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Analysis of Extent of Awareness and Adoption of Improved Oil Palm Fruit Processing Technology in Kogi State, Nigeria

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Abstract
The study analyzed the extent of awareness and adoption of improved oil palm fruit processing technology in Kogi State, Nigeria. Using purposive multi-stage sampling procedure, a sample of 240 oil palm processors was taken from three out of four agricultural zones of the study area to represent the population. Data for the study were collected through the use of structured questionnaire. Organization and description of data were done by the use of frequency distribution table, percentage, mean and sigma/adoption scoring method. The findings indicated that significant proportion (60.4%) of the processors were female with a mean age of 43 years and an average household size of 8 persons. Majority (73.3%) were married, while 82.5% had formal education. The processors were found to be largely experienced with the average of 16 years of experience. In addition, 62.5% of the respondents had less than 5 extension contacts annually, 87.5% were aware of the improved oil palm processing technology, but only 36.2% adopted the technology. The adoption score of 4.176 for oil palm processors who adopted the use of the palm oil extraction technology revealed low level of adoption of the technology in the study area. Based on the finding, it was recommended that the improved oil palm processing technologies/machines should be made affordable to processors by way of governmental subsidy policy to enhance prospective adoption of the technologies.
Keywords: Awareness, adoption, oil palm, improved processing technology.

1.0 Introduction

The oil palm (*Elaeis guineensis Jacq*.) is a perennial crop that originated from the tropical rain forest of West Africa (Olagunju, 2008). According to Olagunju (2008) it spread to South America in the 16th century and to the Asia in the 19th century, and that Asia overtook Africa as the principal oil palm producing region in the world during the 1970s. Ekine and Onu (2008) pointed out that it is generally agreed that oil palm originated in the tropical rain forest region of west Africa and that the main belt runs through the southern latitudes of Cameroon, Togo, Co'te d'lvoire, Ghana, Liberia, Sierra- Leone and Congo. Carrere (2001) also pointed out that the crop is indigenous to the Nigerian coastal plain, having migrated inland as a staple crop and to millions of Nigerian people; it's a part of the way of life.

Palm oil, a product of oil palm fruit is presumed to have formed part of diet in large parts of Africa (including Nigeria) well before written history began (Gelder, 2004). Apart from this major dietary role, it is also largely used industrially especially in soap making, margarine, candles, fuel for internal combustion engines and greases and lubricants (Armstrong, 1998).

Realizing the lifeline significance of the product in the economy of the people, a study of its processing technologies is vital and worthwhile. In oil palm processing there are two major technologies in use, namely traditional or manual and mechanical or modern. It is a common knowledge that use of machines enhances production. The objectives of this study are to: describe the socioeconomic characteristics of oil palm fruit processors in the study area; determine the level of awareness of the improved oil palm fruit processing technology in the study area; and determine also the level of adoption of the improved oil palm fruit processing technology in the study area.

2.0 Methodology

The study was conducted in Kogi State of Nigeria. Oil palm processing is one of the major agricultural activities in the study area particularly within the oil palm production areas of the state such as Dekina, Ankpa, Ofu, Omala, Ogugu, Okpo, Kabba, Aiyetoro-Gbede, Aloji, Egume, Alloma, Ejule, Anyigba and Igalamela. A multi-stage sampling technique was used to select 240 oil palm fruit processors (respondents) for the study. The stratification was based on the existing four agricultural development programme administrative zones in Kogi State: Zones A (Aiyetoro-Gbede); B (Anyigba); C (Koton-Karfe) and D(Alloma).The zones have 6 extension blocks (EBs) each with 8 cells per each block. Based on the concentration of oil palm processing activities, 3 zones: A,B and D were again purposively selected with 48 oil palm fruit processors for one zone and 96 respondents for each of the two remaining zones. Data were collected using structured questionnaire.

Data obtained were analyzed using descriptive statistics such as frequency distribution table, percentages and means. The level of awareness of the improved oil palm processing technology and level of adoption of the improved oil palm processing technology were determined using sigma scoring method/adoption score. The following steps were used:

Obtain the percentage of processors who used the improved processing technology.

$$\frac{\text{Number of processors using improved technology}}{\text{Total number of respondents}} \times 100 = A\%$$

This is followed by dividing the percentage (A %) by two and minus the answer from 100;

$$100 - (A\%/2) = B\%$$

Check B% on the statistical table of normal deviates to get the sigma distance (x). Next, increase the value of the sigma distance using a constant figure of 2 and multiplying the result by the same constant.

$$(\bar{x}+2) \times 2 = \bar{Y}$$

Sigma method assigns weight in reverse direction on a 10 point scale, the actual sigma score would be 10 minus the answer (Y).

$$10 - Y = Z$$

Decision Rule: Any mean score (Z) less than 5 is considered as low level of awareness/adoption of the improved oil palm fruit processing technology.

3.0 Results and Discussions

3.1 Socio-economic Characteristics of the Respondents.

In the study area, oil palm fruit processing venture or enterprise is done irrespective of sex. Table 1 shows that majority (60.42%) of the respondents were female, while 39.58% were male implying that a tangible fraction of men are involved in the processing of palm oil in the study area. This could be attributed to the nature of work done such as cooking palm fruits, manual fibre separation, washing of equipment and containers, cooking of crude oil for clarification, packing of oil fibre and nuts, which is socially regarded as female responsibility in our society. This finding is in consonance with that of Korie *et al.* (2013) who reported that the venture is mainly a female one. Nsoanya and Nenna (2011) equally reported the significant role played by women in the production and processing exercises even though they are traditionally not allowed to own lands especially by inheritance for cultural reasons.

The age distribution of the respondents Table 1reveals that the venture is in the hands of the matured and economically viable people whose ages range from 20 to 60 years. The average age of 43 years further supports the fact that the venture is in the hands of economic population. The youthful nature of the age distribution is also an added advantage in terms of longevity of the trade and the predisposition to innovation adoption. This finding agrees with that of Onoh and Peter – Onoh (2012) that majority of the oil palm farmers and processors fall within the agile and active age range of 40-60 years. To further buttress this finding, Rahman and Lawal (2003) asserted that age of farmer is said to influence farmer's maturity and decision making ability.

Table 1: Socioeconomic Characteristics of Palm Oil Processors

Variable	Frequency	%	Mean
Sex			
Male	95	39.6	
Female	145	60.4	
Age (Years)			42.8 (SD = 11.0)
20-30	39	16.3	
31-40	38	15.8	
41-50	87	36.3	
51-60	60	25.0	
61 +	16	6.6	
Household Size			7.8 (SD = 3.7)
<5	39	16.3	
5-10	136	56.7	
11-15	47	19.6	
16-20	16	6.6	
21+	2	0.8	
Marital Status			
Single	28	11.7	
Married	176	73.3	
Divorced	22	9.2	
Widowed	14	5.8	
Years of Formal Schooling			8.5 (SD = 5.7)
0	42	17.5	
1-6	17	7.1	
7-12	82	34.2	
13-18	84	35.0	
18+	15	6.5	
Experience			16.0 (SD = 9.3)
<5	14	5.8	
5-15	95	39.6	
16-25	74	30.8	
25+	57	23.8	
Extension Contact Per Year			7.7 (SD = 8.34)
<5	150	62.5	
5-10	75	31.3	
11+	15	6.2	

Source: Field Survey, 2012.

The bulk of the palm oil processors in the study area had household sizes ranging from 5 to 10 (72.92%). The average household size of 8 which is slightly higher than the national average of 7 and similar to the findings of Korie *et al.* (2013) suggests a high level of labour availability. According to Onuche, Opaluwa and Edoka (2014), household sizes have implications for labour availability and could influence the likelihood of innovation adoption especially in relation to the financial status of the family which is largely influenced by the age mixes in families.

The distribution of the respondents according to marital status presented in Table 1 reveals that majority (73.3%) of the oil palm processors in the study area were married. The high percentage score for married respondents is not surprising as is a very important institution and early marriage is very common in this part of the country (Nwachukwu and Jibowo, 2000). Very importantly, Voh *et al.* in Mohammed, Achem and Abdulquadri (2014) asserted that a married farmer is more likely to adopt improved agricultural technologies as he/she needs to feed more mouths, as marriage and adoption are supposed to be positively correlated.

Table 1 also shows that only about 17% of the palm oil processors in the area lack any form of formal education. The level of education in the study area as suggested by the average year of schooling of 8.5 years is at most moderate. Education is known to increase managerial and adaptive capacity of individuals and has been found to be one of the most important factors in innovation adoption process as well as in agricultural productivity (Opaluwa, 2014; Audu, 2012; Onuche, Opaluwa and Edoka, 2014; Ewuola and Ajibefun, 2000). Agwu (2006) attested to the finding that high literacy level has a positive effect on adoption of innovative oil palm practices. This is in consonance with earlier finding by Obinne (1991) that education is a factor in the adoption of high yielding modern technologies.

Table 1 equally relays that the average level of experience in palm oil processing as measured by years in which a respondent has been processing palm oil is 16 years. This suggests that the palm oil processors in the study area were largely experienced. Experience comes with time and has proven to be of great advantage especially as the level of mastery increases with it. Agbamu (2006) believes that experience impacts positively on innovation adoption.

Table 1 also shows that over 62.5% of the palm oil processors in the area had less than 5 contacts with extension agents in the course of the year covered by the study. Contact with extension workers is known to facilitate farmers' adoption of improved technologies (Zegeye, 1990; Onemolease and Alakpa, 2009). Such contacts by exposing farmers to availability of information can be expected to stimulate adoption (Voh, 1982).

3.2 Awareness of the Palm Oil Extraction Technology

Table 2 relays the awareness distribution of the palm oil extracting technology in the study area.

Table 2: Awareness Distribution of the Palm Oil Extraction Technology

Research Item	Frequency	Percentage (A %)	100(A%1) =B%	Sigma distance B% = x	Y=(x+2)x2	Actual sigmascore Z =10-y
Not aware	30	12.5	93.8	1.538	7.076	2.924
Aware	210	87.5	56.3	0.159	4.318	5.682
Total	**240**	**100**				

Source: Field Survey, 2012.

Table 2 shows that only about 12.5% of the palm oil processors in the study area were ignorant of the palm oil extraction machine. The remaining 87.5% were aware of the existence of the technology. The sigma score of 5.68 for those who were aware of the existence of the palm oil extraction technology confirmed a very high level of awareness. Awareness of a technology in the area is usually brought about by personal contact, mass media, print media and extension personnel (Adejoh, Edoka and Adah (2012) and is usually the first stage in the adoption process (Agbarevo and Obinne, 2010; Agbamu, 2006; and Obinne, 1989), leading to other adoption processes (Okunola, 2010).

3.3 Adoption of Palm Oil Extracting Machine

The distribution of the respondents according to whether or not they have adopted the innovation is captured in Table 3.

Table 3: Distribution of Respondents According to Adoption of the Technology

Research Item	Frequency	Percentage (A %)	100(A%1) =B%	Sigma distance B% = X	Y=(X+2)x2	Actual Sigmascore Z =10-y
Adopted	87	36.25	81.9	0.912	5.824	4.176
Not adopted	153	63.75	68.1	0.470	4.94	5.06
Total	**240**	**100**				

Source: Field Survey, 2012.

Data in Table 3 shows that while 36% of the respondents adopted the technology, 64% of them did not. The number of those who have adopted the technology is less than half of those who were aware (87.5%) of the technology. The adoption score of 4.176 for processors who adopted the use of the palm oil extraction technology revealed low level of adoption of the technology in the study area. This is low and in contrast with crop technology adoption. For instance, Bello *et al.* (2012) and Adejoh *et al.* (2012) have reported higher levels of adoption for crop technologies. It however agrees with the findings of Umeh and Obinne (1995) who indicated that the adoption of improved production techniques among small-scale farmers has often been found to be low. The low level of adoption of the palm oil extraction technology may not be unrelated to the high cost involved. Adetunji (2004) has relayed that economic, social, political and psychological factors have been identified as factors that could hinder the adoption of technologies. Related to this, Agwu (2006) posited that the low adoption levels could be attributed to high cost, unavailability, as well as complexity associated with the use of improved technologies.

4.0 Conclusion and Recommendations

The study has shown that oil palm fruit processors were aware of the improved oil palm processing technology. Despite this scenario, more than half of the processors could not adopt the innovation of the palm oil extracting

machine probably because of high cost of purchase, fuel (diesel) and maintenance. Consequentially, there could be gradual discontinuance of the use of the technology among the few processors that adopted. This calls for greater concern by all the stakeholders involved in the enterprise.

In the light of the above, improved oil palm processing technologies/machine should be made affordable to processors by way of subsidy policy as this would enhance prospective adoption of the technologies. The subsidy policy should also cover the maintenance spare parts. In addition, enough credit facilities with well relaxed conditionalities should be mounted for oil palm processors.

References

Adejoh, S.O.; Edoka, M.H. and Adah, O.C. (2012). Adoption of farm management techniques among rural farmers in Ankpa Local Government Area of Kogi State, Nigeria. *International Journal of Agricultural Economics, Management and Development*. 2 1-7.

Adetunji, M.O. (2004). Post-harvest technology as a panacea to food security and economic development. Paper presented at Regional Workshop on Food Security as a Panacea for Poverty Eradication and Development of Rural Economy. 2-3.

Agbamu, J.U. (2006). *Essentials of agricultural communication in Nigeria.* Lagos, Malthouse Press Limited. 47-81

Agbarevo, M.N.B. and Obinne, C.P.O. (2010). *Elements of rural sociology and agricultural extension.*Enugu, Teo Publishers. 118-124.

Agwu, A.E. (2006). Adoption of improved oil palm production and processing technologies in Arochukwu Local Government Area of Abia State, Nigeria. *Agro-science: Journal of Agriculture, Food, Environment and Extension* .5(1) 25-35.

Armstrong, R. (1998). Palm oil. The Australian National University, URL: Retrieved on 21st June, 2013 from *http://www.anu.edu.au/forestry/wood/nwfp/palmoil.html.*

Audu, S.I. (2012). Efficiency of resource use and profitability of small scale cassava production in Kogi State, Nigeria. *Unpublished PhD Thesis* submitted to the Department of Agricultural Economics and Extension, Kogi State University, Anyigba, Nigeria.

Bello, M., Dauda, S.; Galadimma, O.E., Anzaku, T.K.A. and Abubakar, A.A. (2012). Factors influencing adoption of crop based technologies in Jenkwe Development Area of Nassarawa State, Nigeria. *Global Advanced Research Journal of Agricultural Sciences.* 1 (18) 250-256.

Carrere, R. (2001). Overview of the oil palm issues world rainforest movement, Uruguay. Retrieved from *http://www.wrm.org.uy.plantations/material oilpalm4.html*

Ekine, D.I. & Onu, M.E. (2008). Economics of small-scale palm oil processing in Ikwere and Etche Local Government Areas of Rivers State, Nigeria. *Journal of Agriculture and Social Research (JASR).* 8 (2) 150-158.

Ewuola, S.O. and Ajibefun, I.A. (2000). Selected media and socioeconomic factors influencing adoption by small-scale farmers: Empirical evidence from Ondo and Ekiti States, Nigeria. *Applied Tropical Agriculture.* 1 24-26.

Gelder, J.W.V. (2004). *Greasy palms: European buyers of Indonesian palm oil.* The Netherlands, Profundo De Bloeman 24 1902.

Korie, O.C., Ejike, O.U., Orebiyi, J.S., Osuigiri, I.I., Saliu, O.J. and Otitolaiye, J.O. (2013). Evaluation of the traditional method of palm oil processing in Isu LGA of Imo State, Nigeria. *International Journal of Agricultural Economics, Management and Development.* 3 102 – 111.

Mohammed, B.T., Achem, B.A. and Abdulquadir, A.F. (2014). Factors influencing adoption of agricultural processing technologies developed by National Centre for Agricultural Mechanization (NCAM) in Ifelodun Local Government Area, Kwara State. *International Journal of Science and Research (IJSR).* 3(4) 413-417.

Nsoanya, L.N. and Nenna, M.G. (2011). Adoption of improved cassava production technologies in Anambra-East Local Government Area of Anambra State, Nigeria. *JORIND* 9(2) 36-43.

Nwachukwu, I. and Jibowo, A. (2000). Evaluation of the utilization of rice processing technology among women in the Central Zone, Nigeria. *Journal of Extension.* 4 63-69.

Obinne, C.P.O. (1989). Communication and adoption of improved cassava production technologies among small-scale farmers in Bendel State. *Unpublished Ph.D. Thesis.* Department of Agricultural Extension, University of Nigeria, Nsukka, Nigeria.

Obinne, C.P.O. (1991). Adoption of improved cassava production technologies by small-scale farmers in Bendel State. *Journal of Agricultural Science Technologies.* 1(1) 12-15.

Okunola, J.O. (2010). Factors influencing adoption of rubber based techniques among smallholder rubber farmers in Delta State, Nigeria. *Journal of Food, Agriculture and Environment.* 8(2) 91-94.

Olagunju, F.I. (2008). Economics of palm oil processing in Southwestern Nigeria. *International Journal of*

Agricultural Economics and Rural Development. 1(2) 69-77.

Onemolease, E.A. and Alakpa, S.O. (2009). Determinants of adoption decisions of rural youths in the Niger Delta Region of Nigeria. *Journal of Social Science* 20 (1) 61-66.

Onoh, P.A. and Peter – Onoh, C.A. (2012). Adoption of improved oil palm production technology among farmers in Aboh Mbaise Local Government Area of Imo State. *International Journal of Agriculture and Rural Development.* 15(2) 966-971.

Onuche, U., Opaluwa, H.I. and Edoka, M.H. (2014). Ill-health and agricultural production: Evidence from Kogi State of Nigeria. *African Journal of Food, Agriculture, Nutrition and Development.* 14(1) 8488-8503.

Opaluwa, H.I. (2014). Technical efficiency and resource use among maize farmers in Kogi State, Nigeria. *Unpublished Ph.D Thesis.* Department of Agricultural Economics and Extension, Kogi State University, Anyigba, Nigeria.

Rahman, S.A. and Lawal, A.B. (2003). Economic analysis of maize-based cropping systems in Giwa Local Government Area of Kaduna State, Nigeria. *International Journal of Agricultural Sciences, Science, Environment and Technology.*3 (2) 139 – 148.

Umeh, J.C. and Obinne, C.P.O. (1995). Extension systems adoption of agricultural innovation and food security in Nigeria: Empirical evidence from selected states. *Proceedings of the Second National Conference of Agricultural Society of Nigeria.*26-28 September, 85-91.

Voh, J.P. (1982). A study of factors associated with the adoption of recommended farmer practices in a Nigerian village: *Agricultural Administration.*2 17-27.

Zegeye, H. (1990). The adoption of modern farm practices in African agriculture: Empirical evidences about the impact of household characteristics and input supply in the northern region of Ghana. *Nyankpala Agricultural Report.* 7weikersheim, Germany: Verlag Josef Margraf Scientific Books.