

## Profitability Analysis of Plantain Production in Yewa Division, Ogun State

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**Abstract.** The study analyzed the profitability of plantain production in Yewa Division of Ogun State. The study was based on primary data obtained in a cross-section survey of 120 respondents drawn by multi-stage random sampling across communities the Local Government Areas (LGAs). Trained enumerators, that personally administered questionnaires/interview schedule, were employed in collecting the study data. The data consists of socio-economic characteristics of the sampled respondents. The study data were analyzed by both descriptive and quantitative techniques. Descriptive techniques including construction of frequency distribution, computation of descriptive statistics (mean, standard errors, etc) were used to analyze socio-economic characteristics of the farm households. The finding reveal that age distribution showed that 61.7 per cent of the sampled farmers, and by extension, rural farm households in the study area have the age of their household heads (farmers) falling below 60 years. While, 71.7 per cent of the heads of the rural farm households were males and 51.7 per cent of the household heads were married. Majority (64.8 per cent) of the household heads possess some formal education, which is predominantly at the primary level; an appreciable level of illiteracy exists among the respondents. Age of the farmers, household size, years of farming experience, fertilizer quantity used, quantity of pesticides used, quantity of insecticide used and total revenue from plantain are statically significant in determining the level of output of the plantain in the survey area. It is therefore recommended that roads linking the rural

communities where plantain is being produced should be made motorable to enhance prompt movement of goods from the farms to the market.

**Keywords:** Plantain, Rural, Communities, Profitability, Households

### 1. Introduction

The nutritional value of Plantain, without doubt is of crucial value which makes it one of the healthiest food in the world in terms of nutrients contents. Plantain originated from South East Asia and Western pacific region (John and Marshal 2001). It belongs to the family of “*Musaceae*” and of two types “*Musa acuminata*” (genome AA) and “*Musa balbisiana*” (genome BB). It is a perennial herbaceous plant that belongs to a group of shrubs 2 to 9m tall with an underground rhizome or corm. It thrives on a wide range of tropical and sub-tropical climate. Plantain requires an optimum temperature of 3<sup>0</sup>C. Mean monthly rainfall of 100mm, pH of 4.5 to 7.5 and sandy loam soils plantain is an important food crops in the Sub-Sahara Africa, providing more than 25% of the carbohydrate and 10% of the calories of approximately ten million people in the region (Awotide, *et al.* 2004). Plantain plays vital role in the feeding systems of both human beings and farm animals. It has a high nutritional value. It is a source of dietary carbohydrate, vitamins and minerals. Plantains are extremely rich in vitamins A. Also, plantain are staple food crops for many people in developing countries, while in terms of gross value of production, plantain

are one of the most important fruits in the developing world, (FAO 2011).

Plantains are extremely rich in vitamins A. Ogazi (1995), observed that plantain is one of the major staple food in Nigeria. It has the highest In terms of distribution; four main types of plantain are available in Nigeria, which are strictly based on their bunch characteristics (a) Horn type (b) French type (c) False type and (d) French-horn type. (John and Marchal, 2001).

In Nigeria, the false horn type is widely distributed because of its ability to tolerate poor soil conditions than others. It also controls land degradation which occurs with constant use of machinery. Plantain also plays an important role in the structuring of rural landscape throughout the producing areas in the country. In the urban areas, it is normally eaten in convenient forms like “Dodo” (fried ripe pulp), chip (fried unripe pulp) and as plantain flour. This plantain flour has an advantage over other starchy foods because it contains protein, mineral and vitamins. Medicinally, plantain can be used to cure some ailments; like sore throats, tonsillitis, diarrhea and vomiting. Due to its high nutrients, plantain is used in the production of Soyamusa, which can be used in the treatment of kwashiorkor. (Idachaba 1995).

According to Oxford Learners Dictionary, profitability can be defined as the state or condition of yielding a financial gain or profit, because without profit earning a proposed business cannot survive. Profitability is measured with income and expenses. Income is money generated from the activities of the business, while expenses are the cost of resources used up or consumed by the activities of the business. Profitability on the other hand can be defined as either accounting profits or economic profits. Profitability is measured with an “income statement”.

In Nigeria, plantain is produced in large quantities in Edo, Delta, Ogun and Ondo State. Other producing States are Rivers State. Cross River State, Imo, Anambra, Lagos, Kwara, Benue, Plateau, Kogi, Abia and Enugu. Plantain cultivation is not limited to big plantations, but

is often grown in small orchards which sometimes go unnoticed. Relative attention given to plantain is focused on its production technology while little is done on its marketing. It is however obvious that increased production without corresponding increase in marketing may amount to wastage of resources.

Agricultural production in Africa has virtually been dominated by small-scale farmers who are known to produce up to 90 per cent of the food consumed in some countries of the continent (Lambert, 2000). These small-scale farmers make up at least 73 per cent of all rural Africans. Despite the fact that such a high percentage of the population are farmers, food demand cannot be met from this source (Garrison, 1999). The central issue, therefore, is how to accelerate the agricultural production growth rate to meet the food needs of the ever-growing population (Shields *et al.*, 2002) Total world production of banana and plantain is estimated to be over 76 million metric tons (FAO, 1993). An estimated 12 million tonnes are produced in Africa annually, most of which are consumed or traded locally (INIBAP, 2003). About 70 million people in the sub-region are estimated to derive more than one quarter of their food energy requirements from plantain. Plantains have relatively high value products in common with most other horticultural crops. The gross value of their annual production in sub-Saharan Africa exceeds that of many other food crops such as maize, rice, cassava and sweet potato (Ortiz and Vuylsteke, 2001).

In Nigeria, plantain has been an important traditional staple food for both the rural and urban populace. They serve as a source of revenue for small-holders who produce them on compound farms, mixed farms and small-scale sole plantain farms (Baiyeri, 2002). Though plantain are crops that have diverse uses to millions of Nigerians, the level of production of plantain in Nigeria has been inconsistent and low (FOS, 1999). An underlying factor in the study area is that farmers are not making efficient use of existing technology, moreover, the efforts designed to improve efficiency are more cost-effective than introducing new technologies as a means of increasing agricultural output

might be difficult (Akalumbe, 1994). In Nigeria, plantain has become a key source of revenue. To harness the export potential of plantain, the current level of its production must be improved to ensure increased revenue generation by the farmers.

## 2. Objectives of the Study

The broad objective is to determine the Profitability Analysis of Plantain Production in Yewa Division, Ogun State, Nigeria. The specific objectives are to estimate the costs and return structure of plantain production in the study area; and elicit the factors affecting the income from plantain production.

## 3. Research Methodology

### 3.1 Study Area

The study was conducted in Yewa Division of Ogun State with a special focus on plantain farmers in Yewa North Local Government Area and Yewa South Local Government Area. Inhabitants of these Local Government Areas are mainly Yoruba speaking with various dialects like Yewa, Anago, and other ethnic groups also exist in a peaceful atmosphere like Hausas, Igbo, Igedes, etc and the three main religions in this division are Christianity, Islam, and traditionalist. Yewa North Local Government Area has human population of about 2,338,570 (NPC 2006). The Local Government Area is bounded in the West by Republic of Benin, in the South by Abeokuta North Local Government Area and in the North by Oyo State. The headquarters of the Local Government Area is located on Latitude 7°15'N and Longitude 3°3'E in the Derived Savannah Zone of Ogun State.

### 3.2 Sources and Methods of Data Collection

Both primary and secondary data were used for the research. Under primary data, structured questionnaire were used to collect data on socio-economic characteristics of plantain farmers and other relevant information and oral interviews and discussion were held on some relevant issues such as the problems facing the farmers in

plantain production. While, secondary data were obtained from journals, texts, statistical bulletins and other published documents.

### 3.3 Sampling Procedure

Multistage sampling technique was employed in this study. The first stage involved the selection of two Local Government Areas (Yewa North and Yewa South Local Government Areas) from the four Local Government Areas in Yewa Division. The second stage was the selection of five communities from the two Local Government Areas earlier selected. The last stage involved the selection of 12 plantain farmers in each community to give a total of 120 respondents sampled.

### 3.4 Methods of Data Analysis

Both the descriptive and inferential statistics were used for the study. The descriptive statistics like frequency count, mean and percentages were used to describe the socio-economic characteristics of the plantain producers and problems confronting them in course of plantain production. While inferential statistics such as Budgetary Analysis which was used to estimate cost and return structure of the producers and Multiple Regression was used to examine factors affecting income from plantain production. The models for the inferential statistics (budgetary analysis and regression statistics) are stated below.

$$NFI = GFI - TC$$

$$GFI = (P \cdot Q) \cdot Q \text{ and } TC = TVC + TFC$$

Where:

NFI = Net Farm Income (₦)

GFI = Gross Farm Income (₦)

PQ- Price per unit of output (bunch of plantain)

Q- Total Output (in kg)

TC- Total Cost of Production (₦)

VC- Variable Cost (₦)

FC- Fixed Cost (₦)

Thus, the Net Revenue  $NR = TR - TC$

Where:  $TR = \sum_{t=0}^n P_i Q_i$  and  $TC =$

$$\sum_{t=0}^n P_{xi} X_i$$

NR is the Net Return, TR, Total Revenue from sales per bunch of plantain, Pi price per bunch of

plantain, I is the quantity of sales made. TC Total Cost of processing of plantain, Pxi=price of its input and X<sub>i</sub> is the input.

The performance and economic worth of the respondents can be determined by the use of the following profitability ratios:

Benefit Cost Ratio(BCR) = TR/TC

Expense Structure Ratio (ESR) = FC/VC

Rate Of Return(ROR) = NR/TC

Gross Ratio(GR) = TC/TR

To obtain the worth of each of the fixed cost items the straight line method of depreciation was used and it was assumed that the salvage value of fixed items used in the business is zero. The formula for depreciation using a straight line method is given as:

$$\text{Depreciation} = \frac{\text{Purchase price (₦)}}{\text{No of years of useful life of the asset}}$$

**Regression model**

To ascertain the relationship between a dependent variable and numerous independent

variables thus required the use of regression model.

$$Y_i = a_i + b_i X_i + U_i$$

Where: Y<sub>i</sub> = Dependent Variable; a<sub>i</sub> = Intercept/Constant; b<sub>i</sub> = Coefficient of Dependent Variables; X<sub>i</sub> = Independent Variables; U<sub>i</sub> = Error Term

Where:

- Y = Plantain output (₦)
- X<sub>1</sub> = Age of plantain farmers (years)
- X<sub>2</sub> = Household size (no of person)
- X<sub>3</sub> = Farming experience (years)
- X<sub>4</sub> = Year of education (years)
- X<sub>5</sub> = Farm size (acres)
- X<sub>6</sub> = Number of plantain sucker planted
- X<sub>7</sub> = Labour cost (₦)
- X<sub>8</sub> = Fertilizer quantity (kg)
- X<sub>9</sub> = Pesticides quantity (litre)
- X<sub>10</sub> = Insecticide quantity (litre)
- X<sub>11</sub> = Revenue (₦)
- U = Error term

**4. Results and Discussion**

**Table 1: Socio-Economics Characteristics of the Respondents**

Items	Frequency	Percentage
<b>Age (years)</b>		
≤ 30	5	4.2
31-40	20	16.7
41-50	16	13.3
51-60	33	27.5
Above 60	46	38.3
<b>Sex</b>		
Male	86	71.7
Female	34	28.3
<b>Marital Status</b>		
Married	62	51.7
Widow	33	27.5
Divorced	6	5.0
Separated	8	6.7
<b>Educational Level</b>		
No formal education	41	35.2
Primary school	52	43.3
Secondary school	19	15.8
Tertiary education	8	6.7
<b>Occupation</b>		
Farming	67	55.8
Trading	18	15.0
Artisans	10	8.3
Transporter	25	20.8

<b>Farming Experience</b>		
Below 5 years	43	35.8
11-15 years	11	9.2
16-20 years	25	20.8
Above 20 years	41	34.2
<b>Household Size</b>		
1-3	43	35.8
4-6	20	16.7
7-9	30	25.0
10-12	14	11.7
Above 12	13	10.8
<b>Mode of Acquisition</b>		
Inheritance	50	41.7
Government source	70	58.3
<b>Farm Size</b>		
1-2 Ha	43	35.8
5-6 Ha	13	10.8
7-8 Ha	7	5.8
Above 8 Ha	57	47.5
<b>Source of Fund</b>		
Self-finance	100	83.3
Credit and loan	20	16.7
<b>Problem Encountered</b>		
Poor market and poor road	88	73.3
No market, poor road and poor economy	32	26.7
<b>Total</b>	<b>120</b>	<b>100</b>

*Source: Field Survey, 2015*

## 5. Results and Discussion

The age of the respondents is an important factor that affects their level of productivity and overall coping ability within the business. Age is believed to influence the level of physical work. Majority of the farmers (79.5%) are above 40 years. This implies that the older farmers can use their experience to increase their productivity level.

Plantain production, especially with respect to farming practices is generally tedious and energy demanding and as a result is often termed a mans' job while the women are left with the processing and sometimes marketing and sales activities. Evidence on Table 1 shows that 71.7 per cent of the heads of the rural farm households were males: This is a reflection of the prevailing custom of the area where most of the farming households are male-headed.

Marital status indicates a condition of being Married (by Law, Religion and/or Tradition) or Unmarried (Single, Widow/Widower, and Divorced). As farming households expand from

being single to married, there will be more people to cater for and feed, which will increase the family labour for the production of plantain and consequently increase farm income.

Education is seen as a social capital that has the ability to impact positively on the ability of the household to take good and well-informed production and nutrition decisions. Education is vital in eradicating ignorance and increases the farmers' exposure and ability to make use of new farming practices and innovation. Meanwhile, while results on Table 1 showed that the majority (43.3 percent) of the household heads possess some formal education, which is predominantly at the primary level; an appreciable level of illiteracy exists among the respondents. And this may limit their ability to take full advantage of extension services, thus affecting their income generation and poverty.

The major occupation of the rural dwellers is farming. However, due to the nature and several challenges associated with rice production, many have had to seek occupational opportunities in several other areas. In the rural

communities, the most common of such jobs include artisan jobs such as carpentry, bricklaying, electrical works, plumbing, welding, transportation, security personnel, and so on; office jobs like secretaries, cleaners, attendants, teaching for those that have some considerable level of formal education and all forms of trading activities all aimed at increasing the income that comes to the home and increases standard of living. It is also worthy of note that most (55.8 per cent) of the households' heads have farming as their main occupation

Farming experience is expected to play vital roles in agricultural practice, decision making and risk management on the farm. An experienced food (crop/animal) farmer would be expected to have a better understanding of his production environment than someone else that is relatively new in the practice. Such an experienced farmer for instance would be able to easily identify causes of loss to his farm enterprise such as pests and disease infestations, erosion, poor performance, poor management/husbandry and such other factors that could contribute to reducing the quality of his produce and quickly nip it in the bud before it leads to a total loss to his farm enterprise. Experience is very important as many farmers rely on past experience (along with current information, methods and techniques) to draw up production plan of work and calendar of operation that will altogether increase their output in quantity terms and yield produce with good quality. The findings showed that farmers having less than five years farming experience constitutes majority (53%) of the respondents

In addition, with better production environment which includes adequate supply/access to machinery, improved crop and breeds that are disease resistant and high viability, fertilizers and other chemicals (herbicides, pesticides and insecticides), better technical know-how and improved farming methods and chiefly, access to funds, food production would increase in quality and quantity terms and this would in turn increase the income level of the farmers. The total household size of the respondents comprises the head of the home, the wives, children as well as all other dependants resident

in the house. Household size and its composition are important factors to consider in analyses of rural farm households, most especially as it determines the availability of labour to household farm economic pursuits. As shown in the table, a typical household in the sample is made up of 1 – 3 members.

The results showed that majority of the farmers 70.0% acquired their farm land from the government. While others through inheritance with farm size above 8 hectares in order to improve production performance. It is evident from the result of the study that majority (83.3%) of the respondents sourced their initial capital through personal saving, about 16.7% source finance through loan credit facilities. Majority of the respondents, 73.3% of the respondents were confronted with the problem of poor market and bad road in the production of plantain in the study area. Lack of access to market, poor road and poor economy also contributed about 26.7% of the problems being encountered by the plantain farmers in the study area. Majority of the plantain farmers suggested provision of good market outlet and construction of good road as a solution to the problems of plantain production in the study area.

### **5.1 Budgetary Analysis Results:**

The estimated costs and return of plantain growers cultivating 1.0 hectare on the average in the zone were ₦32,292.84 and ₦48,105.26 per annum, respectively as shown in Table 2. Among the cost components, cost of labour had the largest share of the total cost (60.3%), followed by cost of consumable farm inputs (26.4%). Revenue from plantain on the average was ₦48,105.26, while the gross margin and net income or returns to management were ₦25,233.47 and ₦15,812.42 respectively. The return per naira outlay was ₦1.3 implies that for every ₦1 invested in plantain production enterprise there is a return of ₦1.3 to the enterprise. The benefit cost ratio and labour efficiency analysis were 2.2 and 3.6, respectively. This shows that output earning per ₦1 expenditure on labour was ₦3.6 showing that labour was well managed. These measures of performance indicate that plantain production in the study area is viable and profitable.

**Table 3: Cost and Return Structure of Plantain**

Inputs	Mean
Bush Clearing	3978.9474
Planting	8262.6316
Fertilizer Application	1871.2632
Harvesting	2266.8421
Cost of Plantain Sucker	148.9474
Labour Cost	1157.8947
Fertilizer	2868.4211
Pesticides	1063.1579
Insecticides	1,253.6842
<b>Total Variable Cost</b>	<b>22,871.7895</b>
Land Cost	6305.2632
Cutlass	1143.1579
Hoe	715.7895
Digger	1256.8421
<b>Total Fixed Cost</b>	<b>9421.0526</b>
<b>Total Cost</b>	<b>32292.8421</b>
<b>Revenue</b>	<b>48105.2632</b>
<b>Gross Margin</b>	<b>25233.4737</b>
<b>Net Income</b>	<b>15812.4211</b>

Source: Field Survey, 2015

**5.2 Linear Regression Analysis Result of Total Output Determinants.**

The estimated parameters and the relevant statistical test results obtained from the analysis are presented in Table 3. It had an adjusted  $R^2$  value of 0.606. This implies that about 60.6% of the variation in supply (Y) is accounted for by the variables ( $X_1$ - $X_{11}$ ) included in the model, while the remaining 39.4% is as a result of non-inclusion of other explanatory variables in the model. The F-value is positive and statistically significant at the  $P \leq 0.01$ , indicating that the variables included in the model adequately explained the net income in the survey area.

Out of the 11 variables modelled, the coefficient of age of the farmers, years of farming experience, fertilizer quantity used, quantity of pesticides used, quantity of insecticide used and total revenue from plantain are positive and statistically significant in determining the level of output of the plantain in the survey area. While other variables are negative though some are significant, implying that there is over-utilization of the variables and increase in them will decrease the total output of plantain.

**Table 3: Linear Regression Analysis Result of Total Output Determinants.**

Variables	Reg. Coefficient	T-Value
(Constant)	8949.386	0.969
Age	631.594***	3.666
Household Size	-5695.473***	-6.059
Year of plantain planting experience	1539.760***	5.731
Educational Qualification	-1144.266	-1.015
Farm Size	-260.919	-0.573
Number of Plantain sucker planted	0.112	0.007
Labour Cost	0.035	0.937
Fertilizer	0.282*	1.804
Pesticides	3.148*	1.886
Insecticides	5.649***	2.766
Revenue	0.261*	1.818
F-value	17.611	
R-Square	0.642	
Adjusted R Square	0.606	

Source: Field survey 2015.

1% Significant level = \*\*\*, 5% Significant level = \*\* and 10% Significant level = \*

## 6. Conclusion and Recommendations

The study employed descriptive statistics, and budgetary technique to analyze the characteristics of plantain farms, forecast the trend in farm size and costs and returns to production. All respondents grew more than one varieties of plantain. Budgetary analysis results showed that plantain production in the study area is viable and profitable. Plantain farmers have a great potential to boost local production through increase in the sizes of plantain farms until when equilibrium would be attained. This could be achieved by use of improved suckers, provision of rural infrastructures such as road that will facilitate easy movement of inputs to the farm and output from the farm to markets.

Based on the findings of this study, the following recommendations were made:

- Roads linking the rural communities where plantain is being produced should be made more motor-able to enhance prompt movement of goods from the farms to the market.
- Special vehicle that will reduce quantitative and qualitative losses should be made available to marketers by the government. This will help to reduce post-harvest losses, deterioration in quality and transportation problems facing marketers in the study area.
- Programmes that will improve plantain marketing should be organized for the marketers by relevant government or non-government agencies. The programme should involve marketing strategies, proper recording and fund generation.

## References

- Akalumbe, O. (1994): Economic of Marketing and Post-harvest Losses of Plantain in Southeastern Nigeria. Unpublished M. Sc Thesis 1994. University of Ibadan, Ibadan.
- Awotide, D.O. Rahji, M.A.Y and Adejobi O.A. (2004): Modelling Technical Efficiency Effects in Plantain Production in the Humid Zone, Nigeria. *Journal of Peasant Studies*. 1:3
- Baiyeri, K. P. (2002): Characterization, Correlation, Path Analysis And Selection Indices Of S Genotypes Under Different Environment. A Ph.D. Research Proposal, Department of Crop Science, University of Nigeria, Nsukka. 1-8pp.
- FAO (2011): Accessed November 2011. Food and Agriculture Organization of the United Nations. <http://www.fao.org>.
- FAO (1993): Yearbook (Vol. 46).FAO, Rome, Italy. 361pp.
- FOS (1999): Annual Abstract of Statistics. Federal Office of Statistic (FOS), Nigeria. 1999 Edition
- Idachaba, F. S. (1995). Food Policy in Nigeria towards a Framework Analysis. *Agricultural Research Bulletin*. 77 (1): 15 - 18
- IITA (2009). International Institute of Tropical Agriculture in Banana and Plantain. <http://www.iita.org/banana-and-plantain>.
- INIBAP (2003). Networking Banana and Plantain: INIBAP Annual Report 2002. International Network for the Improvement of Banana and Plantain. Montpellier, France. pp. 24.
- John, P. and Marchal (2001): Ripening and Plantains. Chapman and Hall, London, pp. 434 – 467.
- Lambert, J. D. H., (2000): Traditional Agriculture: Its Role In Sustainable Food Production and Resource Management In Africa. In: “Africa Beyond Famine” (A. Lemma and P. Malaska Eds). Tycooly, London, pp. 219 – 240.
- National Population Census (NPC) (2006). National Bureau of Statistics Official Gazette. (FGP 71/52007/2 500 (OL.24) Abuja URL. <http://www.nigerianstat.gov.ng>.
- Ogazi P.O (1995). Plantain Storage and Processing in Post-harvest Technology and Commodity Marketing: Proceedings of a Postharvest Conference, 2(9), Nov

- to 1 Dec, 1995, Accra, Ghana. Editor R.S.B Ferris, Publisher IITA, 1998. ISBN 9789781311116. 300 pp.
- Ogazi P.O. (1996). *Plantain: Production, Processing and Utilization*. Paman Associates Ltd., Imo State, Nigeria, 305pp.
- Ogunfowora, O. and Olayide, S. O. (1999): Resource Problems of Rural Economy. In "Element of Rural Economics" Ibadan University Press, Ibadan. pp. 191-217.
- Ortiz R. and D. Vuylsteke (2001): Improving Plantain and Banana Based Systems. In "Plantain and Banana: Production and Research in West and Central Africa" (R. Ortiz and M. O. Akoroda, eds.) Proceedings of a Regional Workshop held at High Rainfall Station, Onne, Rivers State, Nigeria. IITA Ibadan, Nigeria. pp. 2 – 6.
- Shields, M. L., Ranniyar, G. P. and Goode, F. M. (2002): A Longitudinal Analysis of the Factors Influencing Increased Technology Adoption in Swaziland, 1985 – 1991. *J. Dev. Areas*, 27: 469 – 484.