

UTILIZATION OF MODERN OIL PALM PROCESSING TECHNIQUES BY WOMEN IN AKINYELE LOCAL GOVERNMENT AREA, OYO STATE, NIGERIA

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ABSTRACT

Studies have revealed that despite the availability of several modern oil palm processing techniques, many oil palm producers in Nigeria still embrace the use of traditional methods which usually results in low production and also not sustainable in emergency situations. This study therefore examined the utilization of modern oil palm processing techniques in Akinyele Local Government area of Oyo state.

Multi-stage sampling procedure was used to select a sample size of 120 oil palm processors from 5 out of the 12 wards in the LGA using structured questionnaire to elicit information. Data were analyzed using descriptive and inferential statistics such as frequency and percentages, chi-square and PPMC.

Results showed that majority (82.3%) of the respondents in the study were married (82.3%) and practiced Christianity (71.7%) with mean age of 51 years. About 23.0% had adult education with mean household size of 5 persons. About 47.8% of the respondents had no other income generating activity apart from oil palm processing. Also, the mean years of processing experience of respondents in the study area was 14.8 years while majority (95.6%) of the respondents made use of hired labour and 61.9% produced on commercial basis with mean income of ₦20238.94. The study also revealed that dryer (68.1%), oil expeller or extractor (62.8%), sterilizer (61.1%), crusher (58.4%), digester and presser (54.9%), miller (47.8%) and Nut cracker (30.1%) were always available for the use of oil palm processors in the study area with high availability of 69.9%. Respondents' income ($R=0.433 \leq 0.05$), Farm size ($R=0.968 \leq 0.05$) and years of processing experience ($R=0.258 \leq 0.05$) were significant to the utilization of modern facilities of oil palm in the study area. Also respondents' knowledge ($r=0.300, p<0.05$), attitude ($r=0.546, p>0.05$), benefits derived ($r=0.572, p<0.05$) and access to modern facilities ($r=0.983, p<0.05$) were all significant to the utilization of modern facilities for oil palm processing in the study area.

The study identified that respondents in the following categories; those who have high marital support, level of education, income, household size, farm size, production years and older in age had access to and utilized the modern oil palm processing facilities. It is therefore recommended that Government should assist those with low socio-economic characteristics by providing funds and creating awareness about the modern oil palm processing facilities.

Key Words: Utilization, Processing, Techniques

INTRODUCTION

Oil palm is an edible vegetable oil derived from the mesocarp (reddish pulp) of the fruit of the palm oil, primarily the African oil palm *Elaeis guineensis*, and to a lesser extent from the American oil palm *Elaeis oleifera*. It is naturally reddish in colour because of high beta-carotene content (Poku, 2002). Oil palm is one of the few highly saturated vegetable fats and is semi-solid at room temperature.

Oil Palm processing involves so many steps that require different techniques. The processing techniques can be mainly classified into traditional processing technique and modern processing technique. The traditional and modern oil palm processing techniques and implements include:

S/N	Traditional Techniques/Tools	Modern Techniques/Tools
1	Use of cutlass, axe, traditional tree climber and sickle for harvesting	Use of mobile cranes and ladders attached to vehicles, mechanized plucker
2	Use of axe, cutlass for threshing of oil palm fruits	Use of rotating drum coupled with rotary beater bars for threshing of fruit
3	Use of charcoal and local pots for sterilization of fruits	Use of mechanized fruit sterilizer coupled with steam compartment
4	Use of charcoal and local pots for digestion of fruits	Use of mechanized digester with steam-heated vessel fitted with a central rotating shaft for digestion
5	Use of water and basin or bowl to extract and leach out oil	Use of mechanical press. Can either be spindle press or batch press.
6	Use of charcoal, local pot and more water for clarification/purification	Use of mechanized clarification compartment/tank coupled with a wet steaming device
7	Use of plastic kegs or containers for storage	Use of storage tanks with regulated temperature for storage

Source: Ajani *et al*, 2012

Oil palm production is characterized by low productivity at production level (wild grove) and processor level (traditional processing). Despite the several modern oil palm processing techniques available, there is still a low yield of oil palm production. This is due to some other factors which include the lack of storage and marketing facilities and the numerous intermediaries involved in the value chain that have strongly depressed producer prices (Gourichon, 2013). The major constraints of oil palm production according to Olagunju (2008) are the supply of inputs, the inefficiency of processing methods, the low quality of the output, the lack of infrastructure and inefficient distribution. The traditional methods of oil palm processing are usually utilized by women in Akinyele Local Government and this in turn leads to low productivity. With regards to production, the traditional method is dominant, so yields remain low. Moreover, this method is very tedious and laborious compared to mechanical methods and requires a substantial proportion of labour force. Milling cost of production is high, which results in high prices. The lack of infrastructure such as storage facilities, transportation systems, good road networks, communication channels are also sources of inefficiencies in the value chain (Edem, 2012).

However, it has been observed that processing activities are dominated by smallholders

located in the rural communities of Oyo State. These smallholders account for the greater percentage of oil palm output in the state but their output cannot even satisfy local demands both quantitatively and qualitatively which necessitates the use of modern processing techniques in order to meet the rising demand of oil palm within and outside the State. It is against this backdrop that this study was carried out to examine the use of modern oil palm processing techniques by women in Akinyele Local Government Area of Oyo State

Objectives of the Study

The main objective of the study is to determine the utilization of modern oil palm processing techniques among women in Akinyele L.G.A of Oyo State. The specific objectives include to:

1. determine the socio-economic characteristics of the respondents in the study area;
2. identify the modern oil palm processing techniques available in the study area;
3. ascertain the level of access to oil palm processing facilities in the study area;
4. know the level of utilization of modern oil palm processing techniques in the study area;

METHODOLOGY

The study area used for this research is Akinyele Local government area of Oyo state, Ibadan. It is one of the eleven local governments within Ibadan metropolis. The headquarters is at Moniya, Ibadan. Akinyele local government area was created in 1976. It is located in the rain forest zone and grassland of south western Nigeria and has a tropical climate which is characterized by two distinct seasons; the rainy and the dry season. It occupies a land area of 464,892 square kilometers with a population density of 516 persons per square kilometer. Using 3.2% growth rate from 2006 census figures, the 2010 estimated population for the Local Government is 239,745 (National Population Commission, 2010). Akinyele local government area is subdivided into 12 wards: Ikereku, Olanla/Oboda/Labode, Arulogun/Eniosa/Aroro, olode/Amosun/Onidundu, ojo-Emo/Moniya, Akinyele/Isabiyi/Irepodun, Iwokoto/Talonta/Idi-oro, Ojoo/Ajibode/Laniba, Ijaye/Ojedeji, Ajibade/Alabata/Elekuru, Olorisa-Okoko/Okegbemi/Mele, and Iroko.

The population of the study comprises of oil palm processors in Akinyele local government area of Oyo state.

This research involved a multi stage sampling procedure. Purposive sampling technique was used to select 5 wards in Akinyele Local Government area because of the high concentration of oil palm processors in those areas. The selected wards were Ojo-emo/Moniya/Balogun, Ijaye/Ojedeji, Ajibade/Elekuru/Alabata, Akinyele/Isabiyi and Arulogun/Aroro. Two communities with oil palm processors were also purposively selected from each ward to give a total of ten communities sampled. The communities include: Ijaye, Moniya, Olanla, Alabata, Iroko, Aba otun, Elekuru, Onidudu, Aba odo and Oyediji village. Twelve (12) oil palm processors were randomly selected from each community to make a total of 120 respondents selected for the study out of which 113 were recovered and analyzed.

Data collection was done through the use of primary and secondary sources. Structured questionnaire was used to elicit information from the oil palm processors based on the objectives of the study.

Data collected were analyzed using both descriptive and inferential statistics. The descriptive statistics were done through the use of mean, frequency counts and percentages while

inferential statistics was used to test the hypotheses as stated below:
Hypothesis was tested using chi-square and PPMC

RESULTS AND DISCUSSION

Respondents' personal characteristics

The results in Table 1 showed that; 5.3% were male while 94.7% were female, the mean age of respondents was 51.02 years, majority of the respondents (82.3%) were married, few of them (10.6%) were widowed while just 7.1% of the respondents were single.

Results revealed that majority (71.7%) of the respondents practice Christianity in the study area, some, (25.7%) practice Islam, while others (0.9%) were traditional worshippers, .21.2% of the oil palm processors attained Tertiary Education, 22.1% attained secondary education, 21.2% attained primary education, 23.0% attained adult education and 12.4% had no formal education.

Table 1 also showed that the mean household size of respondents was 4.98 people, 47.8% of the respondents in the study area had no other income generating activity apart from oil palm processing. Some, (28.3%) were involved in trading, 13.3% of them were civil servants while few (6.2%) were also artisans and 4.4% in other agro-processing activities, 55.8% had no farm land, 20.4% had farm land size from 0-1 acre, 20.4% had farm land size from 1-3 acre, and 3.5% had farm land size of 4 acre or more, 36.3% were within range of production experience of less than 10 years, 36.3% were within range of production experience of 10-20 years, and 27.4% were within the range of production experience of 20 years and above, 95.6% made use of hired labour, 3.5% made use of family labour, while 0.9% made use of communal labour. This result proved that a greater percentage of the oil palm processors relied mainly on hired labour, 61.9% practiced commercial production, 8.8% practiced subsistence production and 29.2% practiced both, 92% of the respondents did not belong to any farmer group and 8% belonged to farmer groups.

Table 1: Distribution based on personal characteristics of respondents

Variables	Frequency	Percentage	Mean	SD
Age				
20-34	11	9.7	51.02	10.88
35-49	30	26.5		
50-64	63	55.8		
65 and above	9	8.0		
Marital status				
Single	8	7.1		
Married	93	82.3		
Widowed	12	10.6		
Religion				
Christianity	81	71.7		
Islam	29	25.7		
Traditional	1	0.9		
Educational attainment				
No Formal education	14	12.4		
Adult education	26	23.0		
Primary education	24	21.2		
Secondary education	25	22.1		
Tertiary education	24	21.2		
Household size				
1-4	47	41.6	4.98	1.72
5-8	62	54.9		
9-12	4	3.5		
Other income generating activities				
Civil service	15	13.3		
Trading	32	28.3		
Artisan	7	6.2		
Agro-processing	5	4.4		
None	54	47.8		
Years of processing experience				
<10	41	36.3	14.88	9.59
10-20	41	36.3		
>20	31	27.4		
Source(s) of labor				
Family labor	4	3.5		
Hired labor	108	95.6		
Communal labor	1	0.9		
Scale of processing production				
Commercial	70	61.9		
Subsistence	10	8.8		
Both	33	29.2		
Income				
< 10,000 naira	24	21.2	20238.94	13581.943
10,001 - 25,000	45	39.8		
25,001 - 40,000	27	23.9		
>40,000	17	15.0		

Source: Field Survey, 2019

Availability of modern oil palm processing techniques

Table 2 showed that there is availability of some modern oil palm processing implements in the study area but the percentage of availability is lower than the expected percentage. The implication of this is that oil palm processors have the opportunity to make use of the modern

oil palm processing implements available to them and increase the production yield of oil palm.

Table 2a: Distribution of types of modern oil palm techniques available to respondents

Types of facilities	Always		Occasionally		Never	
	F	(%)	F	(%)	F	(%)
Nut Cracker	34	(30.1)	28	(24.1)	51	(45.1)
Sterilizer	69	(61.1)	14	(12.4)	30	(26.5)
Dryer	77	(68.1)	17	(15.0)	19	(16.8)
Crusher	66	(58.4)	20	(17.7)	27	(23.9)
Miller	54	(47.8)	37	(32.7)	22	(19.5)
Oil Expeller/Extractor	71	(62.8)	10	(8.8)	32	(28.3)
Digester	62	(54.9)	19	(16.8)	32	(28.3)
Presser	62	(54.9)	19	(16.8)	32	(28.3)

Table 2b: Categorization of availability of modern oil palm techniques available to respondents

Availability category	Frequency	Percentage	Min.	Max.	Mean	S.D
High Availability	79	69.9	0.00	16.00	7.2832	4.03
Low Availability	34	30.1				
Total	113	100.0				

Source: Field Survey, 2019

Access to modern facilities for oil palm processing

Table 3a indicated that a higher percentage of the respondents had access to the listed modern oil palm processing facilities. This implies that there will be an improvement in both the quality and quantity of palm oil processed using these modern facilities.

Table 3b however summarizes that many of the respondents (64.6%) had high access to the modern facilities available for oil palm processing in the study area. This is because most of the modern facilities needed for oil palm processing were available for their use.

Table 3a: Distribution of access to oil palm processing facilities

oil palm processing facilities	To a great extent F (%)	To a lesser extent F (%)	Not at all F (%)	Mean	Rank
Fruit sterilizer	59 (52.2)	20 (17.7)	34 (30.1)	1.22	6th
Spindle press	69 (61.1)	15 (13.3)	29 (25.7)	1.35	1st
Combined digester	51 (45.1)	27 (23.9)	35 (31.0)	1.14	8th
Clarification tank	67 (59.3)	11 (9.7)	35 (31.0)	1.28	2nd
Screw press	64 (56.6)	14 (12.4)	35 (31.0)	1.26	5th
Rotating drum	35 (31.0)	38 (33.6)	40 (35.4)	0.96	9th
Mechanized plucker	42 (37.2)	11 (9.7)	60 (53.1)	0.84	10th
Digester	67 (59.3)	11 (9.7)	35 (31.0)	1.28	2nd
Pressure Steamer	52 (46.0)	29 (25.7)	32 (28.3)	1.18	7th
Storage tank	68 (60.2)	9 (8.0)	36 (31.9)	1.28	2nd

Table 3b: Distribution of access category to oil palm processing facilities

Access Category	Frequency	Percent	Min	Max	Mean	S.D
High access	73	64.6	0.0	20.0	11.796	7.513
Low access	40	35.4				
Total	113	100.0				

Utilization of modern technology for oil palm processing

Table 4a showed that a high percentage of respondents utilized the listed oil palm processing facilities relative to those who do not utilize them. This will result in availability of sufficient commercial palm oil in the market and a great amount of income to the oil palm processors. Table 4.4b however summarizes that a good number of respondents (63.7%) utilized the modern facilities available for oil palm processing in the study area. This is most likely due to the high knowledge about the processing facilities and also the easy access to those facilities.

Table 4a: Distribution of utilization of modern oil palm processing facilities

Modern processing facilities	Always		Occasionally		Never		Mean	Rank
	F	(%)	F	(%)	F	(%)		
Fruit sterilizer	73	(64.6)	11	(9.7)	29	(25.7)	1.39	1st
Spindle press	67	(59.3)	12	(10.6)	34	(30.1)	1.29	5th
Combined digester	72	(63.7)	5	(4.4)	36	(31.9)	1.32	2nd
Clarification tank	48	(42.5)	32	(28.3)	33	(29.2)	1.13	9th
Screw press	69	(61.1)	9	(8.0)	35	(31.0)	1.30	4th
Rotating drum	64	(56.6)	9	(8.0)	40	(35.4)	1.21	7th
Mechanized plucker	39	(34.5)	16	(14.2)	58	(51.3)	0.83	10th
Digester	54	(47.8)	23	(20.4)	36	(31.9)	1.16	8th
Pressure Steamer	68	(60.2)	8	(7.1)	37	(32.7)	1.27	6th
Storage tank	65	(57.5)	18	(15.9)	30	(26.5)	1.31	3rd

Table 4b: Distribution of utilization category of modern oil palm processing facilities

Utilization category	Frequency	Percent	Min.	Max.	Mean	S.D
High utilization	72	63.7	0.0	20.00	12.22	7.821
Low utilization	41	36.3				
Total	113	100.0				

Test of Hypotheses

Relationship between respondents' selected socio-economic characteristics and utilization of modern facilities for oil palm processing

Chi-square results on Table 5a indicated that there was a significant relationship between utilization of modern oil palm processing techniques and marital status ($\chi^2=4.359$; $p<0.05$), sex ($\chi^2=0.001$), level of education ($\chi^2=0.536$) and religion ($\chi^2=0.550$) while PPMC result on Table 4.10b revealed that age ($r=-0.925$), income ($r=0.433^*$), household size ($r=0.541$), farm size ($r=0.968^*$) and years of processing experience ($r=0.258^*$) were also significant to utilization of modern oil palm processing techniques.

Table 5a: Chi square analysis between some selected socio-economic characteristics and utilization of modern oil palm processing techniques

Variables	X ²	Df	P-value	Decision	Remark
Sex	0.001	1	0.980	S	Reject
Marital status	4.359	3	0.225	S	Reject
Religion	0.550	3	0.458	NS	Accept
Level of education	0.536	2	0.765	S	Reject

Table 5b: Correlation result of respondents' socioeconomic characteristics and utilization of modern facilities for oil palm processing

Variables	R	P	Decision
Age	0.925	0.009	S
Household size	0.541	0.058	NS
Income	0.433*	0.000	S
Farm size	0.968*	0.004	S
Years of processing Experience	0.258*	0.006	S

*= Significant at 0.05 level of significance

Source: Field survey, 2019

CONCLUSION

Based on the summary presented above, it can be concluded that, majority of the respondents had favourable socio-economic characteristics, had high availability to modern oil palm processing facilities, had knowledge on the various modern oil palm processing techniques, had positive attitude to oil palm processing, experienced several constraints in the course of oil palm processing, derived benefits from the use of modern technology on oil palm production, displayed favorable attitude towards the utilization of modern technology and had access to the available modern facilities for oil palm processing in the study area.

Recommendations

- The utilization of modern technology should be encouraged in the rural areas
- Oil palm processors should be educated and enlightened about the modern oil palm processing facilities and techniques available to them.
- Government should provide oil palm processing facilities and financial assistance to oil palm processors who are not privileged

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