

ADOPTION TREND OF IMPROVED OIL PALM FRUIT PROCESSING TECHNOLOGY IN KOGI STATE, NIGERIA.

***Adah, O.C., **Akor, J.A and **Ademu, A.**

*Department of Agricultural Economics & Extension,

Kogi State University, P.M.B. 1008, Anyigba

adahchris224@yahoo.com

08138676000

**Department of Agricultural Education,

Kogi State College of Education, Ankpa.

Abstract

The study analyzed the adoption trend of improved oil palm fruit processing technology in Kogi State, Nigeria (2007-2011). Using multistage sampling procedure, a sample of 240 oil palm fruit processors was selected from three out of four agricultural zones of the State. Data for the study were collected through the use of structured questionnaire. Mean, percentages, frequency distribution table, ranking, graph and sigma/adoption scoring method were used to analyze the data. The findings indicated that 63.75% of the respondents did not adopt the improved/machine technology. The adoption trend increased positively from 13.8% in 2007 to 27.6% in 2011. It was noted that although improved/mechanized processing technology enhances production, many processors could not afford the technology due to high cost. It was recommended that to increase the adoption rate of the technology, government should subsidize and supply the technology to the processors at affordable rates.

Keywords: Adoption, Trend, Improved Processing, Technology.

Introduction

Oil palm (*Elaeis guineensis*) is of the family *palmae* with about 228 *genera* and over 3000 species (Muhammed-Lawalet *et al.*, 2014). It is a perennial crop that originated in the tropical rain forest of West Africa, from where it spread to South America in the 16th century and to Asia in the 19th century (Ojoet *et al.*, 2014). According to Ekin and Onu (2008), oil palm is found in both wild groves and plantation in Nigeria. 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.

The importance of oil palm to the national economy of Nigeria cannot be

overstressed. This, according to Onoh and Peter-Onoh (2012), ranges from production of food for human consumption, employment, to income to farmers and nation and raw materials for industries. It has been a source of revenue to major segments of the rural population of Kogi East Nigeria. Apart from the red oil which is used for cooking on a daily basis, the kernel oil is used extensively for baking cakes, making ice creams, soaps and detergents. The kernel oil is also a component or ingredient of herbal medicine. According to Ayodele (2010), the leaves of oil palm are used for making brooms, roofing and thatching, basket and mats. The thicker leaf stalks are used for walls of village huts. The bark of the palm frond is woven into baskets. Realizing these landmark importance of the product, how to increase its production remains the focus of research. One and the only sure way of realizing this is the adoption of improved/mechanized processing technology. Hence, Korie *et al.* (2013) pointed out that the quality and quantity of palm oil and the earnings from its production depends on the method of extraction employed or its production techniques.

From the foregoing, it is a common knowledge that use of machines enhances production. In the study area, modern small-scale oil palm fruit processing machines known to be more efficient and effective are now sparingly available. Despite the little availability of the processing machines and the fact that oil palm processing is a major farming activity in the study area, oil palm processors (especially the large population of small-scale processors) are yet to significantly adopt improved oil palm fruit processing technology.

Adoption of new ideas or practices by individuals or groups of people is not very easy. Onoh and Peter – Onoh (2012) remarked that adoption is not a snap shot decision but a mental process over a period of time. According to Fregene *et al.* (2008), adoption process is a mental process through which an individual passes from hearing about an innovation to final adoption. The adoption of a practice is not a unit act and instantaneous; the farmer's decision to accept or reject adoption of science based production technology (as in improved oil palm processing technology) consists of several stages and involves sequence of thoughts and decisions.

The quality and quantity of palm oil processed in Kogi State through traditional/manual technology could be low compared with the production potential and capacity of the product in the study area. This is more so that its production is mainly in the hands of the many small-scale processors. It becomes relevant, therefore to determine the adoption status of modern processing technology as compared to local method, vis-à-vis

the adoption trend. Consequently, the following pertinent questions are raised: what is the adoption level of improved oil palm fruit processing technology in the study area? What is the adoption trend of the improved oil palm fruit processing technology from 2007-2011?

The objectives of this study therefore are to: determine the adoption level of the improved oil palm fruit processing technology in the study area; and describe the trend of adoption of the improved oil palm fruit processing technology from 2007-2011.

Methodology

The study area is Kogi State, Nigeria. It is the most centrally located of all the states of the federation. It shares common boundaries with Niger, Nassarawa States and the Federal Capital Territory to the North and Benue State to the East. To the West, it is bounded by Kwara, Ekiti and Ondo States and to the South by Enugu, Anambra and Edo States.

The state is made up of twenty-one (21) Local Government Areas (LGAs). They include Adavi, Ankpa, Ajaokuta, Bassa, Dekina, Yagba-East, Yagba-West, Ijumu, Kabba/Bunu, Kogi, Idah, Ofu, Igalamela/Odolu, Ibaji, Okene, Olamaboro, Okehi, Omala, Ogori-Magongo, Mopamuro and Lokoja LGAs.

Oil palm fruit processing is one of the major agricultural activities in the study area, particularly within the oil palm producing areas of the state, such as Ankpa, Dekina, Ofu, Anyigba, Kabba, Aiyetoro-Gbede, Egume, Ogugu, Okura, Alloma, Inye, Ogodu etc. Multistage sampling technique was used to select 240 oil palm fruit processors for the study. This was done based on the existing four (4) agricultural zones in Kogi State: Zone A (Aiyetoro-Gbede in Ijumu LGA); B (Anyigba in Dekina LGA); C (Koton-Karfe) and D (Alloma in Ofu LGA). 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 from Zone A and 96 respondents each from Zones B and D. Data collected were analyzed using mean, frequency, percentage, ranking, graph and sigma method of scoring adoption level designed by Agbamu (2006). This was used to ascertain the adoption level of improved oil palm fruit processing technology in the study area. In the method, ordinary frequency numbers or percentages were standardized by mathematical procedure in order to obtain normalized standard scores before using them in parametric statistical analysis. The percentage of the processors that adopted improved processing technology was first obtained by:

$$\frac{\text{Number of Adopters}}{\text{Total Number of Respondents}} \times 100$$

This is then followed by dividing the percentage by two and subtracting it from 100

and then use the statistical table of normal deviates to check the answer. To increase the magnitude of this sigma distance using a constant, we have $(\text{answer} + 2)^2$. Since the sigma method assigns weights in reverse relation on a 10 point scale, the actual adoption score would be 10 minus the answer (10-answer).

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

Results and Discussion

Adoption of improved/mechanized oil palm fruit processing technology

The distribution of the respondents according to whether or not they have adopted the palm oil extracting machine technology is captured in Table 1.

Table 1: Distribution of Respondents According to Adoption of the Technology

Research item	Frequency	Percentage	Adoption score
Adopted	87	36.25	4.176
Not Adopted	153	63.75	5.06
Total	240	100.0	

Source: Field Survey, 2012

Table 1 shows that while about 36.25% of the respondents adopted the technology, 63.75% of them did not. The adoption score of 4.176 for the adopters of the technology revealed low level of adoption of the technology in the study. This low level of adoption of the palm oil extraction technology may not be unrelated to the high cost of the technology (Adah and Obinne, 2015). According to Anagloet *al.* (2014), certain constraints faced by farmers, including processors do not allow them to fully adopt improved technologies and they include high costs of inputs and sometimes their unavailability. Onoh and Peter – Onoh (2012) earlier reported that lack of fund (75%) and poor extension contact (50%) were major constraints to adoption of improved oil palm production.

Adoption trend for the adopters of improved oil palm fruit processing technology

The trend of adoption of the improved oil palm fruit processing technology between 2007 and 2011 is presented in Table 2.

Table 2: Adoption Trend for the Adopters of Machine Technology (2007 -2011) (n=87)

Years of Adoption from 2007-2011	Years of use	Frequency	Percentage
2007	5	12	13.79
2008	4	15	17.24
2009	3	16	18.39
2010	2	20	22.99
2011	1	24	27.59
Total		87	100.0

Source: Field Survey, 2012.

Table 2 shows that the adoption and use based on the adopters found in the study area has been trending positively. This includes those who have continued to use the technology as well as the few that have discontinued its use. By 2007 only 13.8% of these adopters had adopted the technology. The number increased progressively to 87 as at 2011 when the data for this study were collected (see figure 1). Years of adoption/use of the improved oil palm fruit processing technology were computed from processors' responses in respect of when (in years) they started using the technology.

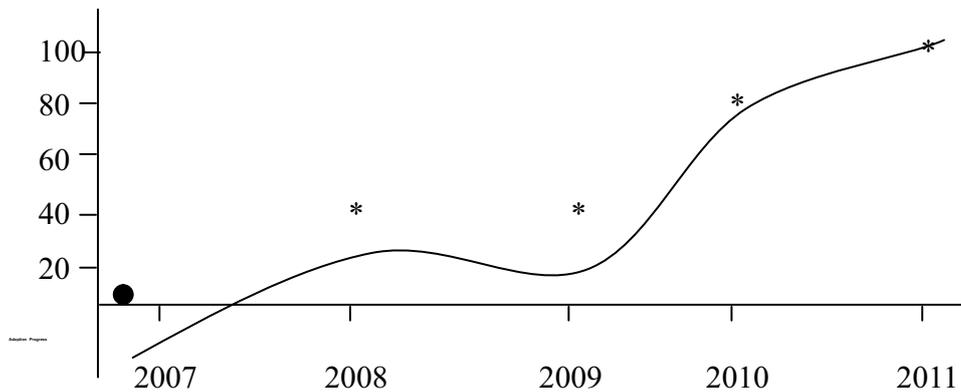


Figure 1: Palm oil extraction machine technology adoption progress for the study area (2007-2011)

The adoption trend for the adopters of palm oil extraction machine technology in the study area from 2007-2011 as shown in figure 1 agrees with the theory of the rate of adoption which states that innovations are diffused over time in a pattern that resembles an

S-shaped curve (Rogers, 1983). The theory is of the view that an innovation goes through a period of slow, gradual growth before experiencing a period of relatively dramatic and rapid growth. An S-shaped curve shows how rate of adoption might typically look like. The curve results from the fact that only a few members of the social system (oil palm fruit processors) adopted the technology in the early stage of the diffusion process. Hence, Fregene *et al.* (2008) noted that early adopters are more likely to be characterized by high socio-economic status, high integration into the social system, high exposure to mass media and interpersonal communication channels, and frequent engagement in information seeking. All these were pointers to the rate of adoption of the technology in the study area.

This is in consonance with the rate of adoption pattern which indicates that the relative speed with which members of a society adopt an innovation; whereby, an individual who first adopts an innovation (early adopter) requires a shorter adoption period than late adopters (Ayoola, 2012).

Conclusion and Recommendations

Adoption of improved oil palm fruit processing technology in the study area was low. This had been attributed to high cost of the technology. As a result of this scenario, the trend of adoption of the technology had been quite slow and gradual, but positive. To address this low rate of adoption, the improved processing/machine technology should be subsidized and supplied by government to the oil palm fruit processors at the rate affordable to them. In addition, government should make available to the processors, credit facilities of low/zero interest rates.

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