

## Economics of Plantain Production in Edo State Nigeria

Ekunwe, P.A. and Ajayi, H.I.

Department of Agriculture Benson Idahosa University, Benin City, Edo State Nigeria.

**Abstract:** This Study examined the cropping pattern, profitability and constraints to plantain production in Edo State, Nigeria. A total of 150 plantain farmers were randomly selected from the list of plantain farmers in the study area as provided by the Agricultural Development Programme (ADP) extension agents of the state. The sampled farmers were interviewed using well structured questionnaire. Simple descriptive statistics, gross margin analysis and t-ratio was used to analysis the data collected, while the likert scale technique was used to identify the constraints faced by the farmers. The result revealed that 82 percent of the farmers were male while 18 percent were female. The mean age of the farmers was 44 years and the average farming experience was 22 years. Also, the average farm size was 1.7 hectare. The results also revealed that majority of the farmers (84 percent) practice mixed cropping as opposed to sole cropping (16 percent). When the cropping pattern was studied with respect to farm size, farmers' age and experiences the results showed that there was a significant relationship between these variables and cropping pattern. The results of the analysis also showed that the gross return was N255, 970.00/ha, with a total variable cost and fixed cost of N43, 410.60/ha and N9, 420.00/ha respectively. The net farm income was N203, 139.40/ha with a return per naira of 37.7% . The major constraints the farmers faced were transportation, labour, storage processing and finance.

**Key words:** Cropping pattern, profitability, plantain production, constraints, Edo State, Nigeria.

### INTRODUCTION

Plantain belongs to the family Musaceae and the genus *Musa*. It is a perennial herbaceous plant, 2 to 9m tall, with an underground rhizome or corm. The principal species are *Musa paradisca* (French plantain), *Musa acuminata* (Gross Michel and Cavendish) and *Musa corniculata* (Horn plantain). The cultivars of plantain are French plantain, French horn plantain, false horn plantain and horn plantain. Plantain thrives on a wide range of tropical and sub-tropical climates. It requires an optimum temperature of 30°C, mean monthly rainfall of 100mm, pH 4.5 and 7.5 and sandy loam soils<sup>[5]</sup>. Plantain originated in South India and moved to South East Africa, from where it spread to Central and West Africa, it is believed to be the oldest cultivated fruit in West and Central Africa. Plantain is grown as a staple food in 52 counties and worldwide on about 12.5 million acres<sup>[9]</sup>. World production of plantain was estimated in 1985 at 25 million tones. Of this, 19.6 tones was projected for Africa, Latin America was the second place producer at 4.1 million tones<sup>[1]</sup>. Annual production in Nigeria is 1,855,000 metric tones<sup>[10]</sup>. In Nigeria, plantain is produced in large quantities in Edo, Delta Ogun and Ondo states. Other producing states are Rivers State, Cross River, 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 some times go unnoticed<sup>[12]</sup>.

Plantain is an important staple crop, supplying up to 25% of the carbohydrates for approximately 70 million people in humid zone of sub-Saharan Africa<sup>[3]</sup>. In Edo State, as in other humid forest zones of the country, plantain is consumed as a staple crop. It is either consumed boiled alone, or used to make porridge or boiled and pounded with yam or cassava (called fufu in Nigeria), it can be roasted on heated charcoal (women on the roadside generally sell it), it can also be fried when ripe and this is called "dodo" or the unripe or slightly ripened plantain pulp can be fried in vegetable oil to obtain plantain chips known as "pekere" in Nigeria. Plantain chips are the most popular plantain products in Nigeria<sup>[6]</sup>. These are sold on the streets or by small and medium scale companies, which deliver them to supermarkets. Unripe plantain is traditionally processed into flour in Nigeria. The flour produced is mixed with boiling water to prepare amala (also known as 'elubo' in some parts of Nigeria). Plantain flour contains 10% of residual humidity and can be hermetically packed in plastic sachets and stored for many months without deterioration of its qualities.

The demand for plantain has increased tremendously in the last one decade as a number of local processing industries have emerged which use it industrially for making bread, cakes, biscuits and so on<sup>[7]</sup>. and<sup>[5]</sup>. This study examines the agronomic practices of plantain farmers, determine the profitability of plantain production and examine the constraints to plantain production in Edo State, Nigeria.

## MATERIALS AND METHOD

**Area of Study:** The study was carried out in Edo State with particular attention on the major plantain producing areas of the state that is Orhionmwon, Ovia North East and Ovia South West Local Government Areas of Edo State. Edo State was created in 1991 out of the former Bendel State. The state has eighteen (18) local government areas. It is predominantly a rainforest region. It occupies a land area of about 17,802sq. Kilometers. From the 1991 census, the state has a population of 2,159,848. It is bounded on the south by Delta State, on the West by Ondo State, on the east by Anambra State and on the North by Kogi State. As a geographical entity it lies between Longitude 5<sup>0</sup> and 5<sup>0</sup> 45<sup>1</sup> East of the Greenwich Meridian and between Latitude 5<sup>0</sup> 15<sup>1</sup> and 7<sup>0</sup> 41<sup>1</sup> North of the Equator<sup>[2]</sup>.

**Data Collection and Sampling Techniques:** Primary data were used for the study and were obtained from with the use of a well-structured questionnaire. The variables covered in the questionnaire include, the socioeconomic characteristics of the farmers, cropping pattern, cost and revenue, farm output etc. The sampling technique used for the study is the simple random sampling technique. A total of 150 plantain farmers were randomly selected in the study area from the list of Agricultural Development Programme (ADP) contact farmers. Fifty farmers were randomly selected from each of the three Local Government Areas (Orhionmwon, Ovia North East and Ovia South West Local Government Areas) that constitute the study area. The village extension agents from the State ADP assisted in identifying the plantain farmers.

**Data Analysis:** The statistical techniques employed in the study were descriptive statistics, t-ratio statistic and gross margin analysis. The likert scale method was also used.

The socioeconomic variables include age, farming experience, educational level, marital status and family size. The socio-economic variables were analyzed using descriptive statistics such as tables, frequency distribution, mean and percentages.

The profitability technique following Ogbonna and Ezedinma<sup>[8]</sup>. as adapted from Jirgi and Baba<sup>[4]</sup>.is

expressed as:

$$NFI = GFI (PQ.Q) - TC (TVC + TFC)$$

Where:

NFI= Net farm income; GFI= Gross farm income; PQ= Price per unit of output Q=Total output; TC= Total cost of production; VC= Variable cost; FC= Fixed cost.

The likert scale method was used in determining the constraints faced by the farmers. This scale is a 5-point scale and employs an ordinal level of measurement. Likert scaling is a bi-polar scaling method measuring either positive or negative response to statement. It is a summative scale. The responses to the various constraints were scored in a way that the response indicating the most serious constraint is given the highest score (that is, 5). As a 5-point scale, the responses were grouped into 5, that is Very Serious (VS)= 5, Serious (S) = 4, Moderately Serious = 3, Least Serious (LS) = 2 and Not Serious (NS) = 1.

The cropping pattern was estimated using descriptive statistic method. The relationship between the socioeconomic variables (age, farm size, experience) and the cropping pattern was determined by the use of the t-ratio statistics.

## RESULTS AND DISCUSSION

**Socioeconomic Characteristics:** The socioeconomic characteristics of the farmers are presented in Table 1. The results of the analysis showed that 82 percent of the farmers in the study area were males while 18 percent were females. From the data analysis most of the farmers interviewed were male. This shows that there were more male involved in plantain production than female. Eighty five percent of the farmers interviewed were married while the remaining were singles. The average age of the farmer was 44 years and the household size was 7 persons. The average age of the farmers indicated that the farmers interviewed were mainly in their middle age. The average farming experience of the farmers was 22 years. The farmers have long been in the plantain production business as indicated from the results of the analysis.

**Table 1:** Mean Statistics of Socioeconomic Characteristics of Plantain Farmers in Edo State, Nigeria.

Items	Respondent	Percentage
Gender: Male	123	82
Female	27	18
Age of Farmers(years)	44	
Farming Experience (years)	22	
Number of Year of Formal Education( years)	11	
Marital Status: Married	138	92
Single	12	8
Household Size (persons)	7	

Source: Derived from Field Data, 2000.

**Agronomic Practices:** Table 2 shows the agronomic practices of the farmers. With respect to cropping pattern 84 percent of the farmer practiced mixed cropping while 16 percent practiced sole cropping. The average farm size was 1.7 hectare and the rented land accounted for 41percent of the source of land for the farmers. The farmers are mainly small scale farmers as shown from the average farm size of 1.7 hectare<sup>[11]</sup>. The average cost of renting land in the study area was N2, 000/ha. The results of the analysis revealed that 83 percent of the respondents used family labour while 17 percent used hired labour. The average cost of labour per day was N1, 200 while the total cost of labour per hectare per annum was N27, 042.70. Labour as a major input is very important in plantain production. The results also showed that of all the farmers interviewed only 7.3 percent used any form of fertilizer and 10 percent used agrochemical. Farmers in the study area do hardly use fertilizer and agrochemical as these inputs are usually very expensive or are not available when needed. The average cost of fertilizer and agrochemical per hectare was N1, 646.5.00/ha and N1, 395.00/ha.

**Table 2:** Agronomic Practices of Plantain Farmers in Edo State, Nigeria.

Items	Respondent	Percentage
Cropping Pattern: Mixed	126	84
Sole	24	16
Weeding Frequency	3 (times)/annum	
Tillage Operation	Manual	
Planting Season	April- June	
Fertilizer Application: Yes	12	8
No	138	92
Agrochemical Application: Yes	15	10
No	135	90

Source Derived from Field Data, 2000.

**T-test Analysis:** When the cropping pattern of the farmers were studied with respect to farm size age, farming experience and education, the t-test calculated was greater than the t-test tabulated at 10 degree and 12 degree of freedom and at 5 percent probability level. Thus we reject the null hypothesis (Ho) that there is no significant difference between cropping pattern and farm size, age, farming experience and education. But accept the alternative hypothesis (Ha) that there is significant difference between cropping pattern farm size, age, farming experience and education. (See Table 3)

**Profitability Analysis:** The farm budget analysis is presented in Table 4. The results show that the total revenue from plantain was N233, 214.00 while the total revenue from other crops (maize, yam, vegetables melon and cassava) in the system was N22, 756.00; this gives total revenue of N255, 970.00. The total variable cost was N43, 410.60/ha and total fixed cost

was N9, 420.00/ha while, the net farm income was N203, 139.40/ha. The return per naira 37.7% implying that for every one naira invested a profit of 37 kobo was realized. The results indicate that plantain was profitable in the study area and it is recommended as a viable enterprise for anyone who wants to go into the venture.

**Table 3:** Test Statistic

Items	t-calculated	t-tabulated	Remark
Farm Size/Cropping pattern	5.230	1.812 (df10)	Reject Ho
Farming Experience/Cropping Pattern	10.560	1.782(df12)	Reject Ho
Age/Cropping pattern	5.369	1.812(df10)	Reject Ho
Education/Cropping pattern	6.342	1.812(df10)	Reject Ho

Source: Derived from Field Data, 2000.

**Table 4:** Costs and Returns in of Plantain Production with other crops per Hectare.

Items	Value (N)
Returns	Value (N)
Plantain Bunch	223,214.00
Other crops	22,756.00
Variable Cost	
Planting Material(suckers)	12, 447.00
Cost for other Crops	2,880.00
Fertilizer	1, 646.00
Chemicals	1, 395
Labour	27,042.60
Total Variable Cost(TVC)	43,410.60
Fixed Cost	
Cost of Land/Annum (Renting)	2,308.00
Depreciation of Tools and Equipment	3,815.00
Interest on Capital	3,397.00
Total Fixed Cost(TFC)	9,420.00
Total Cost (TVC +TFC)	53,830.60
Total Gross Returns	255, 970.00
Net Farm Income	203,139.40
Return Per Naira	37.7%

Source: Derived From Field Data 2000

**Constraints to Production of Plantain:** The results of the production constraints as presented in Table 5 show that transportation ranked first as the most important constraint with a mean value of 4.17 and a Standard deviation of 3.90. This is followed by Labor, storage, processing, land, finance and marketing. Fertilizer and chemical ranked as minor constraints in production of plantain.

**Table 5:** Production Constraints.

Constraints	Mean Value	Standard Deviation
Transportation	4.17	3.90
Labour	4.09	3.78
Storage	3.98	3.45
Processing	3.80	3.34
Land	3.50	3.20
Finance	3.40	2.80
Marketing	3.10	2.30
Fertilizer	1.60	2.40
Chemicals	1.40	2.35

Source: Derived From Field Data 2000

**Conclusion:** The results of the study show that plantain production is a viable venture and highly profitable. With the problem of finance, labour storage and transportation properly handled farmers will be able to get more returns per naira invested in plantain production.

#### REFERENCES

1. Food and Agriculture Organization. FAO., 1987. Root and Tuber Crops, Plantations and Bananas in Developing Countries: Challenge and Opportunities: Plant Production and Protection pp. 87- 83. Rome, Italy.
2. Federal Office of Statistics. FOS, 1996. population figures FOS publication.
3. International Institute for Tropical Agriculture. Iita., 1997. Annual Report.
4. Jirgi., R.I. and K.M. Baba, 2001. Economics of Crop Production in Traditional Farming in northern Nigeria: A case study of Dungaye Village in Sokoto State. In: The role Agriculture in Poverty Alleviation. M.M. Abubakar, T.A. Adegbola and I.S.R. Butxwat (eds) Proceeding of the 43th Annual Conference of the Agricultural Society of Nigeria held at Atbu Bauchi 15<sup>th</sup> -19th October 2000 41-47.
5. Ogazi., P.O., 1996. Plantain: Production, Processing, Utilization, Paman and Associates Limited. Uku-Okigwe.
6. Onyejebu., C.A. and A.O. Olorunda, 1995. "Effects of Raw materials processing conditions and packaging on the quality of plantain chips". Journal of the science of food and agriculture, 68: 277-283.
7. Ogazi., P. O., O. Smith-Kayode, H. M. Solomon and S.A.O. Adeyemi, 1991. Packaging considerations and shelf life study of a new plantain based weaning food in Nigeria". Paper presented at the 8<sup>th</sup> world congress of food science and technology, Toronto, Canada. September. 29 - October 4.
8. Ogbonna., M.C. and C.I. Ezedinma, 2005. Economics of Palm Oil Processing in Ihitte/Uboma, Imo State, Nigeria". Proceedings of the 39<sup>th</sup> conference of the agricultural society of Nigeria, Benin. 2005.
9. Robinson., J.C., 1996. Banana and Plantains. Cab International, Wallingford, UK".
10. Raw Materials Research and Development Council Rmdc. Publication , 2002.
11. Utomakili., J.B. and F.E. Aganmwonyi, 1995. Farm Management: A. Basic Text. Petersam Publishers, Benin City, Nigeria.
12. Wilson, G. F., 1983. Plantain Production: Prospects for improving the food situation on the tropics". Fruits, 38(4): 229 - 239.