Economic Analysis of Oil Palm Production in Surulere Local Government Area of Oyo State, Nigeria.

*AKINNIRAN T. N., I. K. OJEDOKUN, W. A. SANUSI and M. O. GANIYU
DEPARTMENT OF AGRICULTURAL ECONOMICS, LADOKE AKINTOLA UNIVERSITY OF
TECHNOLOGY, P. M. B. 4000, OGBOMOSO, OYO STATE, NIGERIA.
*Correspondence author
e-mail: *tnakinniran@lautech.edu.ng and ojedokunidris@yahoo.com

ABSTRACT

This study determines the economic analysis of oil palm production in Surulere Local Government Area, Oyo State, Nigeria. The population of the study comprises oil palm tree farmers. Multistage sampling technique was adopted to select 125 respondents. Primary data were obtained using a well-structured interview schedule while descriptive and inferential statistics were used for the analysis. The descriptive statistical tools such as mean, frequency distribution, table, percentages, were used to present the socio-economic characteristics of the respondents. The inferential statistical tools; budgetary analysis and regression analysis were employed to measure the profitability of oil palm production and dependence of oil palm output on various inputs used respectively. The result of the findings revealed the socio-economic characteristics of the respondents in the study area as follows; 84.0% were male, 58.4% were within the age range 41-50 years while, 84.0% were married and 67.2% of the respondents had primary education. More than three-quarter (88.8%) practice Christianity, 51.2% have experience within the range of 31-40 years, 55.2% occupy farm size which ranges from 6-10 acres, and 88.8% of them applied fertilizer obtain them from government. All the farmers inherited their land and involved in other occupation. Also, they obtained funds from their previous savings, and utilized hired labour. All farmers in the study area utilized chemical, obtained seedlings from government, though 54.4% of them did not belong to any farmers association. Obsolete technology, low investment level and late arrival of inputs were the major problems faced by the farmers in the study area which government should ensure timely provision of necessary inputs required by farmers for production.

Key words: Production, Oil palm, budgetary analysis, price and profitability.

Introduction

The oil palm (*Elaeis guineensis*) is an ancient plant originated from and grown in tropical rain forest region of West Africa. The oil extracted from its fruits has been used as food and medicine through ages. The oil palm now spreads from 16^oN in Senegal to 15^oS in Angola and eastward to Zanzibar and the Malagasy Republic. However, the main oil palm belt of West Africa runs through the Southern latitude of Sierra Leone, Liberia, Ivory Coast, Ghana , Togo, Benin, Nigeria, Cameroon and into the equatorial region of the democratic Republic of Congo and Angola between latitude 10^oN and 10^oS 9 (Atinmo, 2003). During the 14th to 17th centuries, some palm fruits were taken to the America from there to the Far East (FAO, 2002).

In 1848, the Dutch brought the first African oil palm seedlings to the Far East that spawned the Southern Asia oil palm industry. Palm trees may grow up to 60 feet and more in height. The trucks of young and adult plants are wrapped in fronds which give them a rough appearance. The older trees have smoother trunks apart from the marks left by the fronds which have withered and fallen off. Oil palm is monoecious plant that bears both male and female flowers on the same tree. Each tree chess of fruit-lets weighing about 10 to 40kg with 1000 to 3000 fruit-lets per bunch. Each fruit-lets is spherical or elongated in shape with a dark purple colour and turns orange red when ripe and its weight ranging from 6 to 20gm.it consists of an outer skin (the exocarp, a purple (mesocarp) containing the palm oil in a fibrous matrix, a central nut consisting of a shell (endocarp) and the kernel itself which produces an oil quite different to palm oil but resembling coconut oil. A normal oil palm tree starts bearing fruits 30 months after planting and continues to be productive for about 20 to 30 years. Each ripe bunch is commonly referred to as Fresh Fruit Bunch (FFB). The oil palm fruit is an oval-shaped drupe, 2.5 by 5cm and with a diameter of about 2.5cm. There are three types of fruits that can be recognized according to the thickness of the shell: Dura (with a shell thickness of 2-8mm), Pisifera (without any shell), and Tenera (which is a hybrid from Dura and Pisifera) with a shell thickness of 0.5-3mm with a much thicker mesocarp.

All breeding and planting now use the Tenera breed, the fruits of which have a much higher native content of palm oil than Dura. Modern high yielding varieties developed by breeding programs, under ideal climatic conditions and good management are capable of producing in excess of 20tons of bunches/ha/yr with

palm oil content of 25%. This is equivalent to a yield of 5 tons of oil/ha/yr. (including the palm kernel oil) which far outstrips any other source of edible oil. The ideal composition of palm fruit bunch is as follows: Bunch weight (23-27kg), Fruit/bunch (60-65%), Oil/bunch (21-23%), Kernel/bunch (5-7%), Mesocarp/bunch (44-46%), Mesocarp/Fruit (21-22%) and Shell/fruit (10-11%)

Palm oil appears as one of the most promising productive alternatives for the Nigerian agricultural sector and long term industrialization. But given the present output level of oil palm products, it is clear that Nigeria is supplying below the quantity demanded and it necessitates the importation of the products. Though many researches have been conducted to show the profitability of oil palm production, so also, past production data revealed that many countries are doing well in their production and this is an additional evidence to show that oil palm production is profitable. The present record of the demand for crude palm oil and other oil palm products such as palm kernel cake, palm kernel oil etc. for domestic and industrial use were not kept pace which the supply.

Following the low supply of oil palm products in Nigeria, the country has been somewhat dependent on importation to augment local supply. Over the years, local supply has actually stalled, contracting -1.2% per annum to 1.1mt in 2010 from 1.17mt in 2005. This is majorly determined by low technological inputs, majority of producers are small holders, limited access to credits, scattered farm settlements and slow growth in farm acreage, reduction in yields as a result of poor farm to market turnover, underpinned by transportation challenge and poor road network (Equity research 2012). According to (Sade, 2009), the key factors which affect the pricing of oil palm products in Nigeria are: movement of global price of crude palm oil and existing weather conditions.

The uses of Oil palm today produces the largest quantity of vegetable oil in the world in terms of production i.e. 37 million metric tons (Oil world 2006). Palm oil is an important and versatile raw material for both food and non-food industries accounting for more than 28 million tons of the world's annual 95 million tons of vegetable oil consumption (RSPO 2008). Palm oil is used in various food products such as cooking and frying oils, margarine, frying fats, shortenings, non-dairy creamer, ice cream, cookies, crackers, biscuits, etc. Non- food uses of palm oil and palm kernel oil are either directly or through the oleo chemical routes. Direct applications include the use of crude palm oil (CPO) as a diesel fuel substitute, drilling mud, soaps and epoxies palm oil products; polyols, polyurethanes and polyacrylates. In view of numerous importances of oil palm products as raw materials for industrial uses, for cooking, creation of employment and foreign exchange earner, research needs to be conducted to address the equilibrium between the demand and supply of oil palm products in the country.

From ongoing, this study was designed to examine the profitability of oil palm production in Surulere Local Government Area, Oyo State. Specifically, it identified the socio economic characteristics of oil palm plantation owners, analyzed the cost and returns of setting up an oil palm plantation, examined the level of technology being used in production and identified the determinant factors affecting oil palm output. Also, the study hypothesized that Oil palm production is profitable in the study area.

Oil palm production is a very profitable business when done on a large scale and it has economic advantage for a very long period of time. However, oil palm could be produced in large scale when government support the farmers and the private sectors are equally allowed to participate, this in turn will develop the economy of the nation, create jobs and improve farmers standard of living. But its current production and technology level being adopted has greatly led to shortage in supply to market demand.

METHODOLOGY

This study was carried out in Surulere Local Government Area. It is a major food producing area and a major supplier of food and cash crops in Oyo State. Its secretariat is situated at Iresaadu town with an area of 23square KM and a population of 142,070 at the 2006 census (Wikipedia, 2012). A multistage sampling technique was adopted to select 125 respondents. Five out of 10 political wards in the Local Government Area was selected followed by random selection of 5 villages each from each ward. Also, 5 farmers were furthered selected from each village making a total of 125 respondents for the study. Primary data were collected using a well-structured questionnaire, while the information on revenue and cost structure of oil palm tree owners, socio-

economic characteristics of the farmers, inputs utilized and various problems encountered by oil palm tree owners were collected.

The data collected were analyzed using both descriptive and inferential statistics. The descriptive statistical tools employed include the mean, frequency distribution table and percentages to present the socio-economic characteristics of the respondents while, budgetary analysis and regression analysis were employed to measure the profitability of oil palm production and determine the dependence of oil palm output on various inputs used respectively.

Profit (π) of oil palm production was determined by finding the difference between the total revenue and the total cost. This was expressed as:

$$\pi = GM - TFC, \text{ and}$$

GM = TR – TVC

Where, π represents the Profit, TR = Total Revenue, TC = Total Cost, TFC = Total Fixed Cost, TVC = Total Variable cost and GM = Gross Margin

Profitability ratio of oil palm production was also expressed as:

$$PR = \frac{TR - TC}{TC}$$

The Regression analysis was also employed to determine the amount of change in the value of oil palm (output) produced associated with a unit change in the value of variable inputs. Regression analysis may be simple or multiple, linear or non-linear but multiple regression was employed for the purpose of this study.

Multiple Regression Analysis is used for testing hypothesis about a relationship between dependent variable Y and independent variables $X_1, X_2 \ldots \ldots X_n$ and for prediction. It is mathematically represented as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 \ldots \ldots + \beta_n X_n + \varepsilon$$

Y – Dependent variable

β_0 – Constant known as Intercept.

$\beta_1, \beta_2, \beta_n$ – Regression Coefficients

$X_1, X_2 \ldots \ldots X_n$ – Independent variables

ε - Error Term

$$\varepsilon = y - \hat{y}$$

Where: y – Actual observation

$\hat{y}$ – Fitted values

The dependent variable of this study was the output of oil palm farmers while the independent variables include: X_1 (Age), X_2 (Marital status), X_3 (Educational status), X_4 (Years of experience), X_5 (Farm size), X_6 (Fertilizer usage), and X_7 (Quantity of chemical)

Result and Discussion

Socio-economic characteristics of oil palm farmers were presented in Table 1. From the table, it was revealed that majority (84.0%) of the oil palm farmer's are male while 16.0% are female. It can be seen from table1 that oil palm farmers are dominated by male mainly because of the stress attached to it which female cannot bear. More than half of the farmers (58.4%) are within 41-50years; this indicates that they are still in their productive age while 84.0% of them are married. The result of the findings also shows that 67.2% of the respondents had primary education with 51.2% of them had experience between 31and 40years.

It was revealed from the result of this study that more than half (55.2%) of the farmers occupied 6-10 acres of land for production through inheritance, 88.8% utilize inorganic fertilizer obtained from government though they claimed that fertilizer supply is always untimely for their operations as we have it in Table 2. Oil palm farmers also involved in other farming occupation and obtained their funds from the savings of their previous profits. One hundred percent of the respondent used chemical in their operations obtained their seedlings from government, only 45.6% belongs to one form of farmers' association or the other and it was found that all farmers in the study area set prices based on the prices of other neighboring markets.

Budgetary Analysis

The profitability of oil palm production in the study area was computed from the revenue accrued and cost incurred and the result of findings is shown in Table 3. The variable costs include weeding cost, frond trimming cost, harvesting cost, oil processing cost, cost of feeding, land preparation cost, cost of fertilizer, chemical cost, cost of seedling, transport cost, palm kernel cracking cost, palm wine tapping cost and farmers association due while the fixed cost elements include land acquisition cost and cost of implements.

The profitability analysis above is estimated on an average basis by utilizing the average of the total revenue, and total cost, which include total variable cost and total fixed cost, to determine the gross margin and profit.

Gross margin (GM)

$$GM = ATR - AVC$$

₦2,153,647 - ₦962,477 = ₦1,191,170

Profit (π)

₦1,191,170 - ₦331,036 = ₦860,134

Profit ratio $PR = \dfrac{ATR - ATC}{ATC}$

$$\pi = ATR - ATC$$

= 2,153,647 - 1,293,513

= 860,134

Therefore:

$$PR = \dfrac{860,134}{1,293,513} = 0.664,$$

This implies than on every N1 spent on oil palm production 66k is gained by each farmers, which means that oil palm production is profitable in the study area.

Regression Analysis

This section examines the impacts of certain production factors on the quantity of output derived from oil palm produced. The result of the regression analysis is presented in table 21 below. The adjusted R is 0.959; this implies that as a result of linear association between dependent and independent variables 95.9% of the independent variable can be explained while the remaining 4.1% are included in the error term which cannot be explained.

Linear expression of the regression equation:

$$lnY = -2.087 + 3.048X_1 + 5.135X_2 + 3.060X_3 + 2.399X_4 - 17.576X_5 + 8.856X_6 + E$$

$$(0.136) \ (0.132) \ (0.134) \ (0.129) \ (-0.372) \ (0.901)$$

Y is the oil palm output.

X_1 (Age) is significant at 1% and has positive effect on the quantity of oil palm output produced in that a unit increase in age will raise the output by 0.136%.

X_2 (Marital status) is significant at 1% and has positive effect on the quantity of oil palm output; this implies that the higher the number of married in oil palm production the higher the quantity of output produced in the sample.

X_3 (Educational status) is significant at 1% and has positive effect on the quantity of oil palm output produced in that a unit increase in educational status will raise the output by 0.134%.

X_4 (Years of experience) is significant at 5% and has positive effect on the quantity of oil palm output produced in that a unit increase in educational status will raise the output by 0.129%.

X_6 (Fertilizer usage) is significant at 1% and has negative effect on the quantity of oil palm output produced in that fertilizer usage decreases the output by 0.372%, this is due to abundance of aged oil palm tree that are not economically viable.

X_7 (Quantity of chemical) is significant at 1% and has positive effect on the quantity of oil palm output produced in that a unit increase in quantity of chemical will raise the output by 0.901%.

Conclusion and Recommendations

The result of this study shows that oil palm production is profitable and that majority of the farmers still operate their production on a small scale. Oil palm has been a major player in Nigerian export business before independence and will continue to grow and develop the Nigerian economy in recent day Nigeria if adequately considered a major economy builder from the agricultural sector level, a huge employer of labour and a catalyst in the development of the manufacturing industries.

Based on the conclusion of this study the following are recommended for the oil palm farmers, potential farmers and the government to improve production performances and returns generated

- Farmers should invest more in their production in order to meet the increasing demand of the market and to generate more profits.
- New graduates should be encouraged to take their career in farming so as to replace the old farmers hence, increased productivity and profitability; and
- Government should ensure timely provision of necessary inputs and incentives required by farmers for production.

REFERENCES

Atinmo, S. A. (2003); Economic Analysis of Palm Oil production in Eastern Nigeria.

Equity Research (2012); Impact Assessment Oil Palm Development on tropical biodiversity preservation.

FAO (2002); Small-Scale Palm oil processing in Africa. FAO Agricultural Services Bulletin 148 ISSN 1010-1365. Rome, Italy..

http://www.wikipedia.com/agriculture/?oyo-state-&location

http://www.google.com/emf?search-tf=oyo-state:oysg.gov.ng

http://www.indexmundi.com/agriculture/?commodity=palm-oil&graph=production).

Oil Seeds Association of Nigeria (2003);How will oil palm expansion affect biodiversity? Trends in Ecology and Evolution 23(10): 539-545.

Oil World (2006);Is oil palm agriculture really destroying tropical biodiversity? Conservation Letters 1: 60-64.

Round Table on Sustainable Pal Oil, RSPO (2008); Malaysian Oil Palm Economy.Ministry of Agriculture and Environment.Kualar Lumpur, Malaysia.

Sade, B.O. (2009); Economic Analysis of oil palm production and processing in Ekiti state of Nigeria.Unpublished M. Sc Thesis.UNAD.

UAC(1952);*Statistical and Economic Review.*UAC Lagos, No. 8.Udo. R. K. 1965. Sixty years of plantation agriculture in southern Nigeria. 1902-1962. *Economic Geography,* 41.

Table 1: Socio-economic characteristics of Oil palm farmers

Variable(s)	Frequency	Percentage
Sex		
Male	105	92.4
Female	20	7.6
Age[years]		
≤ 40	3	2.4
41-50	73	58.4
51-60	49	39.2
Marital status		
Married	105	84.0
Widowed	20	16.0
Education status		
Primary	84	67.2
Secondary	41	32.8
Religion		
Christianity	111	88.8
Islam	14	11.2
Numbers of years of experience		
≤ 30	17	13.6
31-40	64	51.2
41-50	44	35.2
Farm size		
≤5	25	20.0
6-10	69	55.2
≥11	31	24.8
Land		
Inherited	125	100
Other occupation		
Yes	125	100
Source of fund		
Personal savings	125	100
Total	**125**	**100**

Field Survey, 2012

Table 2: Distribution of respondents according to input used

Variable(s)	Frequency	Percentage
Type of labour		
Hired	125	100
Fertilizer usage		
Yes	111	88.8
No	14	11.2
Source of fertilizer		
Government	125	100
Individual	0	0
Type of fertilizer used		
Inorganic	125	100
Organic	0	0
Time of supply		
No	125	100
Yes	0	0
Chemical usage		
Yes	125	100
No	0	0
Sources of seedling		
Government	125	100
Individual	0	0
Level of investment		
Yes	57	45.6
No	68	54.4
Price determinant		
Price of other markets	125	100
Other determinant	0	0
Total	**125**	**100**

Field Survey, 2012

Table 3: Profitability analysis

Items	Price
Average Total Revenue (ATR)	2,153,647
Average Variable cost (AVC)	962,477
Average Fixed cost (AFC)	331,036
Average Total cost (ATC) (AVC+AFC)	1,293,513
Gross margin (ATR-AVC)	1,191,170
Profit(ATR-ATC)	860,134

Table 4: Regression Table

Variable	Parameter	Coefficient	Coefficient
Constant	β_0		-2.087
Age	β_1	0.136	3.048*
Marital status	β_2	0.132	5.135*
Educational status	β_3	0.134	3.060*
Years of experience	β_4	0.129	2.399**
Farm size	β_5	-0.029	-0.252
Fertilizer usage	β_6	-0.372	-17.576*
Qty of chemical	β_7	0.901	8.858*

Source: Data analysis, 2012

Note: * indicates significance at 1%

   ** indicates significance at 5%

CALL FOR JOURNAL PAPERS

The IISTE is currently hosting more than 30 peer-reviewed academic journals and collaborating with academic institutions around the world. There's no deadline for submission. **Prospective authors of IISTE journals can find the submission instruction on the following page:** http://www.iiste.org/journals/ The IISTE editorial team promises to the review and publish all the qualified submissions in a **fast** manner. All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Printed version of the journals is also available upon request of readers and authors.

MORE RESOURCES

Book publication information: http://www.iiste.org/book/

Recent conferences: http://www.iiste.org/conference/

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digtial Library , NewJour, Google Scholar