

Effects of Nigeria's Socio-Economic Characteristics on the Profitability of Small-Scale Plantain Farming in Ohaji/Egbema Local Government Area of Imo State

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Abstract

The study examined effects of Nigeria's socio-economic characteristics on the profitability of small-scale plantain farming in Ohaji/Egbema local government area of Imo State. A total of 60 farmers were selected and interviewed using structured questionnaire. Simple descriptive statistics, cost and return, and multiple regression analyses were employed to achieve the objectives. Results indicated that plantain venture was viable and profitable. The Gross Profit was N166, 000 while the net profit was N129, 250. The Total Variable Cost was N114, 000 while the Total Fixed Cost was N36, 750, which were 75.62% and 24.38% of Total Cost of N150, 750, respectively. The Profitability Index of 1.86 and Return on every N1 invested of 86 kobo, confirmed the viability of the enterprise. The number of years spent in school, age, family size and farm size were the major socio-economic factors affecting the production of plantains as they were significant at 5% LOS. The major agronomic practice was mixed farming (90%) against sole cropping (10%). The dominant constraints of the farmers were; poor transportation and bad roads, high cost of labour, inadequate finance and theft. It was therefore recommended that the provision of good roads and transportation, adequate financial support for the farmers, and orderly marketing of the produces, so as to enhance the performance of the farmers. The use of cooperative societies by these plantain farmers was strongly advocated to overcome some of these problems.

Keywords: Socio-Economic, Profitability, Plantain Farmers, Characteristics, Small-Scale, Farming.

Introduction

Agriculture, which is essentially the practice of cultivation of crops and rearing of animals, belongs to the real sector of the Nigerian economy. Over 90% of the population of Nigeria, especially those living in the rural areas are small-scale farmers with small farm holdings ranging from 0.5-2.5 hectares (1.2-6.2 acres) (Adeniji, et al, 2005). These farmers produce food and fiber for the economy and industrial requirements. They also provide employment and foreign exchange earnings for Nigeria. Plantain production is one of such agricultural activity engaged by these farmers. Plantain, *Musa paradiscica*, as it is botanically known belong to the family *Muscas*. There are several varieties of plantain varying in size, shape and number of fruits to the bunch (Irvine, 1960). Locally, plantain is known as Abirika (Igbo); Ogede-agbagba (Yoruba); Ayaba (Hausa). Botanically, there is no distinction between plantain and banana except that the storage of carbohydrate in the fruit takes the form of

starch in plantain and sugar in banana. For this reason, most *Musa sp.* designated as banana are eaten raw when ripe, while those designated as plantain are cooked before they are eaten, even when ripe. There are many cultivars in West Africa but uniform names are not available (Phillips, T.A, 1977). Usually, plantain is grown as a compound crop that is manured with household refuse, it is also found in small field plots and is often used as temporary shade for young cocoa and coffee plants.

Plantain as a staple crop, is currently assuming great importance because of its high nutritional values as well as its medicinal consideration as medical supplements for the treatment of gastro-intestinal disorders, diabetes, etc.

Today over 10million Nigerians, are said to be diagnosed with one form of diabetes or the other. Frison and Sharrock (1999) observed that banana and plantain represent more than 25% of food energy requirement of Africa. Plantain plays vital roles in the feeding systems of both human beings and farm animals. It is extremely rich in iron and Vitamin A. Plantain is either consumed boiled alone or used to make porridge. It can also be roasted as done by women on road side and fried as dodo; thus, providing income for hoteliers and women. In addition, it is used in the food industry for the manufacture of chips, flakes, cakes and grounded into flour (Kainga and Seiyabo, 2012). In view of these identified roles and importance of plantain today, allied to increase in production pressure, there is need for a shift in the production system and goal, if the crop is to remain competitive. Currently, plantain is reported, to be grown in 52 countries with the world production of 33 million metric tonnes (FAO, 2004). Its production in Nigeria between 1990 and 2004 indicated a downward trend in terms of yield per hectare while price per MT have steadily increased within the period (FAO, 2006; FAO/STAT, 2011). However, only eight African countries were named among top ten world producers of plantain with Nigeria ranking the fifth highest producer of the crop (FAO, 2004).

To reverse any downward growth in the crop, ensure food security and make the crop competitive, there is urgent and vital need for the production of plantain to be driven by profit. Profit is the major factor driving private investment and it is an index of efficiency and sustainability. It a situation where income from the business exceeds the expenses or cost and taxes incurred. In Economics, the term profit is regarded as net income of the business after netting the sum of variable costs and fixed cost. It may be zero (if costs is equal to income) and profit (if income exceeds costs). Pure (or net) profit is derived by the deduction of fixed costs from gross profit; thus, a reward for entrepreneurial related functions. Profitability is the state or condition of yielding a financial profit or gain (Business Dictionary, 2004).

In order to improve the profitability, there is need to consider the socio-economic constraints and characteristics of plantain farmers. Such considerations would involve; scale of operation, educational status, age, gender, household size, e. t. c. as well as their production system in order to take care of the physical and environmental factors.

Aim and Objectives of the Study

The study investigated effects of Nigeria's socio- economic characteristics on the profitability of small-scale plantain farming in Ohaji/Egbema local government area of Imo State with the following specific objectives:

- i. examine the socio-economic characteristics of the farmer
- ii. analyse the costs and returns of the producers
- iii. identify their methods of production
- iv. determine the relationship and effects of socio-economic characteristics on profitability of the plantain farmers.
- v. highlight the challenges confronting the plantain farmers. The hypothesis tested involved determining if there were any significant relationship between output of plantain on one hand and educational status, farm size and age on the other hand.

Methodology

Study Area

The study was carried out in Ohaji/Egbema Local Government Area of Imo State, Southeast, Nigeria. Imo State state has 27 local government areas (LGAs) of which Ohaji / Egbema is one. Ohaji/ Egbema was purposively selected because it is the food basket and oil kingdom of Imo state. It has an area of 316km² with a population of 182,891 (NPC, 2006). The local government is situated in the rainforest belt of Southeast Nigeria with relatively annual rainfall between 2000mm- 2500mm ranging from April to late October. The temperature is between 26°C- 28° C with relative Humidity of 98% during the rainy season and 60%- 80% during the dry season. The main occupation of the people are farming, rearing of goats, sheep and keeping chicken, fishing, trading. Other means of livelihood include; hunting, palm wine tapping, palm oil milling and crude oil drilling.

Sampling Procedure

A multi-stage sampling technique was used to select the respondents. First, five out of 16 autonomous communities were selected. In the second stage, two villages were randomly selected from the five autonomous communities; thus giving a total of 10 villages selected. In the third stage, from each village six respondents / farmers were randomly chosen; thus, giving a total of 60 farmers. The villlages chosen were from;

- Egbema Autonomous Community (AC) –Aliocha and Abacheke
- Ohoba AC –Eziama and Umuodu
- Assa/Obile AC- Uzora/ Mgbirichi and Umuobodo
- Umuokanne AC- Umuoloo and Orduga
- Mgbirichi AC- Amakoha and Abakuru

The list of the farmers, constituting the sample frame, was collected from the ADP (Agricultural Development Programme) office in the LGA with the assistance of Community Council Chiefs.

Data Collection

Primary data were collected with the help of structured questionnaire and personal interview schedules. The questionnaire was administered to the selected 60 plantain farmers. Also, secondary information was collected from journals, textbooks, magazines and online materials, among others.

Data Analysis

Data analysis was carried out with statistical tools, such as frequency distribution, tables and percentages. Specifically, the frequency distribution was used to analyze objectives (i), (vi) and (v); while cost and returns and production function models were used to analyzed objectives (ii) and (iv).

Model Specification

The model specifications used were Gross Margin (Profit) Analysis.

i) Gross Margin (GM) Analysis:

$$GM = TR - TVC$$

Where, GM = Gross Margin (N)

TR = Total Revenue

TVC = Total Variable Cost

ii) Ordinary Least Square (OLS) Multiple Regression Analysis. The OLS Multiple Regression consists of seven explanatory Variables (X_1 - X_7), error term and dependable variable (Y).

This is defined implicitly as follows:

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

Where, Y = Output of Plantain (No. of bunches/Metric Tonnes)

X_1 = Age (No. of years)

X_2 = Educational Status (No. of years spent in formal schools)

X_3 = Family Size (Household No.)

X_4 = Sex (Dummy: Male=1, Female=0)

X_5 = Marital Status (Dummy: Married =1, Non-Married = 0)

X_6 = Farming Experience (Years)

X_7 = Farm Size (Hectares)

Apriori: $Y > X_1, X_2, X_3, X_4, X_5, X_6, X_7$

Results and Discussion

Socio-Economic Characteristics

The summaries of the socio-economic characteristics of plantain farmers are presented in Table 1. The results of the analysis showed that the mean number of years spent in formal school was 8 years. This suggests that these farmers were not highly educated but can read

and write, and therefore can adopt basic new technology. This figure is higher than the five years reported by a similar study of plantain farmers in Rivers State (Fakayode et al, 2018). This position also agrees with Onubuogu and Onyeneke (2012) that posited that education and training enhances farmers' productivity. The mean farm experience of the farmers was 16 years and their mean age was 52 years. These two related factors are useful in sound decision making in enhancing productivity, a position in agreement with (Onyeneke and Iruo, 2019). The farmers cultivated an average of 0.56 hectares of plantain farm; thus, suggesting that they are small-scale operators. The farmers also were involved in other secondary occupation, especially farming of other crops and rearing of livestock, from which income was supplemented. The mean income from other sources was estimated to be ₦240,000 per annum.

The respondents were majorly males, and constituted married couples mainly and they used family labour, extensively.

Table 1: Summary Statistics of Socio-economic Variables of Plantain Farmers

Variable		Mean
Level of Education (Years)		8
Farm size	(Hectare)	0.56
Experience	(Years)	16
Age	(Years)	52
Income from Secondary Occupation per annum (Naira)		N 240,000

Sex	Frequency	%
Male	38	63
Female	22	37

<u>Secondary Occupation</u>	<u>Frequency*</u>	<u>%</u>
Trading	45	75
Hunting	10	17
Processing	25	42
Artisans and fishing	30	50
Other Farming Activities	50	83
Civil/Public Service	10	17

<u>Labour Type</u>	<u>Frequency*</u>	<u>%</u>
Family Labour	40	67
Hired Labour	15	25
Both	55	92

<u>Marital Status</u>	<u>Frequency</u>	<u>%</u>
Married	48	80
Single	12	20

*Multiple Response

Source: Field Data, 2015

Cost and Returns

That cost and returns of the plantain farmer is presented in Table 2. The average farm size was 0.56 hectare. The annual output per hectare was put at 400 bunches (approximating 18MT per hectare) at N 700 per bunch. Thus, giving a total income of N 280,000.

The table showed that the average total variable cost was N114, 000 (or 75.62%) of the total cost (N 150,750). The total fixed cost was N 36, 750 (or 24.38% of total cost). The most important variable costs item was the planting materials (suckers) whose cost was 26.53% of the total cost. For the fixed cost, the most important cost item was the value on depreciation of equipment and tools, which was put at 16.58% of the total cost. The profitability index was 1.86 while the returns on every N1.00 invested was 86 kobo. This suggests that for every N1 invested, the net profit was 86 kobo. When this was compared with the existing bank rates (in 2015), namely prime lending rate of 28% p.a. and saving rate of 3.8% p.a., it becomes obvious that the plantain enterprise is profitable.

Table 2: Cost and Returns of Plantain Enterprise Per Hectare

S/NO	Item	Unit	Unit Cost (N)	Total (N)	% Of Total Cost (N)
1.	Output (Bundles)	400	700	-	
2.	Gross Income	400	700	280,000	
3.	Variable Cost				
	Land Preparation	9 MD (Man day)	2,000	18,000	11.94
	• Planting Materials:				
	Suckers used	800	50	40,000	26.53
	Fertilizer	4 (Bags)	2,500	10,000	6.63
	• Planting/ Cultivation	6MD	2,000	12,000	7.96
	• Weeding	6 MD	2,000	12,000	7.96
	• Harvesting	4 MD	1,500	6,000	3.98
	• Pruning	2 MD	1,000	2,000	1.32
	• Transportation & Utilities	Varied	Varied	4,000	2.65
	• Agro-chemicals	Varied	Varied	2,000	1.32
	• Miscellaneous	Varied	Varied	8,000	5.31

	Total Variable Cost			114,000	75.62
4.	Gross Profit			166,000	
5.	Fixed Costs:				
	• Rent/ Lease of Farmland (Plots)	4.5	1,500	6,750	4.48
	• Equipment& Tools (Depreciation Value)	Varied	Varied	25,000	16.59
	• Miscellaneous	Varied	Varied	5,000	3.32
	Total Fixed Cost			36,750	24.38
6.	Total Cost			150,750	100.00
7.	Net Income			129,250	
8.	Profitability Analyses				
	a) Profitability Index			1.86	
	b) Return on Capital invested			86%	
	c) Return on every N1 invested			86k	
	d) Banks prime lending Interest Rate on loans			28% p.a.	
	e) Banks savings interest rate			less than 4% p.a.	

1 manday = 8 Hours work by adult males

Source: Field Data, 2015

Agronomic Practices of the farmers

Table 3 is the summary of the agronomic practices of the plantain farmers. The table showed that ninety percent of the respondents practiced mixed cropping while only 10% practiced sole cropping. The farmers also involved manual tillage of the soil, weeding and pruning of plantain trees in their agronomic practices. Fertilizer and agrochemical applications were minimally used. The planting season starts in April – May. Clearly, there was no evidence of substantial advanced/ improved technology employed by the farmers. Production technique was largely rudimentary.

Table 3: Agronomic Practices of Plantain Farmers in Ohaji/ Egbema LGA, Imo State

Items	Respondent	%
Mixed Cropping	54	90
Sole Cropping	6	10
Tillage Operations	Manual	
Weeding Frequency	3 times p.a	
Planting Season	April-May	
Fertilizer Application:		

Yes	20	34
No	40	66
Agrochemical Application:		
Yes	10	17
No	50	83
Pruning:		
Yes	60	100
No	0	0

Source: Field Data, 2015

Factors Affecting Socio-Economic Characteristics on the Profitability of the Farmers

Table 4 is the Ordinal Least Square Multiple Regression Analysis results on the effects of Socio- economic characteristics, on the profitability of the plantain farmers. Four functional forms, namely: Linear, Exponential, Semi-Log and Double- Log, were tried out. The Double- Log function was chosen as the lead equation on the account of its highest R^2 (Coefficient of production function of the Double Log form is stated as follows:

$$Y = 23.9147 + 0.70623X_1 + 1.2786X_2 - 0.2064X_3 + 0.0156X_4 + 0.12746X_5 - 0.0551X_6 + 0.0713X_7; \\ (0.0892) \quad (1.8054)^{**} \quad (3.1197)^* \quad (-3.7294)^* \quad (0.1032) \quad (0.7390) \quad (-0.9130) \\ (3.1549)^*$$

NB: the figures in parenthesis represent the respective t-values.

The R^2 , the Coefficient of Multiple Determination indicated that the variables X_1 to X_7 explained 59.24% of the variations in the quantity of plantain produced by the farmers.

Further, it showed that each additional year in age yields 0.7062 tonnes of plantain and every increase in year spent in school yields 1.2786 MT of plantain. The use or increase in family size and farm size inversely yields 0.0264 MT and 0.0551 MT of plantain. The age, number of years spent in school, family size and farm size were significant, at least on 5% LOS.

Table 4: Multiple Regression Results on the Effects of Socio- economic Characteristics on the Profitability of Plantain Farmers in Ohaji/ Egbema LGA, Imo State

Explanatory Variables	Linear Function	Semi-Log Function	Double-Log Function	Exponential Function
Constant	15.9317	8.1163	23.9147	11.0069
t-value	2.8714	3.1052	4.0892	1.5281
Age (X_1)	168.389	6147.61	0.706234	0.018965
t-value	(1.9933)**	(1.6177)	(1.805439)**	(2.17917)**
Educational Level (X_2)	93.3326	981.6745	1.27865	0.009852

t-value	(0.4982)	(0.5858)	(3.11977)*	(0.0509939)
Family Size (X ₃)	-312.6270	- 1985.04	- 0.20649	- 0.02893
t-value	(- 0.8957)	(- 0.7218)	(- 0.72948)*	(- 0.80386)
Sex (X ₄)	534.2248	533.1161	0.015664	0.013956
t-value	(0.37174)	(0.36158)	(0.103213)	(0.094167)
Marital Status (X ₅)	- 2230.9000	- 22049.7	0.127463	- 1.29557
t-value	(- 5.7603)*	(- 5.5337)*	(0.739025)	(-3.2420)*
Farming Experience (X ₆)	- 3.26662	- 346.23	- 0.05511	- 0.00048
t-value	(- 0.89194)	(- 0.5904)	(-0.91306)	(- 1.28017)
Farm Size (X ₇)	- 2664.5	-2423.62	0.0713 *	- 0.27946
t-value	(-1.73439)**	(-1.5807)	(3.1549)	(- 1.76391)**
R ²	0.420371	0.4067	0.5924	0.222299
F	5.387508	5.0929	8.9250	2.123395
DF	59	59	59	59
N	60	60	60	60

NB: Values in parenthesis are the equivalent t-values of X₁-X₇ in each functional form

LOS= 5%** ; t- tab = 1.671 and

1%*; t- tab = 2.390

Source: Field Data, 2015.

Constraints of the Plantain Farmers

The constraints to the plantain farmers are presented in Table 5. The table showed that transportation and bad roads topped the list of constraints to the farmers. This was followed by inadequate finance (85%), theft (83%) and marketing impediments of the products by middlemen (80%). Other challenges of the farmers; include high cost of fertilizer, storability of plantain, damages by wind, lack of processing equipment, pest and diseases and rising cost of land.

Table 5: Constraints to the Production of Plantain

Constraints	Frequency*	%
1. Transportation and Bad Roads	60	100
2. High Cost of Labour	52	87
3. Lack of Financial Support	51	85
4. Theft	50	83
5. Marketing Impediments by Middlemen	48	80
6. High Costs of Fertilizer	46	77
7. Storage ability/Short Shelf Live	45	75
8. Damage by Wind	42	70
9. Lack of Processing Equipment	40	67

10. High Incidence of Pest and Diseases	35	58
11. Increasing Cost of Land	30	50

* Multiple Responses

Source: Field Data, 2015

Conclusion

The findings of the study showed that plantain enterprise is viable and profitable. It further revealed that socio-economic characteristics such as; age, number of years spent in school, family size and farm size had significant effects on output of plantain enterprise and therefore constituted major determinants. The studies furthermore highlighted the outstanding constraints in plantain production as high transportation cost and bad roads, rising cost of labour, inadequate finance, theft and marketing impediments of middlemen.

Recommendations

Based on the findings of the study, the recommendations have been made:

1. Identified challenges should be addressed to enhance the production of plantain.
2. Efforts should be geared towards improving the training of the farmers as well as making land available for plantain cultivation.
3. Cooperative Society is highly advocated in these dispensations.
4. Government of Imo State and Ohaji/Egbema Local Council may provide concessional loan to plantain farmers in the area to improve their profitability.

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