

Profitability Analysis of Yam Production in Ika South Local Government Area of Delta State, Nigeria

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Abstract

The study evaluates the profitability of yam production in Ika South Local Government Area of Delta State, Nigeria. The specific objectives were to: ascertain the socio-economic characteristics of yam producers; determine the productivity of yam; determine the profitability of yam production; and identify the major constraints to the production of yam. Twenty four farmers were randomly selected from each of the five clans randomly selected, thus bringing the sample size to 120. Well-structured and validated questionnaires were administered to obtain information from the farmers. Descriptive statistics was used to analyze the productivity of yam output. Gross margin analysis was used to determine the profitability of yam production. The t-test results showed that the profit level in the production of yam was significantly greater than zero. Lack of credit, inadequate preservation facilities, inadequate or low patronage by wholesalers and low price of yam are the major constraints facing yam producers in the study area. From the findings, it was recommended that Government should ease transportation and provide storage facilities so as to improve the welfare of both sellers and buyers.

Keywords: Profitability, production, gross margin, constraint, Delta State

1. Introduction

Yam is a stem tuber crop popularly cultivated in southern and middle belts of Nigeria and used as a major food in the country. Nigeria is by far the world's largest producer of yams, accounting for over 70% of the world production. According to the food and Agricultural Organization report, Nigeria produced 18.3 million metric tonnes of yam from 1.5 million hectares, representing 73.8 percent of total yam production in Africa (FAO, 1985). According to 2008 figures, yam production in Nigeria has nearly doubled since 1985, with Nigeria producing 35.017 million metric tonnes, with value equivalent of \$5.654 million annually (CBN, 2009). In perspective, the world's second and third largest producers of yams, Cote d'Ivoire and Ghana, only produced 6.9 and 4.8 metric tonnes of yam in 2008 respectively. According to the International Institute of Tropical Agriculture, Nigeria accounted for about 70 percent of the world production, amounting to 17 million tonnes from land area of 2,837,000 hectares under yam cultivation (IITA, 2009).

Yam, a tropical crop of the genus *Dioscorea* has as many as 600 species out of which five are economically staple species. These are *Dioscorea rotundata* (White yam), *Dioscorea esculenta* (Chinese yam), *Dioscorea alata* (Water yam), *Dioscorea bulbifera* (Aerial yam) and *Dioscorea dumentorum* (Trifoliate yam). Out of these, *Dioscorea rotundata* (White yam) and *Dioscorea alata* (Water yam) are the most common species in Nigeria. Yams are grown in the coastal region in rain forests, wood savanna and southern savanna habitats.

Yam is in the class of roots and tubers that is a staple of the Nigeria and West African diets which provides some 200 calories of energy per capita daily (Onumadu and Eze, 2008). It is a good source of energy 100g of yam provides 118 calories. It is mainly composed of complex carbohydrates and soluble dietary fibre. Together, they raise blood sugar levels rather very slowly than simple sugars, and therefore, recommended as low Glycemic Index (GI) healthy food, also known as low GI food. Low GI foods helps to increase energy level and lose weight, and they also improve blood glucose control for people with diabetes. In addition, dietary fibre helps reduce constipation, decrease cholesterol levels by binding to it the intestines and prevent colon cancer risks by preventing toxic compounds in the food. It is an excellent source of B-complex groups of vitamins. It is indeed one of the vegetable rich sources of minerals like copper, manganese, calcium, potassium and phosphorus. In Nigeria, in many yam producing areas, it is said that “yam is food and food is yam”. However, the production of yam in Nigeria is substantially short and cannot meet the growing demand at its present level of use. Yam also has an important social status in gatherings and religious functions, which is assessed by the size of yam holdings one possesses. Besides, yam growers could make an important contribution to the national food supply, where a healthy and expanding market food crop industry is a safeguard against the lowering of health standards necessary for productive output in an expanding economy like ours (FAO, 2011).

The major producers of yam in Nigeria are Niger State, Abia State, Nassarawa State and Benue State. The problems of yam marketers include poor storage facilities, poor marketing strategy, and problem of income and culture of the people. As the campaign for household food security gains momentum all over the world, and some extreme hunger and poverty must be eradicated by year 2015, yams are some of the food crops whose production has got to be emphasized. Yams, being an important food crop for at least 60 million people in West Africa, it is therefore necessary to lower its production cost and scale up its production through an efficient use of its production resources (Babaleye, 2005). It is thus important that the profitability of its production be assessed.

It is obvious that there is a potential for the increase in its production and much can be done to derive foreign exchange from its export. In spite of this, little or no study has been conducted to assess the profitability of yam production among small scale farmers, especially in Ika South Local Government Area. The following research questions thus arise: What are the socio-economic characteristics of yam producers in the study area? What is the level of yam production in the study area? Do these producers derive any profit from their yam production activity? What factors could affect the production of yam, thus affecting profits of producers? It is within the premise of this study to address these issues.

The broad objective of the study was to examine the level of profitability in the production of yam in Ika South Local Government Area of Delta State. The specific objectives are to:

- i. ascertain the socio-economic characteristics of yam producers
- ii. determine the productivity of yam in the study area
- iii. determine the profitability of yam production
- iv. identify the major constraints to the production of yam

The following hypothesis stated in the null form was tested:

H₀: The net profit in the production of yam is not significantly greater than zero, that is, $H_0: \pi = 0$

This study is necessary because the findings will enable yam producers and any person aspiring to venture into yam production to have bird – eye view of the business. The study is expected to provide information that would equip

yam producers and potential yam producers with the idea of what it takes to have a profitable yam production enterprise. Also, the study would serve as an addition to existing knowledge and as a useful secondary information source for government, policy makers and future researchers in the country to help in agricultural planning. Students and researchers carrying out study on yam production would benefit adequately from the findings and recommendations made.

2. Research methodology

2.1 Area of Study

This study was carried out in Ika South Local Government Area of Delta State. Geographically, the Ika speaking people are found in the North West of Delta State. Ika South Local Government Area lies between latitude $6^{\circ}13m$ and $6^{\circ}20m$ in the north and longitude $6^{\circ}25m$ and $6^{\circ}29m$ in the west. Agbor is the headquarters of Ika South Local Government Area and is spread out on hills and a deep valley, the Orogodo Valley.

The people speak Ika, a dialect of Ibo language and are well known for their farming prowess. It has a total land area of 436 square kilometers and a population of 162, 594 (National Population Census, 2006). The local government area is made up of eleven clans namely, Agbor clan, Owa clan, Abavo clan, Ute-Okpu clan, Ute-Ogbeje clan, Umunede clan, Akumazi clan, Igbodo clan, Otolokpo clan, Mbiri clan, Idumuesah clan and Orogodo/Boji-Boji metropolis. The topography of the area is fairly undulating and has a tropical climate, characterized by wet and dry seasons. Rainfall is between 175cm and 200cm annually, while average annual temperature is almost $24^{\circ}C$ ($70^{\circ}F$). The local government is located in the rainforest zone and the vegetation consists of luxuriant, deciduous and evergreen forest. Crops like maize, cassava, yam, potato are predominantly grown in the area.

2.2 Sampling Technique

Ika South Local Government is divided into twelve clans. Out of these, 5 clans were randomly selected. From the 5 clans selected, 24 farmers were randomly selected using simple random sampling technique and a total of 120 farmers were selected and interviewed to obtain useful information for the study.

2.3 Data Collection

The data for this study were collected from primary sources using well structured questionnaire. Data were collected on the socio-economic characteristics of the respondents and their level of production. In addition, data on yam output, farm size, family and hired labour input use, quantity of fertilizers, seed yam and the prices of various inputs were collected.

2.4 Method of Data Analysis

Various descriptive and inferential statistics were used for data analysis. Objective (i) was achieved using mean, percentage and frequency counts. For objective (ii), the mean productivity of yam farmers in the area was computed. Objective (iii) was realized using profit function and gross margin analysis. Objective (iv) was achieved using a 5 point likert scale with values 1 = not serious, 2 = not very serious, 3 = undecided, 4 = serious and 5 = very serious to assess the severity of the constraint.

2.5 Gross margin analysis

Gross margin is defined as the difference between total revenue and total variable cost. Mathematically it is usually expressed as;

$$GM = TR - TVC = P \times Q - TVC$$

Where

TR = Total Revenue

TVC= Total Variable cost

P = Price Unit of Yam]

Q = Number of Yam

Total Revenue (TR) is the product of output of yams and the price of yams while the Total Variable Cost (TVC) is the aggregation of the costs of land preparation, planting materials, yam seeds, planting, weeding, mulching and harvesting.

3. Results and discussion

3.1 Social Economic Characteristics of Yam Producers

Table1 shows the distribution of the respondents according to their socio-economic characteristics.

Gender: As shown in Table 1 the gender distribution of the respondents indicated that more males than females are involved in yam production. 80 out of the 120 respondents which represent 66.67% are males, while 33.33% are females. This may not be unconnected with the laborious nature of yam production which most females cannot contend with.

Age: The result in Table 1 shows that ages of farmers range from 20 to 50 years and above. As can seen in Table 1, age group of between 30 – 39 accounts for 45 % of the population which is the highest. This implies that majority of the yam farmers in the study area are in their economic active age. This implies that there would be a sustainable increase in yam production in the area. This agrees with the findings of Rahman et al (2002) in which they showed that farmers' age may influence adoption in several ways. Ebewore (2012) also made similar observation among cocoa farmers in Edo and Ondo States of Nigeria.

Marital Status: Dikito Watchmeiser, (2001), opined that marital status is an important factor in social rural participation and acceptance. Table 1 reveals that 55% of the respondents were married. The findings are in consonance with the findings of Oderhohwo (2008). The implication of the finding is that marriage remains a valued culture in the study area. The higher percentage of married respondents is due to the fact that they derived enough income from the production of yam to support their families. Oladoja, Adedoyin and Adeokun, (2008) contended that marriage is an important factor in the livelihood of individuals in our society as it is perceived to confer responsibility on individuals.

Educational Background: From Table 1, 31.67% of the Respondents had primary education, while 26.67% of them had secondary education. Only 16.67% of the respondents did not have formal education, while 25% of them had tertiary education. This implies that majority of the respondents are educated. Agbamu, (1993), reported that there was a positive correlation between level of education and adoption of innovations. Therefore, a higher level of adoption of new technology for yam production may be expected in the study area. This was earlier reported by Njoku, (1991), who observed that formal education had a positive influence on adoption of innovations.

Farming Experience: From Table 1, it can be observed that majority of the farmers (70%) had been involved in yam cultivation for about 10-29years. This shows that most of the farmers have long years of experience in farming.

Household Size: The majority of the respondents had family size ranging from 6-10 (70%). The implication of this is that most respondents have large families. Banmeke, (2003), asserted that family size is an important index in any rural development intervention which can affect the outcome of such intervention.

Farm Size: Most of the Respondents (90%) cultivated about one hectare of land, while 10% cultivated about two hectares. This shows that the farm sizes are relatively small. This is disadvantageous because to a large extent, farm size determines output level.

The small land holding may not be unconnected with the prevalent land tenure system in the study area which is mainly by inheritance.

Source of Labour

The result in Table 1 shows that 65% of the farmers used family labour, 20% employed hired labour, while 15% employed communal labour. This shows that most of the farmers used members of their family for their farming activities. This was similar to what Rahman and Mali (2003) observed that majority of the small scale farmers are poor and usually utilize family labour.

Contact with Extension Agents

Only 25% of the farmers indicated that they had monthly meetings with the extension agents, while 25% had weekly meetings with them. On the other hand, 50% of the farmers had either had one or two meetings with the extension agents or had not met with the extension agents at all. This may be a contributing factor to the low production level of the farmers and their inability to acquire hybrid varieties of yam.

3.2 Productivity of Yam Output

The mean productivity of the farmers is the total output of yam per farmer per year. It can also be calculated thus:

$$\bar{X}_p = \frac{\sum X_i}{n}$$

Where

\bar{X}_p = mean output per farmer

n = Number of respondents

$$\bar{X}_p = \frac{267,498}{120}$$

$$= 2,229.15$$

Hence, the mean productivity of yam output is 2229 tubers.

3.3 Profitability of Yam Production (gross margin analysis)

Profitability of yam production is calculated by subtracting the average total cost of production from the average total revenue. The formula is stated as follows:

$$GM = TR - TVC = PXQ - TVC$$

Where

TR = Total Revenue

TVC = Total Variable cost

P = Price unit of yam

Q = Number of yam

Table 2 shows the gross margin of yam producers in the study area. The result shows that the yam producers made profit from the production of yam. This was used as a proxy for farm profit since it was difficult to determine the fixed costs of yam producers.

4.4 Constraints of yam production in Ika South Local Government Area

The severity of the constraints in yam production is indicated in Table 3.

Inadequate or low patronage by wholesalers: This is the most serious constraint ($X = 4.80$) in the study area. The wholesalers who are supposed to buy from the farmers are usually not adequate to distribute the products to the retailers or final consumers. This is a very serious constraint because it has resulted in delay in getting the yam tubers to the final consumers.

Inadequate Preservation Facilities: This was ranked as the second most serious constraint ($X = 4.72$). Majority of the farmers have complained of inadequate storage facilities for storing their yam. This is a serious problem because improper storage could lead to spoilage of the tubers before they are consumed.

Price of Yam: The price of yam is another major constraint to majority of the farmers ($X = 4.68$). This is because the cost of yam seedlings and the cost of fertilizer are very high. Hence, the farmers are not able to purchase enough yam seedlings and apply fertilizer when necessary. Hence farmers can not generate enough income from their sales.

Lack of Credit: This is a serious constraint ($X = 4.62$). Financial problems which the farmers in the study area encounter sometimes include inaccessibility to loans and credit facilities. Yam production is capital-intensive as funds are required to purchase necessary farm inputs.

Low Turnover Rate: The farmers attributed it to the problem of transportation and bad road network. In the study area, it is not major constraint because the roads are easily accessible; hence, there is no delay in getting the yam tubers to the consumers.

Low Profitability: This is not a serious constraint because, since the turnover rate is high, the profitability is also high.

Table 3: Constraints of Yam Production in Ika South Local Government Area.

Constraints	Standard deviation	Mean	Rank of mean
Inadequate or low patronage by wholesalers	0.58	4.80	1
Inadequate preservation facilities	0.57	4.72	2
Price of yam	0.55	4.68	3
Lack of credit	0.54	4.62	4
Low turnover rate	0.50	4.01	5
Low profitability	0.32	2.11	6

Source: Field survey, 2012.

Likert Scale: 1 = not serious, 2 = not very serious, 3 = undecided, 4 = serious, 5 = very serious

4.5: Test of hypothesis

From the result in Table 4, it was obvious that the gross margin is significantly greater than zero. Hence, the null hypothesis was rejected, while the alternative hypothesis was accepted

*significant at 5% level

Degree of freedom $N - 1 = 107 - 1 = 106$

At a significant level of $X = 0.05$

$t = 9.262, P < 0.005$

The obtained ratio of 9.262 is statistically significant and the probability of obtaining this result in repeated trials is greater than 95 in 100 times.

Therefore, yam production is profitable for yam producers in the study area.

5. Conclusion and recommendation

From the study, it was established that yam production in the study area is profitable. The high gross margin and result of the t-test confirm this. However, the yam farmers in the study area had to contend with a lot of challenges. Based on the findings from the study, the following recommendations are made:

1. Government should provide loan and credit facilities that are accessible to the farmers, to enable them purchase farm inputs which are essential for the production of yam.
2. Government should provide storage facilities so that yam tubers can be preserved for a long time after harvesting.
3. Government should provide inputs such as fertilizers and agro chemicals for the farmers. These would enable farmers who don't use these inputs to use them so that their output can be increased.
4. Promoting and strengthening of cooperatives should be encouraged. To solve the low prices received by producers, cooperatives should encourage yam production, because cooperatives are service rendering organizations that do not strive for profit so that they will relatively purchase at a fair price from producers.

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Table 1: Socio-economic characteristics of respondents (n = 120)

Variable	Frequency	Percentage (100%)
Gender		
Male	80	66.67
Female	40	33.33
Age		
20 – 29 years	12	10
30 – 39 years	54	45
40 – 49 years	30	25
50 years and above	24	20
Marital Status		
Never married	36	30
Married	66	55
Widowed	12	10
Divorced	6	5
Educational Background		
No formal education	20	16.67
Primary school	38	31.67
Secondary school	32	26.67
Tertiary education	30	25
Farming Experience		
1 – 9	30	25
10 – 19	40	33.33
20 – 29	44	36.67
30 – 39	6	5
Household Size		
1 -5	36	30
6 – 10	84	70
Farm Size (ha)		
1	108	90
2	12	10
Source of Labour		
Family	78	65

Hired	24	20
Communal	18	15

Contact with Extension Agents

Monthly	30	25
Weekly	30	25
Others	60	50

Source: Field survey, 2012.

Table 2: Gross margin analysis of yam production

Cost items	Average cost (₦)
Labour cost	
Weeding	300
Harvesting	370
Transport from farm	400
Fertilizer	270
Cost of planting materials	
Yam seeds	5000
Agrochemicals	2000
Fertilizer	4000
Farm Implements	
Cutlass	2550
Hoes	2000
Spades/shovel	3025
Total Variable Cost	19915
Total Revenue	667625
Total Variable Cost	19915
Gross Margin	647710

Source: Field survey, 2012

Table 3: Constraints of Yam Production in Ika South Local Government Area.

Constraints	Standard deviation	Mean	Rank of mean
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Low profitability	0.32	2.11	6

Source: Field survey, 2012.

Likert Scale: 1 = not serious, 2 = not very serious, 3 = undecided, 4 = serious, 5 = very serious

Table 4: Test of Hypothesis

		Mean	Standard deviation	T – value	Probability level	Remark
Total Revenue	667,625	760614.83	58472.502	9.262	0.0321	Significant*
Total Variable Cost	19915	492408.53	24314.761			

Source: Field survey, 2012

*significant at 5% level

Degree of freedom $N - 1 = 107 - 1 = 106$

At a significant level of $X = 0.05$

$t = 9.262, P < 0.005$

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