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SOCIOECONOMIC DETERMINANTS OF PALM OIL PRODUCTION IN IGBO ETITI LOCAL GOVERNMENT AREA IN ENUGU STATE, NIGERIA

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Abstract

Extant studies have established that Nigeria has lost its place as the global largest producer of palm oil. However, there seems to be a dearth of studies on how the socioeconomic variables of producers affect palm oil production. Consequently, this study analysed the socioeconomic determinants of palm oil production in Igbo Etiti Local Government Area (LGA) in Enugu State, Nigeria. Combinations of multi-stage random and purposive sampling procedures were used to select 120 small-scale palm oil producers. The data collected using a structured questionnaire was analysed with the aid of descriptive statistics of mean, frequency and percentage, and inferential statistical tools of OLS regression and principal component factor analysis. The results reveal that more women (74.2%) dominated palm oil production in the area. The age bracket of most (41.7 %) palm oil producers was between 46-65 years. The overwhelming proportion (70.8%) of the respondents were married with 50.8 percent of them having a household size of between 1-4 persons. The educational level attained by most of the respondents (70.8%) was primary education. 62.5 percent of the respondents had been involved in palm oil production for over 10 years. While the overwhelming proportion (80.8%) of the respondents were not members of cooperative societies. The study found age, education attainment, household size, farming experience, income, and extension contact as the socioeconomic determinants of palm oil production. The study identified financial and institutional factors as the principal factors and constraints to palm oil production in Igbo Etiti LGA of Enugu State. The study concludes that these variables are critical to improving the output of palm oil production in the area. Thus, this should form part of the critical issues to be included in any policy development that targets improvement in palm oil production.

Keywords: ***Palm oil production, constraints, socioeconomic variables, principal component analysis, OLS regression***

1. INTRODUCTION

The oil palm tree is one of the most important tree crops in Nigeria which has contributed greatly to the economic development of the country. According to Nwibo and Odoh (2014), oil palm (*Elaeis guineensis*) is the most important economic tree in the rural economy of the humid rainforest of South Eastern Nigeria. Generally, the oil palm tree is considered a complete plant because all the products and by-products derived from the tree possess commercial value. Hence, no part of the tree is wasted. Palm oil is processed from the fruit of the oil palm. The oil is consumed as household food, used for industrial purposes, and is an important export commodity for foreign exchange earnings in Nigeria. Its production and processing provide employment for many rural populations in the producing areas.

Processing of fresh oil palm fruit bunches for edible oil has been practiced in Nigeria and other West African countries for thousands of years and the oil produced, which is highly coloured

and flavoured is an essential ingredient in most of the traditional West African Countries (Food and Agriculture Organisation (FAO), 2002). Palm oil is rich in arytenoids (pigments found in plants and animals) from which it derives its deep red colour and the major component of its glycerides are saturated fatty acid (FAO, 2002). It is also used as an energy source in livestock feed. Industrially, it is used in the manufacturing of detergents, cosmetics, shoe polish, magazines, and candle sticks (Nwibo and Odoh, 2014).

Palm oil is processed using different techniques, ranging from modern, semi-modern to traditional methods. However, the traditional method of palm oil processing is more prevalent among small-scale producers who are responsible for the bulk of palm oil processed in Nigeria (Olagunju, 2008). Although the traditional method of palm oil production has been described as labour-intensive and inefficient (Huen and Modo, 2000). Similarly, Bamidele (2015) reported that traditional technologies are labour-intensive and have a relatively low extraction efficiency of about 55 percent. According to Akande *et al*. (2013), 80 percent of palm oil produced in Nigeria comes from dispersed smallholders who harvest semi-wild plants and use manual process techniques. Several million smallholders are spread over an estimated area ranging from 1.65 million hectares to 2.4 million hectares and to a maximum of 3 million hectares.

Available data have shown that the volume of palm oil production in Nigeria has drastically reduced. This situation has been brought about by a number of socio-economic and political factors along with technological know-how in the industry (Adah, Akor and Ademu, 2022). Factors responsible for this decline include the technical and productive inefficiency that exists in the production system for palm oil (Ukpabi, 2004). Such inefficiencies arise from the high cost of labour, lack of linkage roads for transportation, poor electricity, lack of potable water, inadequate credit facility and lack of improved equipment for production (Oyaide, 2004). In addition, to the agro-climatic and structural factors (size and scale of production and processing sectors), there are other environmental and co-ordination factors like access to modern inputs and extension service, previously controlled by monopoly marketing board, and poor-quality control that affect palm oil production in Nigeria (Chiemela *et al*., 2021).

The increase in demand for palm oil necessitated the improvement of the crop, the method of cultivation and ways of tapping its vast potential. To accomplish this, the Nigerian Institute for Oil Palm Research (NIFOR), formerly, West African Institute for Oil Palm Research (WAIFOR) was established in Benin City, Edo State (Ikuenobe, 2010). The institute embarked on various experiments to develop, breed and adapt the crop to Nigeria's environment as a way to resuscitate the ailing palm oil industry. The institute has produced several improved seedlings of oil palm. They also made efforts to improve traditional milling processes by producing simple and affordable small-scale milling machines. Despite this effort, the Nigerian palm oil output is not matching demand both in the domestic and international markets.

Extant studies have established that Nigeria has lost its place as the global largest producer of palm oil (Nwibo and Odoh, 2014; Chiemela *et al*., 2021; Adah *et al*., 2022). However, there seems to be a dearth of studies on how the socioeconomic variables of producers affect palm oil production. Existing scholarly studies tend to focus on the agronomic and climatic factors affecting palm oil production (Ukpabi, 2004) with little or no attention given to the socioeconomic determinants. It is against this backdrop that this study examined socioeconomic determinants of palm oil production in Igbo Etiti Local Government Area in Enugu State, Nigeria. Specifically, the study described the socio-economic characteristics of palm oil producers, analysed the socioeconomic determinants of palm oil production in the area, and determined constraints to palm oil production in the study area. The relevance of this study lies not only in the identification of different factors affecting palm oil production but also in determining critical socioeconomic variables of possible intervention to enhance palm oil production in Nigeria.

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2.METHODOLOGY

2.1.The Study Area

The study was conducted in Igbo Etiti Local Government Area (LGA) in Enugu State, Nigeria. The area is situated in Enugu East Agricultural zone of Enugu State. It is made up of thirteen (13) autonomous communities namely: Aku, Diogbe, Ekwegbe, Ikolo, Ochima, Ochebe Ohodo, Onyohor, Ozalla, Udueme, Ukehe, Umuna and Umunko. The local government has a population of 209,248 inhabitants who are mainly farmers (NPC, 2006). The local government has two distinct weather seasons, namely; the rainy season (April- October) and the dry season (November-March). The annual rainfall ranges from 750 to 1200 mm with a mean temperature of 35^0C. The most important geographical feature of the area is Ukopi River located in Ekwegbe community and Adada River located within Aku community. One of the important economic activities of the people is oil palm production and processing into palm oil and palm kernel while farming remains the major economic activity of the people. Cocoyam, cassava, yam, groundnut oil, black beans, and maize are the common major crops produced in this area. The people equally rear livestock such as sheep, the indigenous breeds of cattle, goats, poultry, and pigs.

2.2.Sampling Techniques

Combinations of multi-stage random and purposive sampling procedures were used to select the small-scale palm oil producers. Both male and female farmers were given an equal chance of being selected. The selection was done using the following stages: Firstly, the random selection of 4 (four) autonomous communities out of thirteen (13) autonomous communities in the local government area. Secondly, the random selection f 3 (three) villages in each autonomous community were selected to give a total of twelve (12) villages. Thirdly, the purposive selection of ten (10) small-scale palm oil producers from each village, to give a total of one hundred and twenty (120) respondents who formed the sample size for the study.

2.3.Method of Data Collection

Data for this study were collected from primary source only. This was done with the use of questionnaire which was augmented with interview schedule for the sake of illiterate farmers.

2.4.Analytical Techniques

The data collected for this study were analyzed using descriptive and inferential statistics. Specifically, objective I was analyzed using descriptive statistics such as mean, frequency and percentage. Objective II was actualized using OLS regression analysis while objective III was analyzed using inferential statistics of principal component factor analysis.

2.5.OLS Regression Model Specification

$y = f(x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8)$ … Implicit function

$y = A_0 + A_1X_1 + A_2X_2 + A_3X_3 + A_4X_4 + A_5X_5 + A_7X_7 + A_8X_8 + \text{et}$ …

Explicit function

Where:

Y = Profit from the small-scale palm oil production (Naira)

X_1 = Gender (dummy) male = 1, female = 0

X_2 = Age (yrs)

X_3 = Martial status (dummy) married = 1, not married = 0

X_4 = Educational qualification (number of years spent in formal schooling)

X_5 = Household size (number)

X_6 = farming experience (yrs)

X_7 = Annual income (Naira)

X_8 = Extension contact (Yes = 1, No = 0)

$a_1 = a_8$ Regression parameters

a_0 = Constant.

et = Stochastic disturbance/Error term

3.RESULTS AND DISCUSSION

3.1.Socio-Economic Characteristics of the Respondents

The socio-economic characteristics of palm oil producers were considered. The result shows that the majority (74.2%) of the respondents were females while the rest (25.8%) were males. This implies that palm oil production is dominated by females in the study area. This is because most rural women are involved in palm oil production as a means of income generation. The age bracket of most (41.7 %) palm oil producers was between 46-65 years; while a few (19.2 %) were more than 65 years. This implies that most of the palm oil producers in the study area are still within their productive age which enables them to participate in such vibrant economic activity. Odoh, Nwibo, Eze and Igwe (2020) recognized that at this stage in life, people are more likely to be energetic and have the capacity to use innovations. The overwhelming proportion (70.8%) of the respondents were married; whereas a few (13%) were not married. Thus, married couples dominate palm oil production in the study area. Apparently, they engage in this economic venture as a means of generating income to meet up with their household responsibilities. The household size of most of the respondents, 50.8 percent fell within the range of 1-4 persons; while 13.3 persons had a household size of between 5 and 7 persons.

The educational level attained by the majority of the respondents (70.8%) was primary education while a few (1.6%) completed tertiary institutions. This suggests a low level of education among the respondents although this level is enough to equip one with the ability to read and write which is essential for meaningful engagement in palm oil production. The farm size of the respondents shows that 43.3 % of the respondents possess a farm size of between 2-4 hectares; while few (5%) had a farm size of above 6 hectares. This attests to the level of the operation of the palm oil producers, which is mostly on a small-scale level. The farming experience of the respondents indicates that the majority (62.5%) had been involved in palm oil production for over 10 years, while a few (7.5%) percent had a farming experience of below 5 years. This suggests producers that are equipped with reasonable experiences, which is vital for engaging in palm oil production. The majority (80.8%) of the respondents were not members of cooperative societies; while few (19.2%) were members of cooperative societies. Apparently, the producers lack the collective bargaining power to fix the prices of their products since they operate on an individual basis. The annual income shows that 43.3 percent of the respondents earned between ₦101,000-₦150,000 per annum; whereas 5.83 percent earned below ₦50,000. This shows that most of the respondents are low-income earners. The sources of labour for palm oil production show that 42.5 percent of the respondents employed hired labour, apparently due to the unavailability of family labour as only 20.0 percent of them engaged in family labour.

Table 1: Socio-economic Characteristics of Palm Oil Producers

Socio-economic characteristics	Frequency	Percentage
Gender		
Male	31	25.8
Female	89	74.2
Age (years)		
< 25	0	0
25-45	47	39.2
46-65	50	41.7
>65	23	19.2
Marital Status		
Single	16	13.3
Married	85	70.8
Divorced	19	15.8

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Household Size		
1-4	61	50.8
5-7	43	35.8
>7	16	13.3
Educational level		
No formal education	5	4.2
1-6	85	70.8
7-12	20	16.7
13-16	6	5
>16	2	1.6
Farm Size		
1	51	42.5
2-4	52	43.3
5-6	11	9.2
> 6	6	5
Farming Experience (yrs)		
≤ 5	9	7.5
6-10	36	30
>10	75	62.5
Cooperatives Membership		
Members	97	80.8
Annual income (₦)		
>₦50, 000	7	5.83
₦ 51,00 – ₦ 100200	31	25.83
₦ 101,000 - ₦ 150, 000	52	43.33
₦ 151,000 - ₦700,000	20	16.67
Above ₦ 201,000	10	8.33
Sources of labour used		
Family labour	24	20.0
Hired labour	51	42.5
Both family and hired labour	45	37.5

3.2.Socio-economic Determinants of Palm Oil Producers in the Study Area

Ordinary least square multiple regression analysis was done to determine the determinants of the socio-economic variables of the participants that influence the quantity of palm oil produced in the area. A coefficient of multiple determination (R^2) of 76% was obtained from the regression analysis. This showed that 76% of changes observed in the quantity of palm oil produced were caused by the combined effects of socio-economic variables included in the model. The statistical reliability of the result was shown by the low value of the standard error of the estimates which was 0.38351. Overall, the model was statistically significant ($p < 0.05$), signifying that the socioeconomic variables of the producers exert a significant influence on the quantity of palm oil produced in the area.

The coefficient age of the respondents was negatively signed but statistically significant at a 5 percent level of significance. Although the result indicates that aging comes with declining palm oil production but it is an important determinant of palm oil production. Younger producers are more predisposed to produce a higher quantity of palm oil than their aged counterparts. Perhaps, due to the energy demands of palm oil production (Ebe *et al*., 2018). Besides, Eze and Nwibo (2014) acknowledged that younger people are more energetic and have the capacity to use

innovation than older people. The marital status of the respondents increases the quantity of palm oil although it was statistically insignificant. Thus, married producers produce a higher quantity of palm oil when compared to their unmarried counterparts.

The coefficient of education attainment was positively and significantly ($p<0.05$) related to palm oil production, indicating that educated producers have higher palm oil output. A similar report has been credited to Adah *et al*. (2022) who a positive and significant correlation between education level and the adoption of improved oil palm fruits processing technology in Kogi State, Nigeria. Education enhances one's perception and makes one receptive to changes (Eze and Nwibo, 2014), leading to the adoption of innovations, which ultimately improves palm oil production. This is in consonance with the finding of Ebe *et al*. (2018) who reported that education plays a vital role in palm oil production and processing in Ondo State of Nigeria.

The household size of the producers has a positive and statistically significant ($p<0.05$) influence on palm oil production. Thus, producers with a large household size have higher palm oil output when compared to those with small and/or no household size. Apparently, members of the family serve as free labour for the production of palm oil (Eze *et al*., 2023), which results in higher output.

Farming experience shows statistically significant ($p<0.05$) and positively correlated with output palm oil production. This is in tandem with the finding of Adah *et al*. (2022) who found a positive and significant relationship between processing experience and the adoption of improved oil palm fruits processing technology in Kogi State, Nigeria. Apparently, the expertise gathered over the years of engagement in farming activities is brought to bear on palm oil production which contributes to higher output. The finding is in tandem with that of Ini-mfon *et al*. (2013) who reported that an increase in experience in palm oil processing promotes the performance of the business.

The respondents' annual income exerts a positive and statistically significant ($p<0.01$) influence on the quantity of palm oil produced. Producers who earn a high income are better suited to expand and meet the operational cost of palm oil production, including the procurement and adoption of innovations, which leads to increased output. Extension contact indicates statistically significant ($p<0.05$) and positively correlates with an output of palm oil production. Access to extension exposes one to novel practices and technologies, which overall effect, is improvement in palm oil output. This agrees with the finding of Adah *et al*. (2022) who found a positive and significant relationship between extension contact and the adoption of improved oil palm fruits processing technology in Kogi State, Nigeria.

Table 2: OLS Regression Analysis of the Influence of Socio-economic Characteristics of Palm Oil Producers on the Quantity Produced

Variable name	Regression coefficient	Standard error	T – value	
Constant	4.278	0.401	5.685	***
Gender	-0.006	0.008	-0.680	NS
Age	-0.013	0.011	-1.204	**
Marital Status	0.005	0.007	0.625	NS
Education	0.472	0.053	8.961	***
Household Size	1.000	0.000	1.530	***
Farming Experience	0.014	0.009	1.552	***
Annual Income	0.060	0.118	.510	**
Extension Contact	0.499	0.087	5.758	***
R^2	0.766			
Adj R^2	0.749			
Std. error of estimates	383			

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Note: *** and ** signify significance at 1% and 5% levels of probability while NS indicates Not Significant

3.3.Constraints to Palm Oil Production

Table 3 shows the varimax rotated matrix on constraints to palm oil production in Igbi Etiti LGA of Enugu State. Based on items that clustered and loaded high, two (2) factors were identified and extracted, namely; financial (Factor I), and institutional (Factor II). These two, therefore, represent the principal factors and constraints to palm oil production in Igbo Etiti LGA of Enugu State. From the result, financial factors constraining palm oil production were: lack of capital (0.583), land hold system (0.462), high cost of machines/equipment (0.503), low access to credit (0.595), and high cost of labour (0.627). Institutional factors which arose out of poor and lopsided government policy for improving palm oil production were: inadequate government policies, poor information (0.412), and inadequate technologies (0.877). Enwelu *et al*. (2013) found that high cost of land, and lack of access to credit are among the challenges of smallholder palm oil producers in Awka Agricultural zone of Anambra State, Nigeria.

The government of Nigeria has since shifted attention from the agricultural sector to crude oil since its discovery. The Nigerian government expenditures for agriculture continue to fall far below the African Union target of 10 percent of total annual budget expenditures. Nwoko *et al*. (2018) found that the federal government of Nigeria's budgetary allocation to agriculture ranged from as low as 0.8 percent to a highest of 1.8 percent, except in one outlier year (2009) when disbursements shot up to 5.8 percent. This was rightly noted by Biodiin *et al*. (2021) who observed that financial support to palm oil producers has been grossly inadequate, which constitutes a major impediment to palm oil production in Nigeria. Thus, the low budgetary allocations coupled with much lower actual expenditures are responsible for the underdevelopment of agriculture including palm oil production in Nigeria.

Poor institutional support for palm oil production in Nigeria can have significant negative effects on the overall economy of the country. This can lead to low productivity, food dependence, heighten poverty among farm-dependent families, impede value addition and export potential, increase unemployment and rural-urban migration, and continues dependency of the country on food imports (Nwibo *et al*., 2018). Thus, improving institutional support for palm oil development in Nigeria is critical for addressing these challenges. It requires investment in infrastructure, access to credit, research, and development, extension services, market linkages, and policy reforms to create an enabling environment for producers and agribusinesses to thrive.

Table 3: Varimax Rotated Component Matrix on Constraints to Palm Oil Production

Variables Names	Constraint 1	Constraint 2
Gender Issues	-0.511	-0.441
Inadequate Government Policies	0.100	0.545
Poor Information	-0.184	0.412
Inadequate Technologies	0.246	0.877
Lack of Capital	0.583	0.148
Land hold system	0.462	0.117
High Cost of Machines and Equipment	0.503	-0.384
Low Access to Credit	0.595	-0.087
High Cost of Labour	0.627	-0.284
Inadequate Acquisition Opportunities	0.142	0.187

4.CONCLUSION

This study analysed socioeconomic factors influencing palm oil production in Igbo Etiti LGA of Enugu State, Nigeria. The study concludes that the socioeconomic determinants of palm oil production include age, education attainment, household size, farming experience, income, and extension contact. These variables are critical to improving the output of palm oil production in the area. Thus, this should form part of the critical issues to be included in any policy development that targets improvement in palm oil production. Moreover, the identified financial and institutional constraints limiting the activities of palm oil producers in the area should be factored in and addressed headlong. The study recommends the inclusion of these socioeconomic variables in making policies for the promotion of palm oil production in Nigeria. For instance, structural reforms that will enhance producers' access to extension services are crucial for promoting palm oil production.

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