butter. One reason to increase their capacity beyond the role of traditional Shea butter processing is that, higher capacity and better skills will make them be able to expand the scale of their enterprises. In the next stage, they will be able to take advantage of market opportunities not only in their respective rural communities, but also in the whole country and beyond. Here, extension agent is needed to show and give many innovative skills that could make the business of Shea butter processing better. The low quality of Shea butter is thus a concern, as it falls below international standard. However, demand is decreasing and the potentials of Shea butter in alleviating poverty among rural women is dwindling, necessitating an assessment of the production techniques. Based on the aforementioned scenario,

the study was to analyze the shea-butter production techniques among women processors in Ilorin-South and Baruten LGAs of Kwara state, Nigeria. Specifically to:

- ✓ describe the socioeconomic characteristics of shea-butter processors;
- ✓ identify the source of information on shea-butter production;
- ✓ assess the existing production techniques of shea-butter used by women processors;
- ✓ determine the quantity of Shea butter processed from the techniques used by women processors; and

Hypothesis:

There is no significant relationship between some selected socioeconomic characteristics and the shea-butter production techniques used by women processors in Baruten and Ilorin-South.

2. Materials and methods

The study was carried out in Baruten and Ilorin-south Local Government areas of Kwara State, Nigeria. Geographically, lies between latitude 12° and $11^{\circ}5'$ north of the equator longitude $2^{\circ}5'$ and $60^{\circ}45'$ east of the prime meridian (Ogunlade, Oladele and Babatunde, 2009) with a population of about 2,365,353 and a total land mass of 36,825km² (National Population Census, 2006).

A three-stage sampling procedure was used for sample selection. Stage one, involved a purposive selection of two LGAs (Baruten and Ilorin South) for the study due to the predominance of shea-butter processors in the area. The second stage, involved a random selection of three (3) villages from each of the Local Government areas selected. At the third stage, 20 women processors were randomly selected from each of the village and a total of 120 respondents were used for the study (Table 1). Data obtained were described using frequency counts, percentages, mean and appropriate charts while correlation was used to analysed the hypothesis.

Table 1. Summary of sampling techniques

Local Government Area	Number of villages selected	Number of selected processors per village	Total number of Processors/LGA
Baruten	3	20	60
Ilorin-south	3	20	60
Total	6	40	120

3. Results and discussion

3.1 Socioeconomic characteristics

The mean age of the respondents in Baruten was 38.4 years while the mean age of people in Ilorin-south was 37.9 years, which shows that women processors in Baruten were older than their counterparts in Ilorin-south. Figure 1 also revealed that most (63.3% and 60.0%) of respondents in Baruten and Ilorin-south LGA respectively were married. This implies that greater percentages of the processors in two LGAs were married. Further findings in Figure 1 revealed that large percentage (55.0% and 48.3%) of respondents in Baruten and Ilorin-south had no formal education while 23.3% and 31.7% had primary education and 15.0% and 20.0% had secondary education respectively. This suggests that there were more non-literate in Baruten LGA than their counterparts in Ilorin-south LGA. The implication is that processors in Ilorin-south would adopt and use technologies faster than their counterparts in Baruten LGA. Also, the mean shea-butter processing experience in Baruten was 21.2

years and 15.4 years in Ilorin-south LGA (Fig. 1). This finding suggests that women processors in Baruten are more into shea-butter business ever before women processors in Ilorin-south ventured in to the shea-butter processing. Also, the mean household size of respondents in Baruten and Ilorin-south LGAs were 11 people and 10 people respectively.

3.2 Sources of information on Shea butter production

Results in Figure 2 showed that majority of the respondents in Baruten (81.7%) and Ilorin-south (90.0%) heard information on Shea butter production techniques which signifies high level of awareness in both LGAs. Also, findings in Figure 2 revealed that (46.7% and 43.3%) of respondents in Baruten and Ilorin-south respectively sourced information on shea-butter techniques from cooperative group, 30.0% and 23.3% from friends and Neighbours, 20.0% and 31.1% from extension agents and 3.3% from radio/TV.

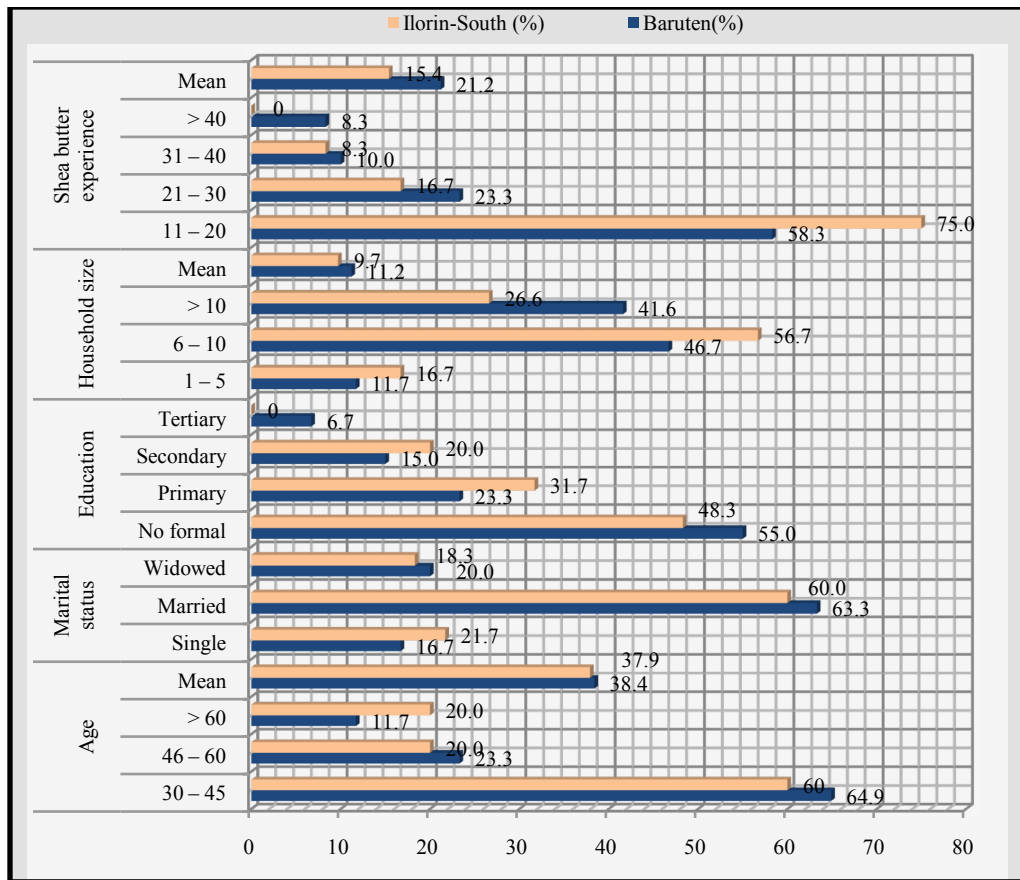


Figure 1: Respondents socioeconomic characteristics

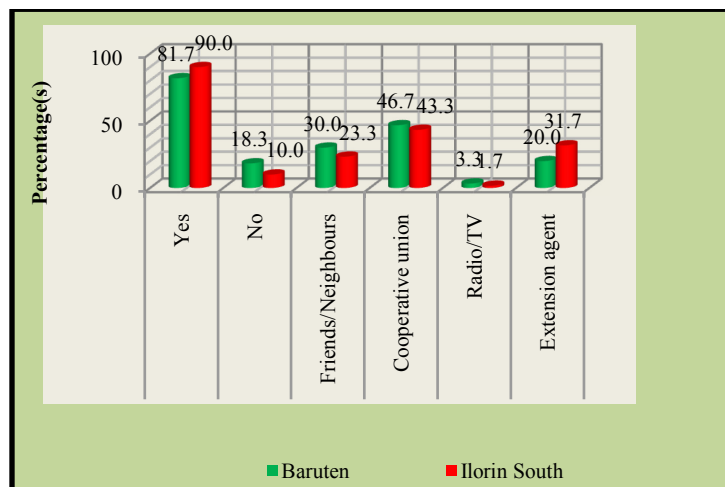


Figure 2. Awareness and Respondents sources of information on shea-butter

3.3 Method of Shea butter Production Techniques

Figure 3 showed the various methods of shea-butter production used by respondents in Baruten and Ilorin-South Local Government areas. It

was revealed that 76.7% and 95.0% of respondents in Baruten and Ilorin-south respectively using traditional method of processing shea-butter, some 16.7% in Baruten and 5.0% in Ilorin-south were using modern method while only 6.6% of

respondents in Baruten and non of the respondents in Ilorin-south were using both methods with about 63.3% of respondents in Baruten and 66.7% in Ilorin-south considered modern method as the best technique to process quality shea-butter products.

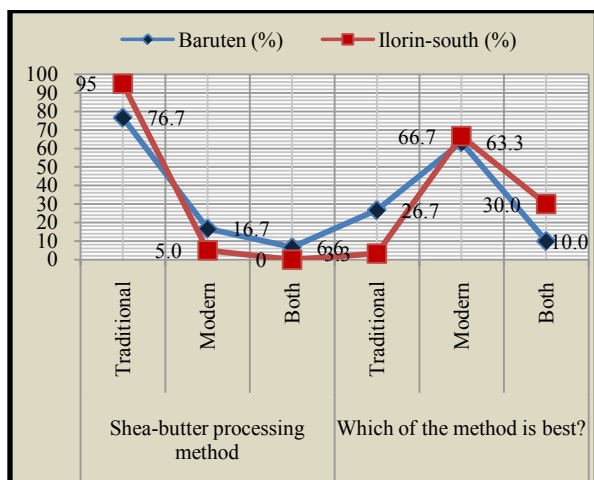


Figure 3. Methods of shea-butter production

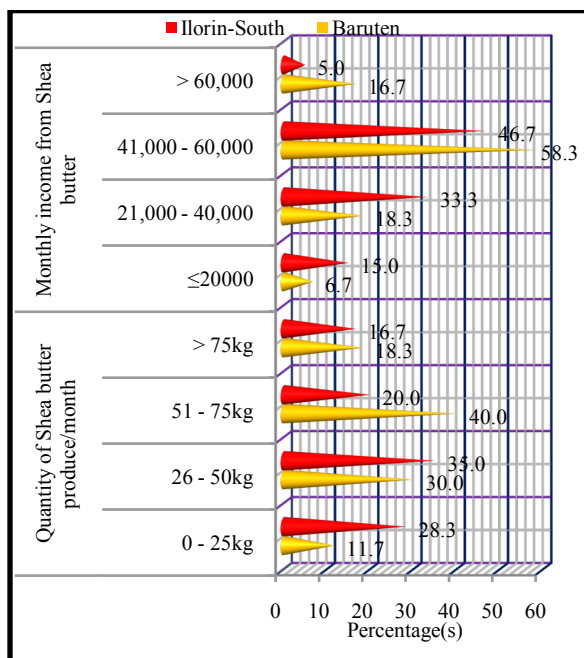


Figure 4. Quantity and monthly income from shea-butter production

3.4 Quantity/monthly income from Shea butter production

From the results in figure 4 showed that about 11.7% and 28.3% in Baruten and Ilorin-south respectively produce less than or equal 25kg per

month, 30.0% of respondents in Baruten and 35.0% of respondents in Ilorin-south produces less than or equal 50kg. Also, some 40.0% and 20.0% of respondents in Baruten and Ilorin-south respectively produce less than or equal to 75kg, while in Baruten (18.3%) and Ilorin-south (16.7%) of respondents produces greater than 75kg per month.

Further results in Figure 4 showed the monthly income generated from Shea butter production, 6.7% and 15.0% of respondents in Baruten and Ilorin South respectively earned less than or equal to N20,000, 18.3% and 33.3% of respondents in Baruten and Ilorin South respectively earned less than or equal to N40,000, some 58.3% and 46.7% of respondents in Baruten and Ilorin South respectively earned less than or equal to N60,000 while in Baruten (16.7%) and Ilorin South (5.0%) respondents earned greater than N60,000 monthly. This implies that the respondents in Baruten LGA produce more of shea-butter than their counterparts in Ilorin-south due to exuberant or availability of shea-butter tree in Baruten LGA, also the income of the respondents in Baruten were more than the income of the respondents in Ilorin-South.

3.5 Various Steps in Shea Butter Production

Results in Table 2 showed the various steps in shea-butter production techniques. In Baruten, picking of fruits was ranked 1st with the mean (3.00), followed by boiling of grounded kernels 2nd (2.85), milling of kernels and cold water mixing 3rd (2.77), cold water separation 4th (2.75), drying of seeds, roasting of kernels and kneading into dough 5th (2.65), filtration 6th (2.55), de-pulping and cracking by hand 7th (2.53), solidification 8th (2.47), cracking by machine 9th (2.32), packaging 10th (2.20), seed selection 11th (2.03), washing of fruits 12th (2.02), standardization 13th (1.88). While in Ilorin-south, picking of fruits also ranked 1st (3.00), drying of seeds 2nd (2.88), seed cracking by hand 3rd (2.87), seed selection 4th (2.80), de-pulping 5th (2.75), cold water mixing 6th (2.72), kneading into dough 7th (2.70), milling of kernels and cold water separation 8th (2.65), boiling of grounded kernels 9th (2.60), roasting of kernels 10th (2.58), filtration 11th (2.55), solidification 12th (2.43), seed cracking by machine 13th (2.38), packaging 14th (2.32), standardization 15th (1.82) and washing of fruits 16th (1.68).

Testing of hypothesis

Results in Table 3, revealed the correlation analysis between some selected socioeconomic characteristics of the respondents and the shea-butter production techniques used in the study area. It was revealed that there was positive and significant relationship between shea-butter production

techniques and some socioeconomic characteristics such education ($r=0.262$, $p=0.001$), shea-butter experience ($r=0.159$, $p=0.001$) and membership of organization ($r=0.183$, $p=0.046$) at 0.05 level of significance. Also, age of respondents ($r= -0.208$, $p=0.022$), marital status ($r= -0.156$, $p=0.089$), household size ($r= -0.061$, $p=0.507$) were negative and significant.

Also, in Table 3 it was revealed that in Ilorin-south there was positive and significant relationship between the respondents shea nut processing techniques and some socioeconomic characteristics such as household size ($r=0.288$, $p=0.001$), education ($r=0.169$, $p=0.012$) and shea nut processing experience ($r=0.513$, $p=0.000$) at 1% and 5% level of significance respectively. The implication of this result is that the respondents with high education level could use modern shea-butter production techniques than those with no or low education. Likewise the higher the use of modern shea-butter production techniques the higher the income of the processors.

Table 2: Steps in shea-butter production techniques

Steps in Shea Production techniques	Baruten (Mean±SD)	Ilorin-south (Mean±SD)
Picking of fruits	3.00±0.00	3.00±0.00
Washing of fruits	2.02±0.89	1.68±0.65
De-pulping	2.53±0.50	2.75±0.44
Drying of seeds	2.65±0.48	2.88±0.32
Selection of seeds	2.03±0.80	2.80±0.51
Seed cracking by hand	2.53±0.59	2.87±0.34
Seed cracking by machine	2.32±0.65	2.38±0.52
Roasting of kernels	2.65±0.58	2.58±0.49
Milling of kernels	2.77±0.43	2.65±0.48
Boiling of grounded kernels	2.85±0.36	2.60±0.49
Kneading into dough	2.65±0.48	2.70±0.46
Cold water mixing	2.77±0.47	2.72±0.45
Cold water separation	2.75±0.44	2.65±0.48
Filtration	2.55±0.53	2.55±0.50
Solidification	2.47±0.54	2.43±0.49
Packaging	2.20±0.44	2.32±0.50
Standardization	1.88±0.56	1.82±0.68

Table 3. Result of correlation between selected socioeconomic characteristics and shea-butter production techniques

Variables	Baruten			Ilorin-south		
	r-value	p-value	Decision	r-value	p-value	Decision
Age	-0.208*	0.022	Significant	0.341	0.318	Not significant
Marital status	-0.156	0.089	Not significant	0.327	1.535	Not significant
Education	0.262*	0.001	Significant	0.169*	0.012	Significant
household size	-0.061	0.507	Not significant	0.288**	0.001	Significant
Shea butter experience	0.159*	0.001	Significant	0.513*	0.000	Significant
Membership of organization	0.183*	0.046	Significant	0.116	0.762	Not significant

** Correlation is significant at the 0.01 level (2-tailed)

*Correlation is significant at the 0.05 level (2-tailed)

4. Conclusion and recommendations

Based on the findings, it was found that shea-butter processing is very prominent in Baruten compare to Ilorin-south. The quantity of shea-butter produce in Baruten was more than their counterparts in Ilorin-south and this may be due to abundant of shea nuts in Baruten. Both shea-butter processors in Baruten and Ilorin-South were still using traditional methods which are operating at low capacity. Also income of Shea butter processors was higher in Baruten than their counterparts in Ilorin-South. It is therefore recommended that modern techniques of shea-butter processing should be encourage and planting of more shea-butter tree is practiced among the processors and also, Government agencies such as Ministry of Agriculture and State Agricultural Development Programme should provide sufficient shea nuts for the processors thus increasing shea butter production.

References

- 1) Addaquay, J. (2004). The Shea butter value chain: refining in West Africa. West Africa Trade Hub (WATH) Technical Report No. 3. Washington, DC: USAID.
- 2) Adgidzi, D. (2008). Shea butter processing and marketing", A paper presented at the workshop for the Young Adro-Business Consultants (YABC) for Niger State mentoring meeting", GTZ-EoPSD, (2008), pp.3-17.
- 3) Alander, J. (2004). Sheabutter- a multifunctional Ingredients for food and costmetics. Lipid technology, 16(9):202-216.
- 4) Bonkougou, E. G. (2005). The Shea tree (Vitellaria paradoxa) and the Africa Shea parklands. Proceedings of the international workshop on processing and marketing of Shea products in Africa, Dakar, Sénégal, 4-6 March 2002. Roma: FAO, CFC Technical paper, No 21:51-59.

5) Carette, C., Malotau, M., Leeuwen, M and Tolkamp, M. (2009). Shea nut and butter in Ghana opportunities and constraints for local processing. Hans Eenhoorn and Resilience Foundation. pp: 6-8. <http://www.resilience-foundation.nl/docs/Shea.pdf> (Accessed 12/8/2011).

6) Lias, M., and Carney, J. (2007). African Shea butter: a feminized subsidy from nature in West Africa”, *The Journal of the International African Institute*, 77: 37-62.

7) Eneh, M. C. C. (2010). An overview of sheanut and sheabutter industry in Nigeria. Paper presented at the national seminar organized by central bank of Nigeria in collaboration with federal ministry of Agriculture and Rural Development and Nigeria Export Promotion Council (NEPC); 4-5 August, 2010.

8) German Technical Cooperation. (2010). Paper presented on the Best Practice on Shea butter Processing in Niger State, Nigeria”, *Employment-oriented private sector development programme*, (2010).

9) National Population Commission (2006). *Population of Kwara State*.

10) Nikiema, A., and Umali, B. E. (2007). *Vitellaria paradoxa* C.F. Gaertn, Van der Vossen, H.A.M. & Mkamilo, G.S. (Editors), *PROTA 14: Vegetable oils/Oléagineux*, PROTA, (2007).

11) Ogunlade, I., Oladele, O. I. and Babatunde, A. O (2009). Farmers' Attitude to Beneficiary Funding of Extension Services in Kwara State, Nigeria. *Journal of Human Ecology*, 26(3): 215-220.

12) Okullo, J. B. L., Omuja, F., Agea, J. G., Vuza, P. C., Namutebi, A., Okello, J.B.A. and S. A. Nyanzi. (2010). Physico-chemical characteristics of Shea butter (*Vitellaria paradoxa* C.F. Gaertn.) oil from the Shea districts of Uganda. *Africa Journal of Food, Agriculture and Nutrition Development*, 10:2070-2084.

13) Schreckenber, K. (2004). A book on the contribution of Shea butter (*Vitellaria paradoxa* C.F. Gaertner) to local livelihoods in Benin, Forest products, livelihoods and conservation, 2 :32-57.

14) Suleiman, M. A. T. (2008). A Report on the Assessment of Potentials for Shea nut in Selected Local Government Areas in Niger State”, (GTZ-EoPSD), pp. 46.