PROCESSORS' TRAINING NEEDS ON MODERN SHEA BUTTER PROCESSING TECHNOLOGIES IN NORTH CENTRAL AGRO-ECOLOGICAL ZONE OF NIGERIA

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ABSTRACT

The need for continual production of high quality shea butter in Nigeria through the use of modern processing technologies necessitated this study. The study was carried out to ascertain training needs of shea butter processors on modern processing technologies in North Central Agro-ecological zone of Nigeria. Primary data were collected from 216 processors through a multi-stage sampling procedure. The data were analysed using both descriptive and inferential statistics. Results revealed that processors were mostly young, married females. Half of the processors had no formal education but had between six and 15 years of processing experience. Extension officers were not fully involved in the training of processors, especially in the areas of teaching and practical demonstrations. The study shows that age (χ^2 = 38.865, p = 0.000), educational level (χ^2 = 69.018, p = 0.000), and years of processing experience (χ = 40.118, p = 0.000) were significantly related to the training needs of shea butter processors. Furthermore, evidence suggests that kneading, milling, crushing, and roasting are areas of operations where processors require additional training. The training of processors by extension officers at least twice a year, especially in the identified areas of training need, is recommended.

Keywords: Training, processors, extension officers, shea butter, modern technologies, Nigeria.

1. INTRODUCTION

Shea tree (*Vitellaria paradoxa)* known under its synonym *Butryospermum paradoxum* is a member of the family *Sapotaceae* (Ojo and Adebayo, 2013:13). Africa is the centre of origin of this genus and it grows in 19 countries across the African continent, namely Benin, Ghana, Chad, Burkina Faso, Cameroon, Central African Republic, Ethiopia, Guinea Bissau, Cote D'Ivoire, Mali, Niger, Nigeria, Senegal, Sierra Leone, Sudan, Togo, Uganda, DR Congo, and Guinea (Eneh, 2010:1).

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In Nigeria, approximately 45 percent of the land is suitable for the growth of the plant (Ololade and Ibrahim, 2014:2). Shea tree grows in the wild in many states including Niger, Nasarawa, Kebbi, Kwara, Kogi, Adamawa, Benue, Edo, Katsina, Plateau, Sokoto, Zamfara, Taraba, Borno, and Oyo. It is widely known, valued, and exploited by the natives in all the areas where it grows (Ololade and Ibrahim, 2014:2).

The economic importance of this crop cannot be over-emphasised. Globally, shea butter is used largely in the food industry (for confectionaries such as biscuits, chocolates, pastries, margarines, and ice creams); pharmaceutical industry (for ointments and anti-inflammatories); and the cosmetic industry (for soaps, candles, lotions, makeup, baby ointments, and hair care (Eneh, 2010:3). Traditionally, it is used as a skin and hair moisturizer and for protection against the sun (Ololade and Ibrahim, 2014:2). The fruits also contribute to food security in areas where it is found growing, mainly for rural poor, especially since their ripening coincide with the lean period of food production. The production of shea nut and processing of the butter serves as one of the main sources of employment for the rural women and children who are engaged in its gathering (Ojo and Adebayo, 2013:13).

The shea processing industries is characterized by the use of crude implements in Nigerian. The use of these crude implements often led to the production of poor quality shea butter that attracts low prices in the international market. However, the Nigeria government realizing the importance of the product with potentials for generating employment and foreign exchange earnings provided some modern processing equipment such as kneading machine, disc mill, hammer mill etc to processors in some of the shea butter producing areas through Raw Materials Research and Development Council (RMRDC) (Daniel, Olafimihan, Kwaya and Odejide, 2005:141). This intervention by the federal government, coupled with that of non-governmental organisations (NGOs) like German Technical Cooperation and World Trade Organisation in providing modern processing technologies, and the active roles played by the women in the production activities have led to significant increases in the production of high quality butter with free fatty acid content of less than one percent and dirt content of less than 0.1 percent (NIFOR, 2013:119).

In order to sustain the increase of shea butter production in Nigeria, processors across the producing states were trained on modern processing technologies in 2011 (Omowunmi, 2013:26). However, a large proportion of the processors in the study areas had abandoned the use of modern processing technologies for the indigenous processing techniques (Akinsokeji, 2012:78). This action has led to the production of shea butter that is not exportable due to its low quality as a result of the poor processing practices of the shea kernel to shea butter (NEPC, 2012:33). Among the major reasons ascribed for abandoning the use of modern processing technologies by processors was lack of skills and difficulties encountered during processing activities. It is against this background that this study was carried out to identify processors' training needs on modern shea butter processing technologies in North Central Agro-ecological zone of Nigeria.

1.1 Objective of the study

The major objective of the study was to identify the training needs of shea butter processors on modern processing technologies in North Central Agro-ecological zone of Nigeria. The specific objectives were to:
Examine the selected personal characteristics of processors.

Ascertain the perceived training activities that extension officers were involved in and their level of involvement.

Determine processors' training needs on the selected modern processing technologies.

1.2 Hypothesis of the study

The hypothesis is stated in the null form:

Ho_1: There is no significant relationship between respondents' selected personal characteristics (age, educational level, and years of processing experience) and their training needs on modern shea butter processing technologies.

2. METHODOLOGY

The study was conducted in North-central Agro-ecological zone of Nigeria. This zone consists of seven states, namely Kwara, Kogi, Plateau, Nassarawa, Benue, Niger, and FCT Abuja. The population size of this region is approximately 20 million based on the 2007 National Population Commission Survey (National Population Census, 2007:49).

A multi-stage sampling procedure, together with purposive and simple random sampling techniques, were used to interview only processors who participated in modern processing training activities in the Niger and Kwara states. Questionnaires based on the objectives of the study were administered to 216 participants with the assistance of trained enumerators during focus group sessions to obtain primary data for the study. Furthermore, respondents' training needs on modern processing technologies were measured using the task and skill-gap analysis propounded by Akangbe, Adesiji, Fakayode and Aderigbe (2011:141).

The task analysis refers to tasks performed by processors and is based on the importance of task, frequency of doing the task, as well as the difficulty of learning it. The frequency of task performed was measured with a five-point Likert scale where 'seldom' = 1, 'occasionally' = 2, 'monthly' = 3, 'weekly' = 4, and 'daily' = 5. The level of importance of a task was measured with a three-point Likert scale where 'marginally important' = 1, 'moderately important' = 2, and 'extremely important' = 3. In the same vein, difficulty of learning the task was measured with a four-point Likert scale where 'easy' = 1, 'moderate difficulty' = 2, 'very difficult' = 3, and 'extremely difficult' = 4. The combined mean scores based on the frequency of task performance, the importance of the task, and the difficulty of learning was used to categorise the training needs of processors as either high or low. Hence, processors who obtained the mean score and above were categorised as having a high need for training, while those who scored below the mean were categorised as having a low need for training.

Similarly, the skill-gap analysis was used to estimate the skill levels of respondents from the list of tasks that were identified from the task analysis. Each task in terms of the respondents' current proficiency were rated on a scale of 1 to 5, with the following descriptors; 'Cannot do at all' = 1, 'Can do less than half of the task' = 2, 'Can do more than half but less than total' = 3, 'Can do total but cannot maintain time schedule' = 4, and 'Can do within time schedule' = 5. Proficiency mean scores were used to categorise respondents as either requiring training or not. Low proficiency would indicate that there is a gap between what is desired and what the situation currently is. Hence, processors who obtained the mean score and above would not require any training, while processors who scored below the mean would require training to solve their problems. Data collected were analysed using frequency tables, percentages, means, and standard deviations. The Chi-square test of association was used to test the

relationship between respondents' personal characteristics and their training needs on modern shea butter processing technologies.

3. RESULTS AND DISCUSSION
3.1 Selected personal characteristics of respondents

Table 1 shows the distribution of shea butter processor according to their selected personal characteristics. The results revealed that the majority (93.1%) of the respondents were female, which implies that female processors were mostly involved in the processing of shea butter in the study areas. In addition, 81.4% of the respondents were between the ages of 21 and 40 years, indicating that most of the shea-butter processors in the study areas were agile youths. Therefore, there are great prospects for increased and sustainable shea butter production amongst the younger processors in the study areas. Table 1 further shows that 85.6% of the respondents were married with 50% of them having no formal education. Moreover, the majority (74.1%) of the respondents indicated that they have 6-15 years of processing experience, while only 5.1% indicated having less than six years of processing experience. From this result, it can be inferred that the majority of the respondents have ample experience in the processing of shea butter in the study areas.

Table 1: Distribution of respondents according to selected personal characteristics (N = 216)

S/N	Variables	Frequency	Percentage
1	Sex		
	Male	15	6.9
	Female	201	93.1
2	Age		
	Below 20	-	-
	21 – 30	65	30
	31 – 40	111	51.4
	41 – 50	25	11.6
	51 – 60	12	5.6
	Above 60	3	1.4
3	Marital status		
	Single	25	11.6
	Married	185	85.6
	Divorced	3	1.4
	Widowed	3	1.4
4	Level of education		
	No formal education	108	50
	Quranic	26	12
	Primary	62	28
	Secondary	18	8.3
	Tertiary	2	1.0
5	Years of processing experience		
	1 – 5	11	5.1
	6 – 10	55	25.5
	11 – 15	105	48.6
	Above 15	46	20.8

Source: Field survey, 2016

3.2 Perceived training activities extension officers were involved in and their level of involvement

Table 2 shows the distribution of respondent's perceived training activities that extension officers were involved in and their level of involvement. The results revealed that extension

officers were not fully involved in training activities such as teaching/ lecturing (M = 2.57, SD = 1.65) and practical demonstrations (M = 2.50, SD = 1.56). The implication of this finding is that processors were not properly taught and this could have hindered their effective use of modern processing equipment. In addition, Table 2 shows that the creation of awareness (M = 4.34, SD = 0.80), setting up of teaching aids like a public-address system, video, posters, and a projector at the training centres (M = 4.33, SD = 0.97), and preparation/ arrangement of training centres or locations (M = 4.03, SD = 1.03) were the training activities that extension officers were fully involved in.

Table 2: Distribution of respondents' perceived training activities that extension officers were involved in and their level of involvement (N = 216)

Training activities	Mean score (M)	Standard deviation (SD)
Teaching/ lecturing	2.57	1.65
Practical demonstration on the use of modern processing equipment	2.50	1.56
Preparation/ arrangement of training centres or locations	4.03	1.07
Setting up of teaching aids like a public-address system, video, posters, projector at the training centres, etc.	4.33	0.97
Creation of awareness	4.34	0.80
Supervision/ co-ordination of trainees	3.76	1.41
Total mean score	21.53	
Average mean score ($\chi2$)	3.59	

(Fully = 2 and Not fully = 1)
Decision rule: ≥ 3.59 = fully involved, < 3.59 = not fully involved.
Source: Field survey, 2016

3.3 Assessment of training needs
3.3.1 Processors' task analysis

Table 3 portrays the distribution of respondents' task analysis on modern shea butter processing activities. The analysis covered how frequently each task was performed per processing activity, the level of importance of such a task, and the level of difficulty encountered in learning the task. The results indicated that respondents require higher levels of training in the areas of kneading (M = 11.2), milling (M = 11), crushing (M = 10.8), and roasting (M = 10.5). The total tasks mean score of these operations is 70.36, while the average mean score was 7.8. Therefore, processors whose tasks score is more than or equal to 7.8 require higher levels of training in order to improve their skills and increase production levels. Table 3 also shows that respondents do not require high levels of training in the areas of extraction (M = 6.0), clarification (M = 5.9), storage (M = 5.33), cracking and separation of nuts (M = 5.05), and drying of kernel nuts (M = 4.57).

Table 3: Distribution of processors' task analysis on selected areas of modern shea butter processing activities (N = 216)

Tasks	Frequency of performance	Level of importance	Level of difficulties	Mean score	Implication
Drying	1.37	1.60	1.60	4.57	Require low training
Cracking and separation	1.72	1.72	1.61	5.05	Require low training
Roasting	4.00	3.17	3.31	10.5	Require high training
Crushing	4.10	3.35	3.33	10.8	Require high training
Milling	4.19	3.39	3.37	11	Require high training
Kneading	4.31	3.44	3.44	11.2	Require high training
Extraction	2.20	1.94	1.85	6.0	Require low training
Clarification	2.20	1.85	1.86	5.91	Require low training
Storage	2.11	1.66	1.56	5.33	Require low training
Total task mean score Average mean score (*M*)				70.36 7.8	

Decision rule: ≥ 7.8 = require high training, < 7.8 = require low training.
Source: Field survey, 2016

3.3.2 Processors' skill-gap analysis

The gap analysis indicates whether or not a task can be improved upon by providing training for such respondents. Task deficiencies that can be solved through training, as shown in Table 4, include kneading ($M = 1.4$), milling ($M = 1.4$), crushing ($M = 1.5$), and roasting ($M = 1.6$). Moreover, Table 4 highlights tasks such as drying ($M = 4.50$), cracking and separation of nuts ($M = 4.39$), storage ($M = 4.19$), and clarification ($M = 3.59$) that do not require additional training since the processors do not lack the necessary skills in these areas of processing activities.

Table 4: Distribution of processors' skill gap analysis on selected areas of modern shea butter processing activities (N=216)

Tasks	Level of proficiency	Mean score (*M*)	Is proficiency a problem?	Can the problem be solved through training?
Drying	1234(5)	4.5	No	No
Cracking and separation of nuts	123(4)5	4.4	No	No
Roasting	1(2)345	1.6	Yes	Yes
Crushing	1(2)345	1.5	Yes	Yes
Milling	(1)2345	1.4	Yes	Yes
Kneading	(1)2345	1.4	Yes	Yes
Extraction	1(2)345	1.6	Yes	Yes
Clarification	123(4)5	3.6	No	No
Storage	123(4)5	4.2	No	No
Total proficiency mean score Average mean score (*M*)		24.01 2.7		

Decision rule: ≥ 2.7 = Problem does not require training to be solved, < 2.7 = Problem can be solved by training.
Source: Field survey, 2016

3.4 Relationship between selected respondents' personal characteristics and their training needs on modern shea butter processing technologies

Positive correlations between selected independent variables and training needs on modern shea butter processing technologies are presented on Table 5. There was a significant relationship between training needs and age of the respondents (χ^2 = 38.865, p < 0.00). This implies that the younger the processors, the more they will favour training on modern processing technologies. A significant relationship was also found between training needs and level of education attained by respondents (χ^2 = 69.018, p < 0.00). Thus, the higher the level of education attained, the more respondents will favour training. Furthermore, a significant relationship was found between processors' training needs and years of processing experience (χ^2 = 40.118, p < 0.00). This finding indicates that the more experienced a respondent is, the more the respondent favours training on modern processing technologies.

Table 5: Relationship between processors' selected personal characteristics and their training needs

Variables	(χ^2)	Df	p-value	Decision
Age	χ^2 = 38.865	4	0.000	Significant
Educational level	χ^2 = 69.018	4	0.000	Significant
Years of processing experience	χ^2 = 40.118	3	0.000	Significant

(χ^2) = Chi-square, df = Degree of freedom, p = probability level of significance, p ≤ 0.05 (significant).
Source: Field survey, 2016

4. CONCLUSIONS

Based on the findings of this study, it can be concluded that the processors were mostly female, young, and married. Half of the respondents had no formal education but most of them had up to 15 years of processing experience. Empirical evidence suggests that extension officers were not fully involved in the training of processors, especially in the areas of teaching and practical demonstrations. Evidence also suggests that kneading, milling, crushing, and roasting of kernels are areas where processors require additional training. Moreover, significant relationships were found between participating processors' training needs and their age, level of education, and years of processing experience.

5. RECOMMENDATIONS

For processors to be properly trained on modern processing technologies, extension officers and skilled extension agents should be fully utilised, especially in the areas of teaching and practical demonstrations.

Training should be conducted at least twice a year for the processors by the extension officers in the identified areas of training needs in order to improve their skills and competencies in the jobs that they do.

In designing extension training programmes for processors in the study areas, age, level of education, and years of processing experience should be taken into consideration by the appropriate stakeholders, since these aspects were shown to have significant relationships with training needs.

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