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CONSTRAINTS TO ADOPTION OF IMPROVED OIL PALM FRUIT PROCESSING TECHNOLOGIES IN KOGI STATE, NIGERIA

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Abstract

The study analyzed the constraints to adoption of improved oil palm fruit processing technologies in Kogi State, Nigeria. Using multistage sampling technique, 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 score was used for data analysis. Results show that 63.75% did not adopt the improved processing technologies. Findings also indicated that lack of capital ($\bar{x}$=4.3) ranked as the extremely serious constraint, followed by exorbitant cost of the technologies ($\bar{x}$=4.2) and exorbitant cost of fuel ($\bar{x}$ = 4.0). Inadequate technical know-how ($\bar{x}$ =3.91); high transport cost ($\bar{x}$ = 3.8) and inadequate extension service ($\bar{x}$= 3.7) also ranked very serious problems. Other problems that werejust serious included inefficiency of processing technology ($\bar{x}$ = 3.43), inappropriate method of processing ($\bar{x}$ = 3.43) and health problems ($\bar{x}$ = 3.41). Based on the identified constraints, it was recommended that Government and financial institutions should give sumptuous credit facilities to the farmers/processors in the oil palm ventures, among others.

Keywords: Constraints, Adoption, Oil Palm, Improved Processing, Technologies.

Introduction

Oil palm (*Elaeis guineensis Jacq*.) is a tropical forest palm native to West and Central Africa (Sheil *et al.*, 2009). According to Daluba (2007) it originated in South America and some parts of Africa. It is a perennial crop and belongs to the family *palmae* with about 228 genera and over 3000 species (Muhammed-Lawal *et al*. in Adah *et al*., 2020). Are *et al.* (2010) pointed out that oil palm is found growing in many parts of tropical West Africa, with its centres of production stretching from Senegal through the Republic of Benin and Nigeria, to the Congo and Angola.

Oil palm is globally known for its importance. It is the source of palm oil which serves as the main cooking oil in most of the countries where it is produced (Food and Agriculture Organization (FAO), 2005; Owolarafe and Arumughan, 2007). Just like other fats, palm oil is a good source of energy, provides carotenoids (pro-vitamin A), and tocopherol or Vitamin E (Babatunde, 1987). Oil palm is one of the world's main sources of edible and soap-making oil, and yields more oil per year than any other oil bearing plant (*Are et al.,* 2010).

According to Ekine and Onu (2008), palm oil has traditionally been and will remain an essential diet of the people of Nigeria. With an ever-growing population, domestic and industrial consumption of palm oil will continue to be on the increase (Omereji, 2005). On the same premise, Vogel (2002) pointed out that the local demand for palm oil is substantial. It is estimated that for every five people in Nigeria, perhaps two litres of palm oil or more are consumed each month for cooking. According to Owolarafe *et al.* (2008) processing of oil palm fruits into palm oil yields a lot of by – products including palm kernel, palm kernel cakes, palm fronds, palm bunch and palm trunk which have numerous domestic and industrial applications. Apart from the fact that about 80% of its production is destined for human consumption, the balance goes into animal feed and other industrial uses. Adah *et al.* (2020) remarked that it has been a source of revenue to major segments of the rural population of Kogi East, Nigeria.

Oil palm fruit processing is one of the major economic activities of the agrarian Nigeria. Processing of the palm fruits into palm oil involves series of activities, which include cutting of the palm bunches, transportation, loading and off-loading, stripping, sterilization and oil extraction (Ekine and Onu, 2008). In line with this, Owolarafe *et al.* (2008) pointed out that oil palm fruits processing involves five basic operations: fruit sterilization, fruit loosening/stripping, fruit digestion, oil extraction and oil clarification. Taiwo *et al.* (2000) and

Owolarafe *et al.* (2002) pointed out that machines for each of these processing technologies are available in different versions at the small scale level, but the whole is yet to be optimized due to costs. Whatever the scale and sophistication of the process, Kiple and Ornelas (2011) enumerated the following main steps are being required: separation of individual fruits from the bunch; softening of the fruit flesh; pressing out of the oily liquid; and purification of the oil. However, traditional which is purely manual as well as improved processing technologies are employed in oil palm processing.

Realizing the lifeline significance of oil palm and its products, how to increase its production remains the research focus. Hence, the adoption of improved processing technologies becomes very imperative. In consonance with this position, Adah (2020) pointed out that it is easy to infer that the speed and ease associated with the machine extraction of oil confers a great deal of advantage in production. It has been observed that the machine is able to extract more oil than when oil extraction is done manually. Further to this, even if the volume of palm fruit processed is the same for the two production techniques, the mechanized production technique is bound to yield more oil per time.

However, the oil palm processing industry has been facing some problems which need to be adequately tackled with a view to harvesting its prospects. According to Soyebo *et al.* (2005), the fundamental problems inhibiting oil palm/palm oil production include small farm size due to tenancy right characterized with leasing and rent, regular communal crises, negative attitude of land owners to farming because of the involved drudgery and long period of maturity of oil palm trees. Another problem that should be tackled is the high cost of borrowing for the industry which according to Alli (2004) needs to be reviewed in view of the long gestation period of the crop.

According to Chukwu and Nwaiwu (2012) contraints include; irregular power supply, poor extension contact, unproductive attitude of workers, lack of funds, lack of processing facilities, inadequate land spacing, processing techniques used and incompetent personnel. These constraints could lead to poor quality and quantity of palm oil produced which negatively affect the price of the product. From the foregoing, the following questions are pertinent: what is the adoption level of improved oil palm fruits processing technologies the study area? what are the constraints to adoption of improved oil palm fruit processing technologies in the study area? The objectives of this study therefore are to: determine the level of adoption of improved oil palm fruits processing technologies in the study area; and

identify constraints to adoption of improved oil palm fruits processing technologies in the study area.

Methodology

The study was carried out in Kogi State, North Central Nigeria. Kogi State has a total land area of 28,312.64km^2 which lies between longitudes 5^{0}18 E to 7^{0}54 E and 6^{0}30 N to 8^{0}42 N. Its annual rainfall ranges between 1016mm in the driest parts of the state to 1524mm in the wettest parts (Kogi State Agricultural Development Project, 1993).

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 comprises of three major ethnic groups namely; Igala, Ebira and Okun; and other minor groups such as Bassa-Nge, Bassa-Komo, Nupe, Kupa, Kakanda, Ogori-Magongo and Gwari. Majority of the people are farmers (Kogi State Agricultural Development Project, 1993).

The study area is made up of twenty-one (21) Local Government Areas (LGAs). They include Adavi, Ajaokuta, Ankpa, Bassa, Dekina, Ibaji, Idah, Igalamela/Odolu, Ijumu, Kabba/Bunu, Kogi, Lokoja, Mopamuro, Ofu, Ogori-Magongo, Okehi, Okene, Olamaboro, Omala, Yagba-East and Yagba-West LGAs. There are two distinct weather seasons in the state- dry and wet seasons. The wet season starts from the end of March and ends towards the end of October. The two most important rivers are Rivers Niger and Benue which form a confluence at Lokoja. Their numerous tributaries traverse across the length and breadth of the state.

Oil palm processing is one of the major agricultural activities in the study area, particularly within the oil palm belt of the state, such as Ankpa, Dekina, Anyigba, Egume, Kabba, Ogugu, Okura, Alloma, Inye, Ogodu etc. Arable crops farming is also practised in the area. There are four agricultural zones in Kogi State. They are Zone A (Aiyetoro-Gbede in Ijumu LGA), Zone B (Anyigba in Dekina LGA); Zone C (Koton-Karfe in Kogi LGA) and Zone D (Alloma in Ofu LGA).

Multistage sampling technique was used to select 240 oil palm fruit processors for the study. Based on the concentration of oil palm processing activities, Zones A, B, and D were purposively selected with 48 oil palm fruit processors from Zone A and 96 respondents each from zones B and D. Data were analyzed using frequency, percentage, sigma method of scoring adoption level (Adah *et al*., 2020) and mean score. The constraints limiting the

adoption of improved oil palm processing technologies were measured on a 5-point Likert scale as follows: Strong Agree with a score of 5; Agree (4); undecided (3); disagree (2); and strongly disagree (1). A mean score of 3.0 and above implies that the constraint is serious while a score below 3.0 means the constraint is not serious.

Results and Discussion

Level of adoption of improved oil palm processing technologies

Table 1 shows the distribution of the respondents according to their adoption status.

Data from Table 1 show that out of 240 respondents, only 87 (36.25%) adopted the improved processing technologies, while majority (153) representing 63.75% did not adopt. The adoption score of 4.176 for processors who adopted the use of improved processing technologies revealed low level of adoption of the technologies in the study area. These findings agree with that of Umeh and Obinne (1995) who reported that the adoption of improved production technologies among small scale farmers has been found to be low. This low level of adoption may not be unrelated to high cost of the technologies, among others(Adah and Obinne, 2015). 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.

Table 1: Distribution of Respondents According to their Adoption Status

Status	Frequency	Percentage	Adoption Score
Adopted	87	36.25	4.176
Not adopted	153	63.75	5.06
Total	**240**	**100.0**	

Constraints to adoption of improved oil palm processing technologies in the study area.

Table 2 shows that lack of capital was ranked as the extremely serious problem as reflected by the highest mean score value of 4.3. This is in line with the suggestion of Agwu (2006) that provision of subsidies on agrochemicals and financial support to farmers are ways of removing constraints facing the oil palm farmers in Arochukwu Local Government Area of Abia State, Nigeria. This is equally in line with the discovery of Mbah (2008) that capital is still a major hindrance in increased rural production in Owerri, Nigeria. This buttresses the importance of credit availability. The finding, also, supports Meludu and Idio (2004), Ogunbameru (2005) and Nenna *et al.* (2009) who observed that under-funding and downward growth in budgetary allocation to agricultural sector as well as mismanagement

and misappropriation had denied the Nigerian farmers/processors the ability to effectively meet with their needs and aspirations. It means capital is still a major obstacle to increased rural production.

Problem	SA (5)	A(4)	U(3)	D(2)	SD (1)	Total Sum of Attitude Score	Mean Score
Lack of capital	41	38	5	0	3	375	4.31
Exorbitant cost of technologies	32	43	7	4	1	362	4.16
Exorbitant cost of fuel	28	39	16	4	0	352	4.05
Inadequate technical knowhow	37	24	10	13	3	340	3.91
High transport cost	24	35	17	7	4	329	3.78
Inadequate extension services	21	34	17	12	3	319	3.67
Technologies risk/danger in processing	21	27	20	15	4	307	3.53
Inefficiency of processing tech.	21	28	13	18	7	299	3.43
Inappropriate method of processing	20	26	17	20	4	299	3.43
Health problems/hazards	19	29	17	13	9	297	3.41

Exorbitant cost of technologies was, also, ranked as an extremely serious problem. It had a mean score of 4.2. Adah *et al.* (2020) reported that the low level of adoption of improved oil palm processing technologies in a study might not be unrelated to the high cost of such technologies. In a study on production and profitability analysis of adopters and non-adopters of improved oil palm fruits processing technology in Kogi State, Adah (2020) found that the adopters were relatively few due to the unaffordability of the technologies. In earlier findings, Oladele and Kareem (2003), Agwu (2006), Anyaegbunam *et al.* (2009) and Anaglo *et al.* (2014) relayed that high cost of the technology and sometimes unavailability hindered adoption of improved oil palm processing technology. Exorbitant cost of fuel with a mean score of 4.0 was, also, ranked as extremely serious problem.

Inadequate technical know-how with a mean score of 3.91, also, ranked a very serious problem. Related to this Agwu (2006) and Ani (2007) among others, posited that the

complexity associated with the use of improved technologies hindered their adoption. High transport cost with a mean score of 3.8 was rated as a very serious problem. The implication is that a poor transport system hampers the movement of people, inputs and products in agriculture. It also, leads to increase in the prices of products. This result agrees with the findings of Onuk *et al.* (2010) who established that the inadequacy of transportation facilities was a major problems facing farmers in Mangu LGA of Plateau State, Nigeria.

Inadequate extension service with a mean score of 3.7 was ranked as a very serious problem. This result agrees with that of Abo and Ekpo (2012) in their study of effect of extension communication on farmers' adoption of sustainable agricultural technologies. They stressed that extension communication has important roles to play in increasing farmer's adoption of sustainable agricultural technologies. Other constraints include inefficiency of processing technologies with a mean score of 3.43, inappropriate method of processing with a mean score of 3.43 and health problems with a mean score of 3.41).

Conclusion and Recommendations

Oil palm processing activities have been found to flourish very well in the study area. The adoption of this technologies in the study area was low due to array of constraints. They ranged from lack of capital, exorbitant cost of the technology and fuel, inadequate technical know-how, high transport cost, inadequate extension services etc. To address these constraints, government and financial institutions should give sumptuous credit facilities to properly identified oil palm processors. Such credit facilities will enable the processors overcomethe constraints of exorbitant cost of the technologies, fuel and transport. In addition, adequate extension services should be provided for the processors efficiency and know-how.

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