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ECONOMIC ANALYSIS OF PLANTAIN PRODUCTION IN AFIJIO LOCAL GOVERNMENT OYO STATE, NIGERIA

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ABSTRACT

The study was carried out to investigate the economic analysis of plantain production in Afijio Local Government Oyo State, Nigeria. Multi – stage sampling technique was used in the data collection. A total of 150 respondents were sampled. Statistical tools such as frequency distribution, production function and budgetary analysis were used in analyzing the data for this study. The result shows that most of the respondents were male (93.3.0 %) and married (76.70%). The major problems faced by the respondents in the study area include inadequate credit facilities, problems of pest and disease and inadequate farm land. The estimated costs and return of plantain growers cultivating one hectare on the average in the zone were ₦ 134,860.00 and ₦ 482,000.00 per annum, respectively. The operating cash expenses ratio was 23.57%, which connotes that 23.57 % of the gross revenue was used to cover the operating expenses. The regression analysis reveals that double function had the F-ratio that was significant at 10 % α – level and based on the statistical and econometric theories, the double log function was chosen as the lead equation with coefficient of multiple determinations (R^2) value of 0.88, which implies that 88.09 % of variables is allocated to the explanatory variables.

Keywords: Plantain, Production, Gross margin, Budgetary.

INTRODUCTION

The phenomenon of crop productivity and growth to a large extent hinges on the input-output relationship. Plantain is one of the most important staple food crops grown in the tropics and sub-tropics of the world. Frison and Sharrock, (1999) observed that banana and plantain represent more than 25 percent of the food energy requirement of Africa. Plantain plays vital roles in the feeding systems of both human beings and farm animals. It has a very high nutritional value in source of dietary carbohydrates, vitamins and minerals. Plantains are extremely rich in vitamin A. Today plantain is grown in 52 countries with world production of 33 million metric tons (FAO, 2004).

Plantain is estimated that about 70 million people in West and Central Africa derive more than 25% of their carbohydrates from plantains, making them one of the most important sources of food energy throughout the African lowland humid forest zone (Swennen, 1990). Plantain also plays an important role in the structuring of rural landscape throughout the producing areas in the country. Also, the gross value of plantain and banana in terms of their annual product exceeds that of several other crops such as maize, rice, cassava and sweet potato in sub-Saharan Africa (FAO, 2001).

In Nigeria, plantain production is becoming a significant economic activity for income generation for both large scale and small holder farmers, especially for those who produce them within their home compounds or gardens.

MATERIALS AND METHODS

Study area

The study was carried out in Afijio Local Government Area of Oyo state which is located in the capital territory, within latitudes 4o 45^{o} N and 5^{o} 23$^{/}$ S and Longitudes 5^{o} 15$^{/}$ E and 6^{o} 45$^{/}$ E. The Area constitutes a population of 198, 344 (National Population Census 2006) and lies within the rainforest zone, with a humid equatorial climate and mean annual rainfall ranging from 2,000 to 4,000mm and alternating rainy (March-November)

and dry (December to February) seasons, featuring a short dry period between July and September (August break). Maximum average temperature is 30^0C with a relative humidity between 55 and 90 percent, depending on season and location. The major occupation of the people are fishing, farming and trading. Other means of livelihood include hunting, lumbering, distillation, palm oil milling, building, and weaving (Alagoa 1999).

Sampling Technique

Multi – stage sampling technique was used. The first stage involved stratified sampling which was used in grouping the various villages in Afijio Local Government Area. Random sampling was used in selecting one from the minority and two from the majority, making three towns which were Awe, Fiditi and Iwajowa. The third stage involved random selection of three communities in each town making five (5) communities. A list of such farmers was collected from the respective community's council of baales and Oyo State A.D.P (Agricultural Development programme).

Method of Data Analysis

Statistical tools such as frequency distribution, production function and budgetary analysis were used in analyzing the data for this study.

Budgetary Model

Gross margin was estimated using the expression:

$GM = p_iq_i - r_ix_i$ ---------- (1)

where,

GM = gross margin (₦)

i = i-th farm in the sample

P_i = average price of plantain and sucker (₦)

q_i = average quantity of plantain bunches and suckers produced

r_i = average price of variable inputs (₦)

x_i = average quantity of variable inputs used(kg)

Subsequently, a net return was obtained from gross margin.

Net returns = GM – TFC ---------- (2)

Where,

TFC = Total fixed cost

Various ratios were computed to ascertain the extent of the profitability of plantain enterprise namely:

Operating expense ratio = Total Variable Cost/Gross Revenue

Return per Naira outlay = NFI/TC

Benefit Cost Ratio (BCR) = Total Revenue (TR)/Total Cost (TC)

Labour efficiency measure = Value of total output/Total wage bill

A project is viable, if its benefit cost ratio is equal to or greater than 1 and at the particular discount rate. The higher the BCR, the more viable is the investment. Labour efficiency method was employed to show whether labour was efficiently managed in the zone.

Model Specification

It was postulated in this study that the output of plantain is a function of the farm size, labour, planting materials, fertilizer used, capital investment, age of farmer and farmer's experience that were employed in the production process. The regression model depicting this functional relationship was given in its implicit form as:

$$Y = f(X_1,X_2,X_3,X_4,X_5,X_6,X_7)$$

Where:

Y = quantity of plantain produced in tonnes.

X_1 = Farm size (in hectare).

X_2 = Labour (in manday).

X_3 = Planting material (number of suckers).

X_4 = Fertilizer applied (in kilograms).

X_5 = Capital investment (in naira)

X_6 =Age of farmer (in years).

X_7 = Farmer's experience (in years)

RESULTS

Table 1 shows the Socio-Economic Characters of Plantain farmers in the study area. The table shows that 93.3% of the plantain farmers were male. A greater number of the plantain producers surveyed (46.7%) fall within the age bracket of 31-60 years and with working experience of between the working of 31-60 years. Findings also shows that 90% of the plantain farmers had at least one form of formal education and 76.7% were involved in only farming occupation.

Table 1: Socio-Economic Characteristics of Respondents

Variables	Frequency (N=150)	Percentage
Gender		
Male	140	93.3
Female	10	6.7
Age		
≤ 20	0	0.0
21-30	45	30.0
31-60	70	46.7
>60	35	23.3
Marital status		
Single	20	13.3
Married	115	76.7
Divorced	5	3.3
Widowed	10	6.7
Educational Level		
No formal education	15	10.0
Primary education	85	56.7
Secondary education	45	30.0
Tertiary education	5	3.3
Farming Experience (years)		
Less than 5	31	20.7
5-10	83	55.3
11-16	24	16.0
17 and above	12	8.0
Dependants		
None	25	16.7
1-3	50	33.3
4-6	40	26.7
7-10	35	23.3
11 and above	0	0.0
Main occupation		
Trading	25	16.7
Farming	115	76.7
Civil Servant	10	6.6

Budgetary Analysis Results

The estimated costs and return of plantain growers cultivating one hectare on the average in the zone were ₦ 134,860.00 and ₦ 482,000.00 per annum, respectively (Table 2). Among the cost components, cost of sucker was the largest share of the total cost of ₦ 63,000.00, followed by cost of labour ₦ 34,500. Revenue from plantain had the highest share ₦ 440,000.00 of total revenue, while the gross margin and net income or returns to management were ₦ 368,700.00 and ₦ 347,140.00 respectively.

Table 2: Estimated Revenue for Cost and Return for Plantain Production.

Item	Unit	Quantity	Amount (₦)
Revenue			
Revenue from Plantain	550 bunch at ₦800.	550	440,000
Revenue from suckers	600 sucker at ₦ 70	600	42000
Total revenue			482000
A Variable cost			
Rent on Land			
Land Preparation	7 persons at N1,500 (60 man-day)	7	10,500
Planting	5 persons at1,500 (50 man-day)	5	7,500
Weeding	7 persons at1,500 (80 man-day)	1,500	10,500
Harvesting	4 persons at1,500 (35 man day)	4	6,000
Suckers used	900 sucker	70	63,000
Transport Cost			15,800.00
Total Variable Cost (TVC)			**113,300**
Gross Margin (GM) = TR-TVC			368,700
B Fixed Cost			
Depreciation on tools			21,560
Total Fixed Cost (TFC)			21,560
C Total Cost (TC) = (TFC + TVC)			**134,860**
Net Income (NI) =(GM -TFC)			347,140
Profit Margin (%)= NI/TR			72.02
Return Per Naira Outlay (N) NI/TC			3.57
Operating Expense Ratio (%) = TVC/TR			23.51
Benefit Cost Ratio (BCR) = TR/TC			3.57
Labour Efficiency = TR/labour Cost			13.97

Ordinary Least Squares Multiple Regression Results of Inputs-Outputs Relationship In Plantain Production

The result implies that plantain production in the study area is profitable. Of the four functional forms employed in the analysis of input –output relationship in plantain production, the double log form had the best fit to the set of data employed. This was followed by the exponential, semi-log and linear functional forms in that order (Table 3).

Table 3: Ordinary Least Squares Multiple Regression Results of Inputs-Outputs Relationship in Plantain Production

Variable	Coefficient	Standard Error	T-value	P-value
Constant	93.32	0.051	6.110	0.211
Farm size(X_1)	0.075	0.023	3.153	0.000**
Labour (X_2)	0.0711	0.227	2.862	0.001**
Planting material (X_3)	2.89	0.855	0.025	0.000**
Fertilizer applied (X_4)	-0.079	0.068	-1.149	0.123^{+}
Capital investment (X_5)	0.028	0.011	3.378	0.000**
Age of farmer (X_6)	-0.085	0.029	-2.681	0.002**
Farmer's experience (X_7)	0.050	2.52	0.880	0.021*
R^2	0.8827			

*Significant 5% **Significant at 1%

Double log was chosen as the lead equation on the basis of conventional statistical and econometric criteria. The value of the coefficient of multiple determination (R^2) obtained and its statistical test at 5% and 1% indicates that the size of farm, labour, number of suckers, fertilizer, amount of capital, age and experience of farmers explain about 88.27% of the variation in quantity of plantain produced. The regression analysis further showed that every size of farm employed in plantain production yields 0.075 tonnes of plantain, while every labour employed yields 0.071 tonnes of plantain, number of suckers employed yield 0.079 tonnes of plantain, while capital employed yields 0.0282 tonnes of plantain.

The use of fertilizer and farmers age in the study area inversely yields 0.079 tonnes and 0.085 tonnes of plantain respectively. The size of farm, labour, number of suckers, amount of capital, and age of farmer were significant at both 1% and 5% levels while farmer's experience was significant at only 5%. This means that the farm size, labour, number of sucker, capital in naira, Age of Farmers, Experience of farmers employed in the production process influences the quantity of plantain produced.

However, there was no significant relationship between fertilizer applied and plantain produced at both 1% and 5% levels. This suggests that fertilizer application had no effect on the output of plantain. This was attributed to lack of fertilizer product and technical know-how.

Constraints Associated With Plantain Production

The result of analysis of constraints encountered by plantain farmers in the study area ranked from most critical to the least showed that inadequate credit facilities took the lead indicated by 20.7%. This was followed by the problems of pest and disease (19.3%) and inadequate farm land (16.7%). It is interesting to note that these three constraints identified as most important constraints sum up to over half (56.7%) of the problems encountered by plantain farmers in the study area.

It may be concluded that if these three constraints are looked into, other impediments such as 4th,5th , 6th, 7th, 8th, and 9th constraints may cease to exist or reduce to minimum in the study area.

Table 4: Constraints faced by plantain farmers in the study area

Constraints	Frequency	Percentage (%)	Rank
Inadequate credit facility	31	20.7	1st
Pest and disease problem	29	19.3	2nd
Inadequate farm land	25	16.7	3rd
Inadequate inputs	19	12.7	4th
Poor Transportation system (Inadequate vehicles)	15	10.0	5th
Bad roads	13	8.7	6th
Marketing problem	8	5.3	7th
High cost of hired labour	6	4.0	8th
Pilfering	4	2.7	9th
Total	**150**	**100**	

DISCUSSION

The result shows that 93.3% of the plantain farmers were male. This result which shows that male farmers dominated plantain production in the study area which may be due to the fact that plantain farming might be tedious for female farmers. This is in with Oladebo et al (2013) who found out that female farmers prefer vegetable production to plantain production. The results on socio-economic variables further show that the plantain that highest producers surveyed were on age range of 31-60 years (46.7%) and with working experience of between the working of 31-60 years. This finding is supported by Agboola (1999) who maintained that farmers within the middle age are matured and have the capacity of producing plantain efficiency.

The operating cash expenses ratio was 23.57%, which connotes that 23.57 % of the gross revenue was used to cover the operating expenses. About 76.43% of gross revenue went to the farmer's

equity and unpaid labour and management. The benefit cost ratio and labour efficiency analysis were 3.57 and 13.97, respectively. This shows that output earning per ₦ 1 expenditure on labour was ₦ 13.97 showing that labour was well managed. These measures of performance indicate that plantain production in the study area is a viable and profitable venture and should be engaged by the unemployed youths in Nigeria.

The value of the coefficient of multiple determination (R^2) obtained and its statistical test at 5% and 1% indicates that the size of farm, labour, number of suckers, fertilizer, amount of capital, age and experience of farmers explain about 88.27% of the variation in quantity of plantain produced. This is in agreement with earlier work by Muhammad et.al. (2012) on economic analysis of cassava production in Lagelu Local Government Area of Oyo, State, Nigeria, which shows that R^2 was 79.7%. Also with Fakayode *et.al* . (2011) work which show the value R^2 of 0.721 and is significant at 5 per cent level of significance as indicated by the F-ratio.

Conclusion and Recommendations

The study was carried out to investigate the economic analysis of plantain production in Afijio Local Government Oyo State, Nigeria. The finding shows that most of the respondents were male and married and they were still at middle-age group

On the basis of this study, the major problems faced by the respondents in the study area include inadequate credit facilities, problems of pest and disease and inadequate farm land.

Based on the study findings, the study recommends the need to provide and rehabilitate the necessary infrastructures and other utilities in the study area. This would help to discourage rural–urban migration. Also efforts at making available lands, and improved planting materials for plantain production should be enhanced. Subsidy on the fertilizer input to relieve costs of plantain production is indeed necessary to enhance good plantain output.

REFERENCES

Agboola, A.A.A. (1999. The propagation of plantain Matrix Inversion by partitioning algorithm. *International Journal of Mathematics Science*, 1: 69-76.

Fakayode, B. S., M., Rahji, A. Y. Ayinde, O. and Nnom G. O. (2011). An economic assessment of plantain production in Rivers State, Nigeria. *International Journal of Agricultural Economics and Rural Development* , 4

Food and Agriculture Organization AGROSTAT Database (2004). Food and Agriculture Organization of the United Nations. *Production year book.* FAO Rome.

Frison, E.A and S.L Sharrock (1999): "Introduction: The Economic, Social and Nutritional Importance of Banana in the World" In *Banana and Food Security.*

Muhammad, H.U., Muhammad, U.S and Mayowa, O.O. (2012). An economic analysis of cassava production in Lagelu Local Government Area of Oyo State, Nigeria. 2 :36-43.

Oladebo, J.O. Oyeleye, A.A. and Oladejo, M.O. (2013). Effect of soil conservation investment of efficiency of cassava production in Oyo State, Nigeria. *Journal of Biology, Agriculture and Healthcare.* 3(13): 47-52.