ASSESSMENT OF STRATEGIES FOR RURAL WOMEN PARTICIPATION IN COMMERCIAL PALM KERNEL OIL PRODUCTION FOR WEALTH CREATION IN TARABA STATE, NIGERIA

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ABSTRACT: *This study was an assessment of strategies for rural women participation in commercial palm kernel oil production for wealth creation in Taraba State, Nigeria. Four specific objectives and research questions guided the study. The study adopted the survey research design. The instrument for data collection was a 42-item structured questionnaire which was used to generate data from a sample size of 275 respondents comprising of 265 rural women who are involved in small-scale traditional method of palm kernel oil extraction from Takum, Ussa, Bali and Kurmi Local Government Areas of Taraba State and 10 Agricultural Extension Agents who are serving in the aforementioned Local Government Areas. The instrument was administered on the respondents in their localities by the researchers and eight (8) research assistants. 210 copies of the instrument were successfully filled and returned. Findings of the study revealed that provision of processing facilities and adequate storage facilities are some of the strategies for enhanced commercial processing of palm kernel oil. On the basis of the above findings, it was recommended that extension agents should expose rural women to the strategies that could enhance commercial processing of palm kernel oil.*

KEYWORDS: palm kernel oil, wealth creation, rural women, processing strategies

INTRODUCTION

Oil palm (*Elaeis guineensis*) is a tree crop that thrives well in the forest belt. It originated in the tropical rain forest region of West Africa with the main belt running through the Southern latitudes of Cameroun, Cote d'Ivore, Ghana, Liberia, Nigeria, Sierra Leone, Togo and into the equatorial region of Angola and the Congo (Ajani, Onwubuya and Nwalieji, 2012). In Taraba State, Nigeria, oil palm is predominantly found in the forest belt of southern and central Taraba particularly, Takum, Ussa and Kurmi Local Government Areas of Taraba State.

Oil palm is an important tree due to its huge potentials and benefits to the livelihood of many in both rural and urban communities. According to Ekenta, Ajala, Akintola and Oseni (2017), the importance of oil palm to the national economy of Nigeria cannot be overemphasized. It ranges

from production of food for human consumption, employment, income to farmers and nation and raw materials for industries.

Oil palm is a tree crop with multiple products. The fruits when processed give rise to three major products which includes palm oil, palm kernel oil and palm kernel cake. Sivasothy (2006) opine that, oil palm can be used in various forms including palm kernel oil which is extracted from the nut.

Palm kernel oil is an edible plant oil derived from the kernel of the palm fruit (Hartley in Okeke and Oluka, 2017). It has a pleasing aroma and it is processed to serve many purposes. According to Okeke and Oluka (2017), palm kernel oil is known to confer special attractive physical features and aroma to beakers of bread and other bakery products. It is also used in making chocolate and some other related food products. In a similar vein, Ezeoha, Akubuo and Ani (2012) opined that palm kernel oil has many uses as it can serve as a source of concentrated energy in addition to serving as lubricants and emulsifiers, ingredient in paint making as a drying base, and in the manufacture of candles. Furthermore, palm kernel oil is also useful in the production of cosmetics.

Similarly, in a typical African setting, palm kernel oil is used to fuel native lamps for lighting in rural communities that are not connected with electricity (Shaver, 2005). It is also popularly used as body cream for people of different age groups including infants in rural and semi-urban communities. Palm kernel oil extraction is achieved using both modern and traditional methods. The traditional method involves a lot of strategies starting with the shelling of palm nuts to the final extraction of the oil from the nuts.

Generally, in Taraba State, rural women are responsible for the small-scale traditional processing and sales of palm kernel oil. Some of these women are either illiterate or semi-literate with little or no opportunities for capacity building which has resulted in their low production capacity. This has created a huge demand and supply gap.

Capacity building according to Usoro and Ufot (2013) is the conscious attempt at upgrading, renovating and disseminating skills, abilities and strategies that will enable TVET teachers react appropriately to professional demands and changes. Similarly, Ekele and Wombo (2013) define capacity building as the process of enhancing individual's knowledge and skills for effective performance. In this context, capacity building is a deliberately planned programme aimed at improving the performance of rural women in the production of palm kernel oil.

The need to assess the strategies that could enhance commercial palm kernel oil production among rural women can never be over emphasized. An assessment of the strategies for enhancing rural women participation in commercial palm kernel oil production for wealth creation is a function of the socio-economic characteristics of the rural including education among many other factors. Education has been known to be a powerful tool for shaping people's

life and making life meaningful (Dauna, Umar and Akintunde, 2017). Education equally plays a key role in agricultural development process through its effects on productivity as well as a vital tool in technology adoption. This can be achieved through a deliberately planned farmer education programme.

Farmer education according to Donye and Ani (2014) is all educational opportunities available for adults living in rural farming communities. Farmer education is therefore necessary in order to improve the production capacity of rural women in commercial palm kernel oil production so as to bridge the demand and supply gap. In any agricultural production or processing operations, educational level of the farmers determines the rate at which such farmers adopt improved technologies thereby enhancing their productivity. In this vein, Eze *et al.,* in Okwuokenye and Ovharhe (2017) affirmed that education enhances adoption of new technologies among farmers. Similarly, Mafimisebi *et al.,* in Ahamefule and Ogbonna (2017) opined that education may help processors in the procurement of resources and in the adoption of efficient methods of processing which may boost their production.

In Taraba State, most rural dwellers including women are predominantly farmers. However, the reoccurring herdsmen-farmers crises coupled with the high cost of farm inputs such as fertilizers have greatly affected the food production capacity of rural farmers thereby reducing their income. There is need for the adoption of alternative means of generating income. The proper utilization of palm kernel for the production of palm kernel oil can provide additional income to the rural populace especially women, hence the need to assess the strategies that could enhance the participation of rural women in commercial palm kernel oil production in Taraba State.

The theoretical framework for this study was anchored on Diffusion of Innovation (DOI) Theory developed by E.M. Rogers in 1962, which is one of the oldest social science theories. It originated in communication to explain how, over time, an idea or product gains momentum and diffuses (or spreads) through a specific population or social system. The end result of this diffusion is that people, as part of a social system, adopt a new idea, behavior, or product. The theory was considered applicable to the current work because, this study is set out to carryout an assessment of the strategies for enhancing rural women participation in commercial palm kernel oil production for wealth creation. At the end of the study, the effective and efficient alternatives will be transmitted to the rural women for them to adopt and put to practice so as to improve their efficiency in palm kernel oil production.

Statement of the Problem

The negative effect of poverty is more in rural communities. The reason for this is because, rural communities have little opportunities for wealth creation and income generation in addition to lack of basic social amenities and education opportunities. Rural women who are the most

affected by this menace of poverty have over the years strives to earn a living through the production and processing of agricultural products using traditional methods.

However, due to inadequate education and skills, the production capacity of these women has continued to remain at the lowest level taking into consideration, the current economic realities. The noticeable gap is the lack of education on strategies that could enhance the commercial production of palm kernel oil among rural women in Taraba State. This prompted the researchers to carry out an assessment of the strategies that could enhance the participation of rural women in commercial palm kernel oil production for wealth creation in Taraba State.

Objectives of the Study

The aim of this study was to assess the strategies for rural women participation in the commercial palm kernel oil production for wealth creation in Taraba State. Specifically, the study sought to:

i.   examine the socio-economic characteristics of the respondents
ii.   examine the processes involved in the traditional method of palm kernel oil extraction in Taraba State
iii.   identify the strategies for enhanced commercial processing of palm kernel oil by rural women in Taraba State
iv.   examine the benefits derived from palm kernel oil processing in Taraba State

Research Questions
i.   What are the socio-economic characteristics of the respondents?
ii.   What are the processes involved in the traditional method of palm kernel oil extraction in Taraba State?
iii.   What are the strategies for enhanced commercial processing of palm kernel oil by rural women in Taraba State?
iv.   What the benefits derived from palm kernel oil processing in Taraba State?

METHODOLOGY

Research Design

This study adopted the Survey research design. This design was an investigation in which only part or a sample of the population was used and the choice of the sample was done such that representativeness was ensured. This implies that the sample speaks for the population as well and the information obtained from the sample can be generalized for the population. Furthermore, policy recommendations which are useful for planning can be derived from survey designs. The design was considered appropriate for this study since data were collected from a

small group of the population which was used in describing the entire population for the purpose of making generalization.

Area of the Study

The study was conducted Taraba State in the North Eastern part of Nigeria. The state is located on latitude $8^o10'$ north and longitude $10^o30'$ east. According to the 2006 census, the state has an estimated population figure of two million, three hundred thousand, seven hundred and thirty six (2,300,736). The state has a land mass of 54,473sqkm. Four Local Government Areas of Takum, Ussa, Bali and Kurmi were used for the study because large oil palm plantations are found in these areas. Taraba State is bounded in the west by Nasarawa State and Benue State, northwest by Plateau State, north by Bauchi State and Gombe State, northeast by Adamawa State, south and east by Cameroon. The state has sixteen (16) Local Government areas and two (2) Special Development Areas. The palm kernel oil producers are mostly rural women with average level of education and mostly middle income earners.

Population of the Study

The population for the study was all the registered rural women who are involved in small-scale (between 4 – 20 litres) traditional palm kernel oil processing in Takum, Ussa, Bali and Kurmi Local Government Areas of Taraba State and Agricultural Extension Agents serving in these four aforementioned local government areas.

Sample and Sampling Technique

The sample size for the study was two hundred and seventy-five (275) respondents comprising of 265 rural women and 10 extension agents. Multi-stage sampling technique was used to draw the sample size from the population. In the first stage, purposive sample technique was used to select four (4) local government areas of Takum, Ussa, Bali and Kurmi. These local government areas were selected based on their high potential for palm kernel oil production. Secondly, simple random sampling technique was used in selecting 265 rural women and 10 extension agents from the total population. Simple random sampling was used so that each individual from the population has an equal chance and probability of being selected.

Instrument for Data Collection

Data was collected using a 42-item structured questionnaire developed from reviewed literature. The questionnaire covered processes of palm kernel oil production using traditional method, strategies for enhanced palm kernel oil production by rural women, benefits derived from palm kernel oil processing and the challenges faced by rural women in palm kernel oil production. The first 12 items of the questionnaire were divided into two categories of needed and performance. The needed category had a 4-point response scale of highly needed (4), moderately needed (3), slightly needed (2) and not needed (1). The performance category also had a 4-point response

scale of highly performed (4), moderately performed (3), slightly performed (2) and not performed (1). The remaining 30 items on the questionnaire had a 4-point response scale of highly needed/strongly agree/very common (4), moderately needed/agree/common (3), slightly needed/disagree/ rarely common (2), and not needed/strongly disagree/not common (1). The instrument was subjected to face and content validity and thereafter, the reliability of the instrument was determined after a trial testing.

Method of Data Collection

The instrument was administered on the respondents in their localities by the researchers with the help of eight (8) research assistants. The research assistants were trained on how to administer and retrieve the instrument. Two hundred and seventy-five (275) copies of the questionnaire were administered on the respondents in all. 265 copies were administered on rural women and 10 copies were administered on the Agricultural extension agents. At the end of the instrument administration, 210 copies of the instrument were successfully filled and returned, 202 from rural women and 8 from extension agents. This represents a retrieval rate of 76.36%.

Method of Data Analysis

Data collected were subjected to descriptive analysis. Simple percentage was used to describe the socio-economic characteristics of the rural women while mean and standard deviation was used to answer research questions. To answer research question two which has to do with determining the skills needs of rural women in palm kernel oil production, the following steps were taken: the mean (Xn) of the needed category was determined for each item, the mean (Xp) of the performance category was also determined for each item, the performance gap (PG) was determined by finding the difference between Xn and Xp for each item. That is, PG = Xn – Xp. Where the PG value was positive for each item, it indicates that the rural women needed capacity building due to the fact that the level at which the rural women needed the skills was higher than the level at which they were performing. Furthermore where the PG value was negative for each item, it indicates that the rural women do not need capacity building due to the fact that the level at which the rural women needed the skills was lower than the level at which they were performing. Similarly, mean and standard deviation was used to answer research questions 3 to 5. Any item with a mean value of 2.50 and above was regarded as either needed or agree or common whereas any item with a mean value of 2.49 and below was regarded as either not needed, disagree or not common depending on the response options for the respective questions.

RESULTS AND DISCUSSION

This chapter presents results of the data analysis and discusses the findings of the study.

Research Question 1
What are the socio-economic characteristics of the respondents?

Table 1: Socio-economic characteristics of rural women (N=202)

Socio-economic parameters	No. of Respondents	Percentage (%)
Age of respondents (years)		
18 – 25	63	31.19
26 – 35	73	36.14
Above 35	66	32.67
Total	**202**	**100**
Level of education of respondents		
No formal education	26	12.87
First School Leaving Certificate (FSLC)	50	24.75
SSCE	70	34.65
NCE/ND	40	19.80
First degree (B.SC/B.ED/B.A/HND)	13	6.44
Master degree (M.SC/M.ED/M.A)	2	0.99
Doctorate degree (PhD)	1	0.50
Total	**202**	**100**
Occupation of respondents		
Civil Servant	25	12.38
Business women	52	25.74
Housewife	71	35.15
Farmer	54	26.73
Total	**202**	**100**
Yearly income of respondents		
Less than ₦50,000/annum	52	25.74
₦50,000 – ₦100,000/annum	84	41.58
More than ₦100,000/annum	66	32.68
Total	**202**	**100**

Results from Table 1 indicated that 31.19% of the rural women engaged in palm kernel oil processing were between the ages of 18-25 years, 36.14% were between the ages of 26-35 years while 32.67% were above 35 years of age. On the level of education of the respondents, 12.87% had no formal education, 24.75% had first school leaving certificate, 34.65% had secondary school certificates and 19.80% were holders of Nigeria Certificate in Education/National Diploma. Similarly, about 12.38% of the respondents were civil servants, 25.74% were business women, 35.15% were fulltime housewives whereas 26.73% were farmers. Furthermore, about 25.74% of the respondents earned less than ₦50,000 per annum, 41.58% earned between ₦50,000 – ₦100,000 per annum whereas about 32.68% of the respondents earned more than ₦100,000 per annum.

Research Question 2
What are the processes involved in the traditional method of palm kernel oil extraction in Taraba State?
Table 2: Processes involved in the traditional methods of palm kernel oil extraction (N=210)

S/N	Item	$\bar{X}_n$	SDn	$\bar{X}_p$	SDp	PG $(\bar{X}_n - \bar{X}_p)$	Remarks
1.	Shelling of the palm nuts to separate the kernel and shell	3.79	.36	3.54	.66	0.25	CBN
2.	Use a clay-bath to separate the kernel/shell	3.51	.58	3.31	.72	0.20	CBN
3.	Scoop the floating kernels in baskets	3.55	.79	3.25	.89	0.30	CBN
4.	Wash the scooped kernel with clean water	3.53	.91	3.21	.86	0.32	CBN
5.	Dry the washed kernels	3.68	.54	3.42	.62	0.24	CBN
6.	Heat the dried nuts to fry	3.67	.54	3.63	.56	0.04	CBN
7.	Pound or ground the fried kernels to a paste in a motorised grinder	3.56	.65	3.48	.70	0.08	CBN
8.	Mix the paste with a small quantity of water	3.43	.79	3.53	.66	-0.1	CBNN
9.	Heat the mixture to release the palm kernel oil	3.80	.48	3.44	.61	0.36	CBN
10.	Periodically skim the released oil from the top	3.34	.73	3.38	.65	-0.04	CBNN
11.	Store the oil in storage facilities	3.60	.65	3.32	.89	0.28	CBN
12.	Pack the oil in measured containers for marketing	3.66	.66	3.53	.61	0.13	CBN

$\bar{X}_n$ = mean of needed category, $\bar{X}_p$ = mean of performance category, SDn = standard deviation of needed category, SDp = standard deviation of performance category, PG = performance gap, CBN = Capacity building needed, CBNN = capacity building not needed.

Results from Table 2 revealed that the performance gap for 10 of the items ranged from 0.04 to 0.36 and were positive. This indicated that mean of the needed category for these items was greater than the mean of performance category. The implication of this is that, the rural women needed capacity building in the aforementioned 10 processes. In another development 2 items in Table 2 had their performance gap range between -0.04 to -0.1 which were negative. This means that the mean of needed category was less than the mean of the performance category. This revealed that rural women did not require capacity building in these 2 processes.

The findings agrees with FAO (n.d.) that the traditional palm oil processing starts with the shelling of the palm nuts which is performed using two stones to crack each nut and separating the kernel and shell simultaneously. Similarly, Okeke and Oluka (2017) stressed that the processes involved in production of palm kernel oil are selection of good palm kernel-nuts, crushing the nuts with the nut crusher, heating the seeds with the mechanical seed fryer so as to excite the oil molecules the transferring the heated – crushed nuts to the oil press.

Research Question 3

What are the strategies for enhanced commercial processing of palm kernel oil by rural women in Taraba State?

Table 3: Strategies for enhanced commercial processing of Palm kernel by rural women

S/N	Strategy	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_g$	SD_g	Remarks
1.	Formation of women cooperative societies to enhance access to credit facilities	3.87	.35	3.84	.45	3.85	0.40	Needed
2.	Provision of farmer education to rural women on the potentials of palm kernel oil	3.62	.51	3.67	.52	3.65	0.52	Needed
3.	Provision of training manuals to rural women on palm kernel oil processing	3.50	.75	3.71	.64	3.60	0.69	Needed
4.	Strengthen the institutional capacity to enforce appropriate laws for effective inspection and compliance	3.50	.75	3.37	.87	3.43	0.81	Needed
5.	Access to processing equipment	3.37	.74	3.38	.90	3.37	0.82	Needed
6.	Subsidy on transportation costs	3.50	.75	3.24	.99	3.37	0.87	Needed
7.	Provision of processing facilities	3.50	.92	3.45	.71	3.47	0.81	Needed
8.	Expert advice from extension agents	3.75	.70	3.50	.75	3.62	0.73	Needed
9.	Provision of credit facilities	3.75	.70	3.60	.71	3.67	0.71	Needed
10.	Access to good road networks to oil palm producing communities	3.87	.35	3.71	.66	3.79	0.51	Needed
11.	Establishment of linkages between oil palm processors and palm kernel oil processors	3.62	.51	3.37	1.00	3.50	0.76	Needed
12.	Provision of adequate storage facilities	3.62	.74	3.40	.83	3.51	0.78	Needed
13.	Improved market networks	3.62	.74	3.31	1.04	3.46	0.89	Needed

$\bar{X}_1$ = Mean of extension agents, SD_1 = standard deviation of extension agents, $\bar{X}_2$ = mean of rural women, SD_2 = standard deviation of rural women, $\mathbf{X}g$ = grand mean, SD_g = grand standard deviation

Results from Table 3 revealed that the 13 items had their grand mean ranged between 3.37 to 3.85 indicating that all the 13 items are the strategies that are needed for enhancing commercial processing of Palm kernel by rural women. Furthermore, the standard deviation range of between 0.40 to 0.89 indicate that the respondents are too far from the responses of each other. Findings further revealed that provision of processing facilities and adequate storage facilities are some of the strategies for enhanced commercial processing of palm kernel oil. The absence of the aforementioned has limited production capacity of these rural women. This is in agreement with the observation of Okeke and Oluka (2017) that plastic containers and metal drums are dominantly used in most areas in south-east Nigeria for the storage of palm kernel oil. This indicated that palm kernel oil extraction has not received much attention in mechanization.

Research Question 4

What the benefits derived from palm kernel oil processing in Taraba State?

Table 4: Benefits derived from palm kernel oil processing

S/N	Benefits derived from palm kernel oil processing	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_g$	SD_g	Remarks
1.	Palm kernel cake is used as livestock feed	3.00	.53	3.05	.95	3.02	0.74	Agreed
2.	Palm kernel oil is used in vegetable oil	2.75	.70	3.08	.89	2.91	0.79	Agreed
3.	Palm kernel oil is used in soap making	3.00	.75	3.75	.52	3.37	0.64	Agreed
4.	Palm kernel shells are used as energy source	3.00	.92	2.95	1.01	2.97	0.97	Agreed
5.	Palm kernel oil is also used in making chocolate	3.12	.64	2.81	1.05	2.97	0.84	Agreed
6.	Palm kernel oil is used as body cream for people of different age groups	3.00	1.06	3.60	.56	3.30	0.81	Agreed

$\bar{X}_1$ = Mean of extension agents, SD_1 = standard deviation of extension agents, $\bar{X}_2$ = mean of rural women, SD_2 = standard deviation of rural women, $\mathbf{X}g$ = grand mean, SD_g = grand standard deviation

Results from Table 3 revealed that all the 6 items had their grand mean value between 2.91 to 3.37 indicating that all the 6 items are the benefits derived by rural women from palm kernel oil processing. Similarly, the standard deviation value of between 0.64 to 0.97 showed the closeness of the responses of the respondents. The findings of this study is in line with the opinion of Adesiyan (2019) that palm kernel oil is used in edible fats, in making ice cream and mayonnaise, in baked goods and confectioneries, and in the manufacture of soaps and detergents. Press cake,

after extraction of oil from the kernels is also used as livestock feed. Similarly, Adejugbe, Oyegunwa, Iliya, Aigbogun, Oyelami, and Olusunle (2017) opined that cake gotten during the milling is used as ingredient for livestock feeds and widely used in livestock industries.

CONCLUSION

Palm oil is also produced in commercial quantities in Takum, Ussa and Kurmi Local Government Areas of Taraba State. Palm kernel which is a by-product from palm oil extraction is often left underutilized thereby resulting to high wastage. Proper utilization of palm kernel for the production of palm kernel oil can provide additional income to the rural populace especially women. This prompted an assessment of the strategies that could enhance the participation of rural women in commercial palm kernel oil production in Taraba State.

Recommendations

Based on the findings of this research, the following recommendations are made:

1. Rural women should be educated on the processes involved in the traditional method of palm kernel oil extraction.

2. Extension agents should expose rural women to the strategies that could enhance commercial processing of palm kernel oil.

3. Rural women should take advantage of the benefits derived from palm kernel oil processing improve their livelihood.

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