

Full Length Research Paper

Assessment of oil palm production and processing among rural women in Enugu North agricultural zone of Enugu State, Nigeria

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The study assessed oil palm (*Elaeis guineensis* Jacq.) production and processing among rural women in Enugu North Agricultural zone of Enugu State, Nigeria. Data for the study was collected from a sample of one hundred (100) respondents through the use of interview schedule. Descriptive statistics such as percentage, mean score and standard deviation were used for presenting the data. The duration of the study was April 2010 and February 2011. The respondents involved in oil palm production and processing obtained oil palm fruits mostly from women cooperative society. They obtained palm oil, palm kernel, palm kernel oil, palm wine, brooms, baskets, livestock forage and fuel wood from oil palm production. The major source of labour used for oil palm processing was household members. Benefits derived from oil palm processing include: additional income (98.4%), purchase of household basic needs (90.1%), payment of children school fees (82.6%), among others. Constraints to oil palm production and processing include: lack of fund for buying of processing machine (M= 2.7), high cost of labour (M= 2.7), poor extension services (M= 2.7), use of poor variety of oil palm seedlings (M= 2.5), lack of storage facilities (M= 2.5), lack of improved varieties/cultivars (M= 2.5), poor access to good road network for easy transportation of produce (M= 2.5), among others. The study recommends that appropriate labour saving technologies should be developed for rural women involved in processing of oil palm in order to reduce the difficulties they encounter in the activity. This will in turn increase productivity.

Key words: Oil palm (*Elaeis guineensis* Jacq.), production, processing, rural women, Nsukka, Enugu State, Nigeria.

INTRODUCTION

Oil palm (*Elaeis guineensis* Jacq.) originated in the tropical rain forest region of West Africa. The main belt runs through the southern latitudes of Cameroon, Côte d'Ivoire, Ghana, Liberia, Nigeria, Sierra Leone, Togo and into the equatorial region of Angola and the Congo. Thus oil palm locally called *Nkwu* (Igbo) and *Ope* (Yoruba) in Nigeria is native to West African humid tropics, the Congo basin and Central Africa, growing wild in secondary forest (Ugochukwu et. al., 1999).

Nigeria used to be the world's largest producer of oil palm before the crude oil boom era. Malaysia has now taken the leading position. Oil palm plantation and allied industries is now the main stay of Malaysian economy. Malaysia came to Nigeria in the 70s to obtain oil palm seeds and seedlings. Researchers have established that oil palm trees do better on plantation farms when planted on a deep, slightly acidic loamy soil with pH 5 – 6 under a climatic condition, humid tropics with 250 cm rainfall well distributed; and long hours of light. It is mainly propagated by seed through pre-nursery and field nursery practices (Ugochukwu et al., 1999). It is the most important source of vegetable oil of all oil-bearing plants

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and yields highly (Sivasothy, 2006).

Oil palm can be used in various forms; the leaves are used in making brooms and as roofing materials (in the rural areas). The bark of the frond can be peeled and woven into baskets. The main trunk can be split like sawn timbers and used as part of building materials. Palm wine can be obtained from oil palm, red palm oil is readily obtainable from the fresh fruit bunches. When the fruit is processed the residue obtained can be used as fuel (for cooking and fertilizer to improve soil nutrient). Red palm oil is used in cooking, making soap, candle and margarine. Palm kernel oil can be extracted from the nut (Sivasothy, 2006).

The residue obtainable in the process of palm kernel oil extraction otherwise called palm kernel cake is used as livestock feed. Palm kernel oil is used in vegetable oil and soap making. Palm kernel shells are also useful as energy source and industrial raw materials such as mosquito coils (Soyebo et al., 2005). Eric and Ikheloha (2007) reiterated that palm oil is a major product processed from oil palm fruits in Nigeria. It is converted to cooking oil, raw material for manufacturing industries for soap, creams, margarines and confectionaries. It can also be converted to petrol to drive automobile as is the case in Malaysia. The picture of oil palm fruit bunches is shown in Figure 1.

A flow chart for oil palm processing is shown in Figure 2. This comprises sterilization, stripping, digestion and pressing, clarification, purification, drying and storage. For the kernel line, there are steps such as nut/fibre separation, nut conditioning and cracking, cracked mixture separation, kernel drying and storage. The dried kernels are often sold to palm kernel crushers for extraction of crude palm kernel oil. In some integrated plants, kernel crushing facilities exist side by side at the same complex. There are two distinct methods of extracting oil from the digested material. One system uses mechanical presses and is called the dry method. The other called the wet method uses hot water to leach out the oil (Sivasothy, 2006).

In the dry method, the objective of the extraction stage is to squeeze the oil out of a mixture of oil, moisture, fibre and nuts by applying mechanical pressure on the digested mash. There are a large number of different types of presses but the principle of operation is similar for each (Tang and Teoh, 1995).

According to Poku (1998), processing oil palm fruits for edible oil has been practiced in Africa for thousands of years and the highly coloured and flavoured oil produced is an essential ingredient in much of the traditional West African cuisine. Generally, women in the communities are responsible for the processing and sale of farm produce. Rural women in the Ashanti Region of Ghana process staple palm oil manually. Without the ability to obtain micro-credit loans, they were limited to producing small amounts of oil that often did not meet family needs.

Small-scale agro-processing among rural women seems to hold the key to rural poverty reduction and the prolific oil palm tree provides the best raw material for starting rural industries. It is agreed that traditional methods of extracting palm oil are inefficient and tedious for making oil for sale (Ataga et al., 1993).

There is lack of deliberate extension efforts towards oil palm cultivation in Nigeria except documentary programmes on oil palm relayed on radio and television occasionally by the Nigeria Television Authority. However, group discussions and the key informant interview revealed other fundamental problems such as tenure-right which is mostly tenancy-right through leasing and rent. Lack of land for planting of oil palm trees, inefficient methods of harvesting and conveying oil palm fruits also pose serious challenges to oil palm production and processing among rural women in the study area. The study therefore sought to:

- a. identify sources of oil palm trees available to rural women;
- b. ascertain methods and processes involved in oil palm processing;
- c. ascertain sources of labour available for oil palm processing;
- d. identify benefits derived from oil palm processing;
- e. ascertain problems faced in oil palm production processing.

MATERIALS AND METHODS

The study was carried out in Enugu North Agricultural Zone of Enugu State, Nigeria. The major occupation of people in the state is farming. Major crops grown include: cassava, yam, cocoyams, vegetables, oil palm, while livestock reared are poultry, goat and sheep. There are three agricultural zones in the state, namely; Enugu North, Enugu East and Enugu West. Enugu North was purposely selected for the study because the rural women in the area are highly involved in oil palm processing. Enugu North comprises six extension blocks. Three blocks were selected from the six blocks, while two circles were also selected from each of the blocks using simple random sampling technique. In each of the circles selected, eighteen (18) rural women involved in oil palm production and processing were selected using simple random sampling. Generally, the study comprised three (3) blocks and six (6) circles, giving a total of one hundred and eight (108) respondents who were supposed to be used for the study. It was discovered in the course of data analysis that eight (8) copies of structured interview schedule were not filled properly and were dropped, leaving a total of one hundred (100) used for data analysis. The structured interview schedule used for data collection was divided into seven areas based on the objectives.



Figure 1. Fresh fruit bunches waiting for processing at palm oil mill.

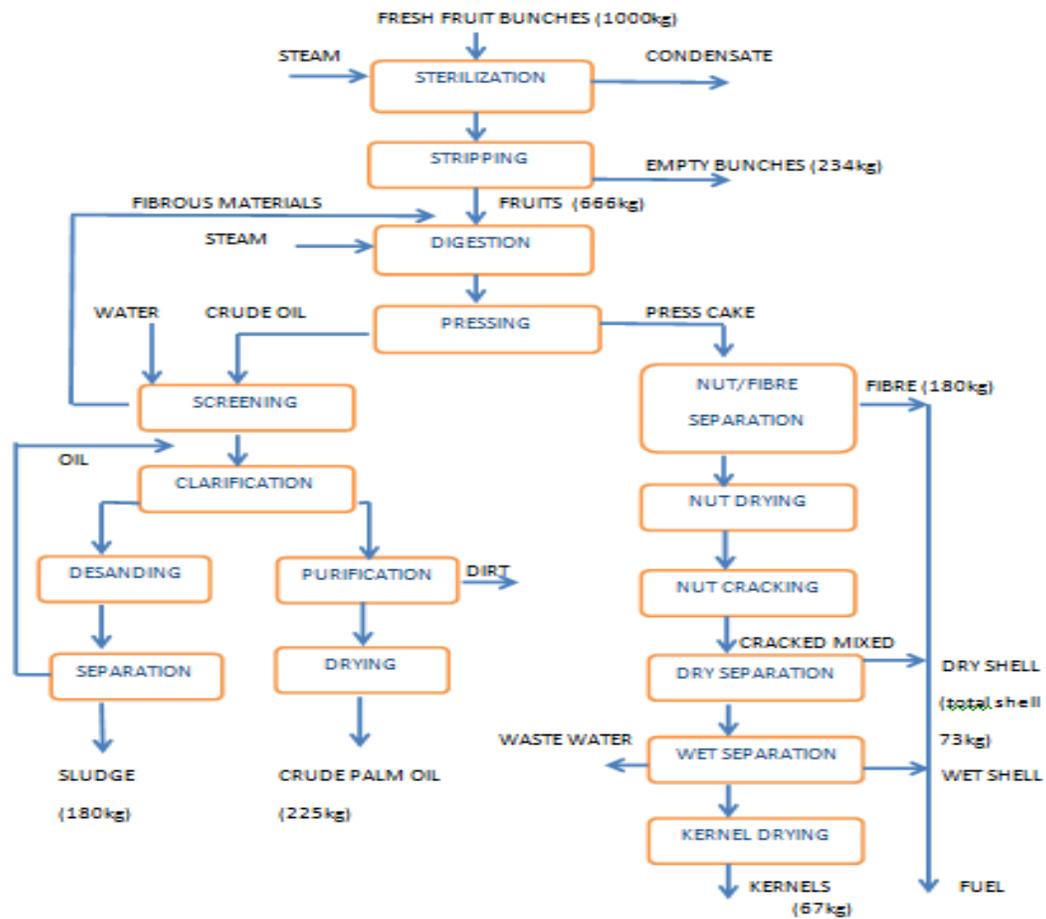


Figure 2. Flow chart for oil palm processing (Sivasothy, 2006).

The first area sought information on socio-economic characteristics of the respondents. Respondents were asked to indicate their actual age (years), this was later categorized as 20 to 29 years, 30 to 39 years, 40 to 49 years and 50 years and above. They also indicated their marital status, number of years spent in school, years of farming experience, household size and primary occupation. The second area dealt with sources of oil palm and products from oil palm among rural women. Respondents were asked to indicate sources of oil palm fruits available to them as well as the products obtained from oil palm processing. The third section considered the sources of labour and number of people involved in oil palm production and processing. These sources include: palm oil, palm kernel, palm kernel oil, palm wine, brooms, baskets, among others. Methods and processes involved in oil palm produce processing were highlights of the fourth section. The respondents were asked to indicate the methods and processes they use in processing oil palm fruits. The fifth section discussed sources of labour and number of people involved in oil palm production and processing. The respondents indicated sources of labour and number of people involved in oil palm production and processing. The sixth section dealt with problems faced in oil palm production and processing. The respondents reacted to possible constraint variables using a four point Likert-type scale of "to a great extent (3)", "to some extent (2)", "to a little extent (1)" and "to no extent (0)". The mean value of 1.5 was used to determine the major constraints. The seventh area addressed strategies for improving oil palm production and processing. Respondents reacted to possible important strategies for improving oil palm production and processing using a three point Likert-type scale of "very important" (2), "important" (1), and "not important" (0). The mean value of 1.0 was used to determine the major strategies. The data generated were presented using frequency, percentage, mean score and standard deviation.

RESULTS AND DISCUSSION

Socio-economic characteristics of the respondents

Results in Table 1 show that 51.5% of the respondents were within the age range of 30 to 39 years. The mean age of the respondents was 33.2 years. The results show that rural women involved in oil palm production and processing were young and in productive years hence greater involvement in the activity. Majority (70.5%) of the respondents were married while 23.1% were widowed. This implies that the respondents had husbands and children who could provide most of the labour needed for processing of oil palm fruits.

Only 4.0% of the respondents had no formal education; a

greater percentage (96.0%) had formal education. Education will facilitate farmers' ability to use technologies and appreciate their importance in farming activities. According to Adesina and Baidu-Forson (1995), education has been identified as a major factor in the adoption and absorption of technology.

The mean farming experience of the respondents was 19.5 years (Table 1). The findings of this study show that most respondents have been involved in agricultural production for a long period of time. The extensive farming experience acquired by the respondents will help them to boost productivity as well as sustain agriculture. About 45% of the respondents had household size of 1 to 5 persons. The mean household size was 6 persons. Thus, the large family size constitutes the family labor which most of the respondents rely upon in carrying out processing of oil palm produce. A greater proportion (60.1%) had farming as a primary occupation, while 30.5% were involved in petty trading, among others. This implies that farming is the dominant occupation among rural women in the study area. Hence, efforts are needed in providing adequate extension services to them in order to increase productivity.

Sources of oil palm and products from oil palm

Majority (90.2%) of the respondents obtained oil palm fruits through women cooperative society, 40.0% bought from the market, while 26.4% obtained from own plantation. This implies that most of the respondents did not own oil palm plantation. This could be attributed to the fact that they did not own lands where they can plant oil palm trees. They should be encouraged to join cooperative society since it is the major source of oil palm produce.

The products derived from oil palm as indicated by the respondents include: palm oil, palm kernel, palm kernel oil, brooms, livestock forage, fuel wood, among others (Table 2). This shows that the respondents derived series of products from oil palm which they can sell in the market for increased income and economic empowerment.

Methods and processes involved in oil palm produce processing

Entries in Table 3 revealed that all (100%) the respondents were using leg in processing oil palm fruits, 60.0% were using hand pressing, while 45.0% made use of hydraulic pressing, among others. This implies that the respondents were still using traditional methods of oil palm processing which is tedious, unhygienic and time consuming. The findings agree with a study carried out by Etoamaihe and Ndubueze (2010) which stated that

Table 1. Distribution of respondents according to socio-economic characteristics (n=100).

Variable	Percentage	Mean (M)
Age (years)		
20-29	18.2	
30-39	51.5	33.2
40-49	14.0	
50 and above	16.3	
Marital status		
Married	70.5	
Single	6.4	
Widowed	23.1	
Educational level (years)		
No formal education	4.0	
Primary school	50.0	
Secondary school	40.0	
Tertiary education	6.0	
Farming experience (years)		
1-10	29.6	
11-20	27.8	
21-30	15.7	19.5
31-40	21.3	
41 and above	5.6	
Household size (persons)		
1-5	44.8	
6-10	40.2	5.6
11-15	10.0	
Above 15	5.0	
Primary occupation		
Farming	60.1	
Petty trading	30.5	
Civil service	4.5	
Public service	4.9	

The mean farming experience of the respondents was 19.5 years.

Table 2. Percentage distribution of respondents according to sources of oil palm and products from oil palm (n= 100).

Source*	Percentage
Women cooperative society	90.2
Buying from the market	40.0
Self owned	26.4
Products*	
Palm oil	100
Palm kernel	100
Palm kernel oil	36.1
Palm wine	3.4
Brooms	50.4

Table 2 Contd.

Baskets	23.5
Livestock forage	60.3
Fuel wood/dry fronds	45.1

*Multiple responses.

Table 3. Percentage distribution of respondents according to methods and processes involved in oil palm produce processing (n= 100).

Method*	Percentage
Use of leg	100
Pounding	8.4
Hand pressing	60.0
Direct screw pressing	2.5
Hydraulic pressing	45.0
Combination of digester and screw pressing	20.4
Processes*	
Fermentation	100
Sterilization	50.0
Clarification	42.8

*Multiple responses.

Table 4. Percentage distribution of respondents based on sources of labour and number of people involved in oil palm production and processing (n= 100).

Variable	Percentage
Sources of labour*	
Household members	78.0
Relations	6.7
Hired	51.7
Exchange labour	13.3
Number of people	
1-5	52.3
6-10	20.0
11-15	27.5

*Multiple responses.

rural women's use of traditional methods for oil palm processing is laborious, time consuming and unhygienic in nature. Oke (2002) reiterated that majority of palm oil processors adopted traditional techniques of processing.

Majority (100%) of the respondents were also using fermentation in the course of processing, while 50.0% and about 43.0% were involved in sterilization and clarification, respectively.

Sources of labour and number of people involved in oil palm production and processing

Results in Table 4 indicate that household members (78.0%) constitute the major source of labour used by the respondents. Other sources of labour include: hired

labour (51.7%), exchange labour (13.3%) and relations (6.7%). About 52% of the respondents indicated that they used 1-5 persons for processing of oil palm produce, while 27.5% indicated that they used 11-20 persons, among others (Table 4). This shows that members of household were mostly used in providing labour for processing of oil palm. Large household size could be an added advantage for source of labour which is needed for farm and off-farm activities.

Benefits derived from oil palm production and processing

The benefits derived from production and processing oil palm as indicated by the respondents include: additional

Table 5. Percentage distribution of respondents based on benefits derived from oil palm production and processing (n = 100).

Variable*	Percentage
Payment of children school fees	82.6
Additional income	98.4
Increase in household consumption	70.4
Purchase of household basic needs	90.1
Quantity of palm oil obtained (liter)	
1-10	22.5
11-20	60.0
Above 20	92.4
Estimated income (₦)	
1000-10000	4.0
10001-20000	16.0
Above 20000	80.0

*Multiple responses.

income (98.4%), purchase of household basic needs (90.1%), payment of children school fees (82.6%), among others (Table 5). This implies that the rural women's involvement in oil palm production and processing empowers them economically, helps them to meet up with family responsibilities.

Majority (92.4%) of the respondents obtained more than 20 liters of palm oil, 60.0% obtained 11-20 liters, while 22.5% obtained 1-10 liters. This implies that the quantity of palm oil produced by the respondents is quite encouraging and this could be a source of livelihood for them.

A greater percentage (80.0%) realized more than ₦20,000.00 from sale of palm oil, 16.0% got ₦10001-20,000 from selling palm oil, while 4.0% obtained ₦1000-10000. This implies that the respondents made higher incomes from sale of palm oil (Table 5).

Problems faced by rural women in oil palm production and processing

The major constraints to effective production and processing of oil palm among rural women include: lack of fund for buying of processing machine (M= 2.7), high cost of labour (M= 2.7), poor extension services (M= 2.7), use of poor variety of oil palm (M= 2.5), lack of storage facilities (M= 2.5), lack of improved varieties/cultivars (M= 2.5), poor access to good road network for easy transportation (M= 2.5), among others (Table 6). Despite the fact that greater proportions of respondents were using pressing machines, they were highly constrained by fund related and infrastructural factors. Most of the

standard deviation was less than one; this indicates the disparity existing on the responses of the respondents. It shows that each respondent has peculiar problems. The findings of the study are supported by Soyebó et al. (2005) which stated that oil palm processors are faced with lack of improved planting materials and government support.

Strategies for improving oil palm production and processing among rural women

Entries in Table 7 show the mean score and standard deviation of perceived possible solutions to the problems faced by respondents. The major solutions indicated by the respondents include: provision of improved varieties of oil palm seedlings (M = 3.2), provision of credit facilities (M = 3.1), improved labour saving device for harvesting and processing (M = 3.0), availability of processing machine (M = 2.9), expert advice from Women in Agriculture unit of ADP (M = 2.9), better processing technique and equipment (M = 2.9), provision of adequate storage facilities (M = 2.9), cheaper transportation cost (M= 2.8) proper and regular weeding of oil palm plantation (M = 2.8) and cheaper cost of hired labour (M = 2.8).

Other possible strategies include: availability of land (M = 2.5), improved marketing channels/networks (M = 2.5), provision of farm inputs such as harvesting machine (M = 2.4), among others.

The implication of the above findings is that if the possible solutions are considered they will go a long way to help the rural women in production and processing of oil palm, effectively.

Table 6. Percentage distribution of respondents according to problems faced in oil palm production and processing (n=100).

Problem	Mean score (M)	Standard deviation (SD)
Land tenure problems/scarcity of land which inhibits production expansion	2.0	0.63
High cost of transportation	2.1	0.62
High cost of milling machine	1.6	0.98
Unavailability of milling machine/processing facilities	2.4	1.16
High cost of hired labour	2.7	0.60
Insufficient quantity of oil palm produce	1.0	1.16
Use of poor variety of oil palm	2.5	0.77
Tedious nature of processing	2.4	0.84
Poor market price	0.5	0.79
Poor market networks	1.2	0.74
Lack of storage facilities	2.5	0.84
Scarcity of labour	2.1	0.99
Poor quality of oil palm produce	1.3	0.73
Lack of improved varieties/cultivars	2.5	0.76
Poor extension services	2.7	0.83
Low soil fertility	1.0	1.15
Shortage of labour	2.2	0.68
Lack of fund for buying of processing machine	2.7	0.99
Weed problem	1.9	0.78
Difficulties of harvesting during rainy season	1.9	0.77
Poor access to good road network for easy transportation	2.5	0.73

Table 7. Percentage distribution of respondents based on strategies for improving oil palm production and processing (n=100).

Strategy	Mean (M)	Standard deviation (SD)
Formation of women cooperative society to enhance access to credit facilities	2.7	0.83
Availability of processing machine	2.9	0.60
Expert advice from Women in Agriculture unit of ADP	2.9	1.14
Cheaper transportation cost	2.8	0.79
Better processing techniques and equipment	2.9	0.58
Better harvesting techniques	2.6	0.60
Improved marketing channels/networks	2.5	1.27
Provision of farm inputs such as harvesting machine	2.4	0.68
Cheaper cost of hired labour	2.8	0.60
Provision of improved varieties of oil palm seedlings	3.2	0.74
Provision of credit facilities	3.1	0.70
Proper and regular weeding of oil palm plantation	2.8	0.82
Availability of land	2.7	0.80
Access to good road network	2.1	1.23
Improved market network	2.3	0.68
Provision of adequate storage facilities	2.9	0.61
Improved labour saving device for harvesting and processing	3.0	0.58

CONCLUSION AND RECOMMENDATIONS

The results show that rural women involved in oil palm production and processing were young, married and in productive years. The respondents obtained oil palm fruits through women cooperative society, obtained palm oil, palm kernel, palm kernel oil, palm wine, brooms, baskets, livestock forage and fuel wood from oil palm production.

Household members were the major source of labour used for oil palm processing.

They used the income realized from oil palm for payment of children school fees, purchase of household basic needs, among others.

The activities of the respondents were highly constrained by lack of funds and infrastructure. The study concludes that adequate provision of funds and credit facilities will help to improve oil palm production and processing among the rural women, especially in helping them to purchase processing machines for easy production of palm oil and increased products.

Efforts are needed by the extension agents in providing and disseminating information on improved varieties of oil palm seedlings for adoption by the rural women. This will improve the yield of oil palm as well as boost the productivity of oil palm produce and also enhance increased revenue among rural women. Appropriate labour saving technologies should be developed and disseminated for use by the rural women in order to save time and the drudgery involved in processing oil palm.

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