

PROFITABILITY AND CONSTRAINTS OF PLANTAIN FARMING AMONG RURAL HOUSEHOLDS IN NIGERIA: DELTA STATE PERSPECTIVE.

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ABSTRACT

The specific aim of the study was to evaluate the cost and returns of plantain farmers. Multistage sampling technique was adopted and 126 plantain farmers were selected purposively. Questionnaires that were structured were used for the collection of data which were analyzed using gross margin analysis and descriptive statistics. Most plantain farmers were aged and married with secondary school status. Plantain farming was done part-time with a large household size that was highly experienced. Most respondents carried out agronomic operations while most production systems were lacking. Farmers' constraints were unstable prices, flooding, post-harvest losses, and credits among others. The cost and returns analysis revealed that the business gross margin and net return were ₦ 444, 700 and ₦300, 156.20 respectively revealing profitability. The business benefit-cost ratio of 1:4 revealed that the profit margin of the plantain business was 40%. The study recommendation is that plantain farmers should form themselves into cooperatives to regulate the unstable plantain prices and access to more credits to increase farm investment.

Keywords: Constraints, farming, plantain, profitability, rural households

INTRODUCTION

Plantain (*Musa paradisiaca*) is a food crop that strategically occupied a vital position in rapid food crop farming in Nigeria (Akinyemi *et al.*, 2010). A vital stable food crop in the humid forest zone of central and West Africa is Plantain (Faturoti *et al.*, 2007). African countries stood among the top ten world plantain producers with Nigeria ranking fifth-highest plantain producer (FAO, 2004). Plantain's world production output is about a 33million metric, tons and has grown in 52 countries globally (FAO, 2004).

Plantain is estimated at approximately 2.4metric tons and is a valuable source of essential vitamins, potassium, dietary fiber, energy and starch. Also a good powerful antioxidant and helps in the reduction of constipation problems in the body due to the presence of dietary fiber (it contains 2.3grams of dietary fiber per 100gram). Plantain is known to contain crude fiber, sodium, carbohydrate, calcium, potassium, phosphorus and magnesium and plantain products contribute about 6.3 to 15.3 percent energy, 9.2 to 23.3 percent iron, 5.9

to 30.2 percent protein, 28.5 to 33.7 percent zinc and 7.8 to 16 percent calcium (Adepoju *et al.*, 2012). The food crop plantain is important in vitamin B6, C, minerals and dietary fibers with carbohydrates accounting for 32 percent of plantain fruit weight (Oladejo and Sanusi 2008; IITA, 2014).

Soil for the cultivation of palm, rubber and cocoa production especially forest soil is good for plantain farming (Akinyemi *et al.*, 2010). Plantain production needs a well-distributed rainfall year-roundbut dry season irrigation becomes necessary (IITA, 2014).

The main constraints limiting plantain farming as stated by Akinyemi *et al.* (2010) includes land, cultural practices, labour, pest, diseases, post-harvest handling and storage. Ajayi and Mbah (2003) noted that most plantains produced were wasted due to environmental factors.

Plantain is consumed by many persons in form of chips (fried unripe and ripe plantain, boiled, roasted plantain or it could be eaten as plantain flour as stated by (Okoruwa *et al.*, 2014) also roadsides' women in Nigeria market fried unripe and ripe plantain (Bifarin and Folayan, 2009).

Delta State is one the leading plantain producer in Nigeria (Morris and Kamarulzaman, 2014) but a research gap existed in the aspect of constraints and profitability of plantain in Delta State, Nigeria. This research gap gives birth to this research study.

OBJECTIVES OF THE RESEARCH:

Objectives is designed to:

- i. study the socio-economic characteristics of its farmers.
- ii. analyse plantain farmers agronomic operations.
- iii. determine the plantain production system
- iv. examine plantain farmers constraints and
- v. analyse the cost and returns of the business

METHODOLOGY

Study Area

Delta State was selected for the study due to its abundant and leading plantain producer in Nigeria, as collaborated by Morris and Kamarulzaman (2014) that plantain farming is mostly concentrated in Bayelsa, Delta, Akwa-Ibom and Oyo States. Delta State comprises of different ethnic groups and twenty-five local government areas (LGAs). It has a population of

about 4,112,445 persons and a landmass of 17,698km² (NPC, 2006). The state is endowed with crude oil and it is an agrarian state. It is located on latitude 5.7⁰N and longitude 5.9⁰E.

MATERIAL AND METHODS

A multi-stage sampling technique was adopted and 126 plantain farmers were purposively selected. Firstly, seven LGAs were randomly chosen from the twenty-five LGAs of the state. Secondly, six rural communities each were randomly chosen from the seven LGAs giving a total of 42 rural communities and finally, three plantain producers each were purposively chosen from the 42 rural households giving an aggregate of 126 plantain producers. The analyses of data were done using a Gross Margin Analysis Model and descriptive statistics such as mean, mode, frequencies and percentages were engaged to analyse the socio-economic variables, agronomic operations, production systems and plantain farmers’ constraints.

Model specification

- Mean = $\frac{\sum fx}{\sum f}$ -----equation i
 - TCp = TVCp + TFCp ----- equation ii
 - GMp = TRp – TVCp ----- equation iii
 - NRp = TFCp ----- equation iv
 - BCRp = TRp/TCp -----equation v
- Where
- Σ = Summation sign
 - F = frequency

- X = classmark
- TCp = Total cost of plantain farming
- TVCp = Total variable cost of plantain farming
- TFCp = Total fixed cost of plantain farming
- GMp = Gross Margin of plantain farming
- TRp = Total revenue of plantain farming
- NRp = Net returns of plantain farming
- BCRp = Benefit-cost ratio of plantain farming.

RESULT AND DISCUSSION

Socio-economic characteristics of plantain farmers. Most plantain farmers fall within the age bracket of 40 – 52 years with an average age of 49 years indicating age and maturity. Most producers were married (84.9%) males (77.8%) engaging more in plantain farming. It was mostly done on a part-time basis (96.0%) with a mean family size of 10 persons. Secondary school educational level (36.5%) followed by primary school educational level (31.0%) and an average 12 years of experience revealing adequate farming experience as shown in Table 1. These findings collaborated with the findings of Emaziye (2021) who stated that cassava farming activities were left in the hand of aged and illiterate persons with large households size in Delta State. Also, Ovharhe et al, (2020) confirmed the findings that youth migrated to cities leaving farming work with aged and illiterate farmers in Delta State.

Table 1: Socio-economic Characteristics of Plantain Farmers

Socio-economic characteristics	Frequency	Percentage (%)	Mean/Mode
Age in years			
27 -39	26	20.6	49 years
40 – 52	51	40.5	
53-65	43	34.1	
66-78	6	4.8	
Marital status			
Married	107	84.9	Married
Single	6		
Widow	9	4.8	
Divorced	4	7.1	
Gender			
Male	98	77.8	Male
Female	28	22.2	
Farming status			
Part-time	112	88.9	Part-time
Full Time	14	11.1	
Family size (persons)			
1-5	19	15.1	10 persons
6-10	47	37.3	
11-15	53	42.1	
Educational level			
No formal education	32	25.4	

Primary school	39	31.0	
Secondary school	46	36.5	Secondary school
Tertiary	9	7.1	
Farming experience (years)			
1 – 7	40	31.8	
8 – 14	43	34.1	12 years
15 – 21	29	23.0	
22 – 28	14	11.1	

Source: Field Data.

Plantain Farmers Agronomic Operations

Table 2 states that farmers carried out weeding (100.0%) of their farms, fertilizer application (33.3%) while most plantain farmers do not apply fertilizer (66.7%) to increase soil nutrients probably due to

scarcity and cost. Most respondents tilled the land (73.0%) as part of its agronomic practices with less plantain support with stakes or other materials against wind damage (28.6%) and during the planting season(88.1%) (April to June yearly).

Table 2: Plantain farmers Agronomic Operations

Agronomic Operation	Yes	No
Weeding	126 (100%)	0 (0.0%)
Tillage	92 (73%)	34 (27.05)
Fertilizer application	42 (33.3%)	84 (66.7%)
Chemical application	49 (38.9%)	77(61.1%)
No plantain support against wind damage	26 (28.6%)	90 (71.4%)
Plant during planting season April-June	111(88.1%)	15(11.9%)

Source: Field Data

Plantain Production Practices

Table 3 reveals that production systems such as formal training (3.2%), use of improved variety (10.3%), extension services (0.8) and standard spacing (31.0%)

were lacking. This is in line with the findings of Akinyemi *et al.*, (2010)who stated that cultural operations and extension services were lacking in Nigeria.

Table 3: Plantain farmers Agronomic Operations

Agronomic operation	Yes	No
Formal training	4 (3.2%)	122 (96.8%)
Use of improved variety	13 (10.3%)	113 (89.7%)
Extension services	1 (0.8%)	125 (99.2%)
Standard & spacing (2.5m apart)	39 (31.0%)	87 (69.0%)

Source: Field Data

Plantain Farmers Constraints

They experience hindrances that reduce plantain production. Lack of credits (9.1%), theft (6.3%), pest and diseases (6.9%), land acquisition (5.2%), flooding (6.1%), high transportation cost (4.8%), storage and processing facilities (6.1%), unstable prices (9.3%), fertilizer available (7.2%), lack of extension services (9.4%), lack of formal training (9.2%), improved

variety availability (1.0%) and wind damage (8.1%) as shown in Table 4.

This was similar to the findings of Akinyemi *et al.*, (2010) that stated that land cultural practices, labour, pest, diseases, post-harvest handling and storage were among the constraints encountered in Nigeria. Also Nwaiwu *et al.*, (2012) farming, inaccessibility to improved cultivar coupled with marketing prices that were major constraints in Abia State, Nigeria.

Table 4: Plantain farms constraints

Farmers constraints	Frequency	Percentage
Credit	121	9.1
Theft	83	6.3
Pest and diseases	92	6.9
Land acquisition	69	5.2

Flooding	81	6.1
High transportation cost	63	4.8
Storage and processing facilities	81	6.1
Unstable price	123	9.3
Fertilizer availability	73	5.5
Post-harvest losses	77	5.8
Labour	96	7.2
Lack of extension services	125	9.4
Lack of formal training	122	9.2
Improved variety availability	13	1.0
Wind damage	107	8.1

Source: Field data, multiple responses observed

Plantain farmers' revenue per acre

The average number of bunches harvested from an acre was 1.50 with a mean price per plantain bunch of N750

giving a total sum of N1, 132,500 as shown in Table 5. Plantain revenue per acre was quite substantial and encouraging.

Table 5: Distribution of Plantain farmers according to their revenue per acre

Variables	Amount (N)
Quantity (bunch)	1510
Rate per bunch (N)	750
Total Revenue (N)	1,132,500

Source: Field Data

Plantain farmers cost of production

Most total variable costs were the purchase of plantain suckers, fertilizer, chemical (insecticides), weeding (herbicides), labour and transportation which amounted to N687, 800. The fixed cost was the depreciation of tools, interest on capital and land amounting to N144,

543.80. The total cost was N832,343.80 per acre as shown in Table 6. This is in agreement with Emaziye (2020) that the total variable cost of the business was far greater than the total fixed cost in crop production in Delta State.

Table 6: Distribution of Plantain Farmers According to their cost of production

Cost	Quantity	Rate	Amount
Variable cost (N)		(N)	(N)
Plantain suckers	161	100	161800
Fertilizer (Liquid)	10	400	40,000
Chemical (Insecticide)	2	4000	8,000
Weeding (herbicides)	10	1600	16,000
Labour	100 (Man hours)	4500	450,000
Transportation			12,000
Total variable cost (TVC)			687,800
Fixed cost (N)			
Land rent age			70,000
Depreciation of tools and equipment			35,000
Interest on capital			39,543.80
Total fixed cost (TFC)			144,543.80
Total cost (TC)			832,343.80

Cost and returns analysis of plantain farming

The parameters in Table 7 revealed that the total revenue was N1,132,500 as against the total cost of N832,343.80 with total variable cost and total fixed

cost of N687,800 and N144,543.80 respectively. The gross margin and returns were N444,700 and N300,156.20 respectively which shows that profit in the plantain farming business was quite substantial.

The benefit-cost ratio of plantain farming was approximately 1.4 revealing that for every one naira invested into plantain farming, forty kobo was gotten as profit (40%), hence if N1,000,000 invested a profit of N400,000 will be realized, with the benefit-cost ratio of 1.4, the plantain business is lucrative. These findings

were inline with the research work of Ekunwe and Ajayi (2010) who confirmed that net farm returns of plantain production were N203, 139.40/ha and benefit-cost ratio of 1.37 in Edo State, Nigeria. Also Aminu *et al.*, 2017 stated that plantain farming net returns were 1.49 in Lagos State, Nigeria.

Table 7: Cost and Returns Analysis of Plantain Farming

Variables	Amount (N)
Total Revenue (TR)	1,132,500
Total Variable cost (TVC)	687,800
Total fixed cost (TFC)	144,543.80
Total cost (TC)	832, 343,80
Gross Margin (GM) = TR _p – TVC _p =	444,700
Net Returns (NR) = GM _p – TFC _p =	300,156.20
Benefit cost Ratio (BCRp) = TR _p /TC _p =	= 1.4

CONCLUSION AND RECOMMENDATION

Most plantain farmers were aged and matured with a mean age of 49 years that were mostly married with the low educational level of secondary school. Most respondents engaged in plantain farming on a part-time basis with a large mean family size of 10 people and a mean plantain farming experience of 12 years. Most plantain farmers carried out agronomic operations such as weeding, fertilizer application, tillage, planting in the plantain season of April to June and providing support to plantain against wind damage. Most production systems such as formal training, use of improved cultivars, extension services and standard spacing of 2.5m by 2.5m were lacking. Most constraints noticed by farmers were pests, diseases, storage and processing facilities, unstable prices, flooding, high transportation cost, and post-harvest losses among others. The total revenue gotten from an acre of plantain plantation was N1, 132,500 and the total cost of plantain production for an acre was N832, 343, 80. The cost and returns evaluation stated that the gross margin and net returns were N444, 700 and N300, 156.20 respectively which showed that the plantain business was profitable. The benefit-cost ratio of 1.4 revealed that the profit margin of the business was 40%. This implies that for every one Naira invested forty Kobo profit will be gotten by the plantain farmer. The study recommends that plantain farmers should form themselves into co-operatives to regulate the unstable plantain prices and access to more funds for the increase in plantain production.

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