

# Factors Influencing Profitability Of Yam Production By Small-Scale Farmers In Anambra State, Nigeria

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**Abstract:** *This paper analysed the factors affecting the profitability of yam production by small-scale yam farmers in Anambra State, Nigeria. Specifically, the paper described the socioeconomic features of yam farmers, estimated the profitability of yam production and assessed the factors that affected the profitability of yam production in the study area. Primary data were collected from a total of 50 yam farmers from two LGA in the State using purposive sampling technique. Data were analyzed using descriptive and inferential statistics such as mean, frequency count, percentages, profitability and multiple regression analyses. The paper revealed that yam production in the study area was marginally profitable; farm size, cost of fertilizer, cost of pesticides, sorting as well as transportation cost were the significant factors that affected the profitability of yam production in the study area. The study recommended that farmers could be encouraged to be more involved in the marketing of their tubers by sorting of the yam tubers into similar lots as this has been seen to increase profitability. Also, the cost of production in general and specifically costs of fertilizer and pesticides could be subsidized by the government in order to increase profitability.*

**Keywords:** *yam production, small scale, cost of production, profitability, factors.*

## I. INTRODUCTION

Yam (*Dioscorea spp*) is a premium crop in the Nigerian food system and also one of the major tuber crops in the economy in terms of land under cultivation as well as the volume and value of production (Bamire and Amujoyegbe, 2005). It is one of the major staple foods which is very valuable to the Nigerian household, can serve as livestock feed and also has potential for industrial starch production (Ayanwuyi *et al.*, 2011).

There are over 600 species of yam worldwide but six species can be considered as the edible ones in the tropics. These are white yam (*Dioscorea rotundata*), yellow yam (*D. cayenensis*), water yam (*D. alata*), trifoliolate yam (*D.*

*dumentorum*), arial yam (*D. bulbifera*) and Chinese yam (*D. esculenta*). Yam tubers are eaten boiled, roasted, fried and pounded and could be chipped, dried and produced into yam flour (Ayanwuyi *et al*, 2011).

The importance of yam as a crop in rural South Eastern Nigeria is more than its economic value. This is because considerable amount of ritualism has been attached with its production and utilization. Worthy of note is the fact that many important cultural values are attached to yam, especially during wedding and other social and religious ceremonies. In many farm communities in Nigeria and other West African countries, the size of the yam enterprise that one has is a reflection of the person's social status. Its consumption is also relatively high in urban areas in spite of the competition from

other products like maize, cassava, rice and sorghum (Food and Agriculture Organisation (FAO), 2001; International Institute of Tropical Agriculture (IITA), 2001; Izekor and Olumese, 2011).

Nigeria is the world's largest producer, producing about 38.92 million metric tonnes per annum and its production has more than doubled over the years (CBN, 2009; FAO, 2007; FAO, 2008). Nwosu and Okoli (2010) however attributed this increase in output more to the large area planted with yam than increase in productivity. Although Nigeria is the largest producer of yam in the world, there has however been a general decline in its production over the years (Idumah *et al.*, 2014).

Yam production is confronted with myriads of problems which include high labour demand, sources of credit which are not reliable, menace of pests and diseases, declining soil fertility, haphazard weather conditions as well as inadequacy of planting materials (Tetteh and Saakwa, 1994; IITA, 2008). These problems had been adduced to lead to increasing cost of yam production which continue to force many farmers out of production (NRCRI, 2008), or reduce investment funds into yam farming resulting in an increase in demand over supply.

Though, yam's significant contribution to the food security in the sub-region has been well documented (Maroya *et al.*, 2014), however the need to quantitatively investigate the factors influencing the profitability of yam production in the study area becomes of utmost importance. Hence, this study described the socio economic features of yam farmers, estimated profitability associated with yam production, and examined the factors affecting the profitability of yam production in Anambra State.

#### HYPOTHESIS OF THE STUDY

H<sub>0</sub>: No factors affect the profitability of yam production.

#### II. METHODOLOGY

The study was carried out in Anambra State. A multi-stage sampling procedure was used for the study. Two LGAs namely Oyi and Anambra East were purposively selected because of their prominence in yam production. Thereafter, three towns were purposively selected from each of the two LGAs namely Njete, Umunya, and Akwusu in Oyi LGA; while Aguleri, Umuleri, and Umuoba-anam were selected from Anambra East. Finally, 25 yam farmers were randomly selected from each of the LGAs. Thus, a total of 50 yam farmers were sampled for this study. Primary data were collected using pretested structured questionnaire. Data on personal profile, educational background, problems encountered during production, storage and marketing were collected. Descriptive statistics were used to analyze socio-economic features of the farmers. Profitability analysis was used in analyzing cost and returns in yam production per hectare. Multiple regression analysis was used in determining the factors affecting the profitability of yam production. Using the ordinary least squares in estimating the regression model, four functional forms namely the linear, semi-log, double-log and exponential were tried out and the one that gave the best

fit in terms of the magnitude of R<sup>2</sup>, Adjusted R<sup>2</sup> and the significance of the overall regression as judged by the F- ratio and the significance of the individual coefficients was chosen.

The multiple regression model was implicitly stated as:

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, U) \text{ ----- (1)}$$

Explicitly, the estimated function was:

$$Y = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + B_5X_5 + B_6X_6 + B_7X_7 + B_8X_8 + U \text{ ----- (2)}$$

Where; Y = Profitability ratio

X<sub>1</sub> = size of farmland

X<sub>2</sub> = cost of seedling/yam sett

X<sub>3</sub> = cost of staking

X<sub>4</sub> = cost of harvesting

X<sub>5</sub> = cost of fertilizer

X<sub>6</sub> = cost of pesticide

X<sub>7</sub> = cost of transportation

X<sub>8</sub> = sorting

U = error term.

Gross Margin is the difference between the Total Revenue (TR) and the Total Variable Cost (TVC). The net revenue or net profit is the difference between Gross margin and Total fixed cost or between Total revenue and Total cost.

#### III. RESULTS AND DISCUSSION

##### SOCIOECONOMIC CHARACTERISTICS OF THE RESPONDENTS

The socioeconomic characteristics of yam farmers directly or indirectly affected their farming operations as presented in table 1. The result revealed that majority of the yam farmers were mostly males (76.0%) and majority (88%) of about 50 years and above in age with their mean age of 61 years. This implies that the yam farmers in the study area were relatively old, more experienced, but this could pose a major problem for increased yam production and marketing as the youth were not much involved in yam production. This result is similar to Ike and Inoni (2006) who also reported that farmers in their study area were relatively old. Also, majority of the respondents (54%) were not educated which could make it difficult for adoption of new technologies for production and marketing of their output. The results further revealed that majority of the farmers (80%) were small sized farmers with mean farm size of 2.6 acres which is approximately 1 hectare with an average farming experience of 16 years. The average start-up capital for yam production in the study area was ₦31,800.00.

Socioeconomic characteristics	Frequency	%
<b>Age</b>		
30 – 39	2	4.0
40 – 49	4	8.0
50 – 59	17	34.0
60 – 69	16	32.0
Above 70	11	22.0
<b>Gender</b>		
Male	38	76.0
Female	12	24.0
<b>Education</b>		
Not educated	27	54.0

Primary certificate	21	42.0
Secondary certificate	1	2.0
Tertiary	1	2.0
<b>Farm size (acre)</b>		
0.5 – 1	10	20.0
1.1 – 2	13	26.0
2.1 – 3	13	26.0
3.1 – 4	4	8.0
4.1 – 5	8	16.0
5.1 – 6	1	2.0
6.1 – 7	0	0.0
7.1 – 8.0	1	2.0
<b>Years of experience</b>		
Below 6	2	4.0
6 – 10	5	10.0
11 – 15	5	10.0
16 – 20	10	20.0
Above 20	28	56.0
<b>Startup capital</b>		
Below 10,000	26	52.0
10,000 – 20,000	6	12.0
21,000 – 30,000	0	0.0
31,000 – 40,000	2	4.0
41,000 – 50,000	2	4.0
51,000 – 60,000	2	4.0
61,000 – 70,000	1	2.0
71,000 – 80,000	2	4.0
81,000 – 90,000	2	4.0
91,000 – 100,000	2	4.0
Above 100,000	5	10.0

Source: Data Analysis, 2017

Table 1: Socioeconomic features of the yam farmers

#### PROFITABILITY OF YAM PRODUCTION IN THE STUDY AREA

The results of the costs and returns for yam farmers are presented in table 2. It shows that the cost of yam production was ₦4,446,857.44 per hectare. The total revenue (sales) per hectare was ₦4,810,597 and the gross margin per hectare was ₦552,117.00. The profitability index (benefit-cost ratio) of ₦1.08 was realized, which means that, for every ₦1.00 a farmer invested in yam production in Anambra state, he realized ₦1.08. Though the result shows that yam production in the study area was profitable, the level of profitability was rather low. It means the farmer only receives 80k out of every ₦100 invested. This explains the unwillingness shown by the farmers to invest in yam production as reported by Akinsanmi and Dopfer, (2005), hence the reduction in the supply of yams (NRCRI, 2008).

S/N	Item	Value (₦)
A.	Total Variable Cost	4,258,480
1	Cost of seedling	981,180
2	Cost of minisetts	400,000
3	Weeding	292,500
4	Cost of staking	255,000
5	Cost of mulching	292,500
6	Cost of harvesting	255,000
7	Sorting and Removal	1,020,000
8	Pesticides	900,000
9	Fertilizer	180,000

10	Transportation	102,800
B.	Total Fixed Cost	15,000
11	Rent on land	125,000
12	Depreciation cost on tools	63377.442
C.	Total Cost (A + B)	4,446,857.442
D.	Total Revenue	4,810,597
E.	Gross Margin (D – A)	552,117.00
F.	Net Farm Income (E – C)	363,739.558
H.	BCR	1.08

Source: Data Analysis, 2017

Table 2: Profitability per hectare of Yam production in Anambra State, Nigeria

#### FACTORS AFFECTING PROFITABILITY OF YAM PRODUCTION

The Ordinary Least Squares (OLS) regression analysis was carried out to determine factors which influence the profitability of yam production in the study area. The results of the estimations are presented in Table 3. The linear functional form was found to be the lead equation of the regression.

The regression results were significant at 1% level and coefficient of determination ( $R^2$ ) was 0.9835 with an adjusted  $R^2$  of 0.9803. This implies that the included variables were able to explain about 98% of the total variations for the determinants of the profitability of yam production. The F-ratio was 312.34 and is significant at 1% level, implying that the joint effects of all the included variables were significant.

The result revealed that five out of the eight variables included in the model were significant. The coefficient of farm size was negative and significant at 0.000 (1%) levels which indicate an increase in the profitability of yam as the size of farm decreases. This means that as the farm size increases, the cost component of the profitability index increases or the benefit component reduces. Either way, the farmers would not be interested in investment in yam production. This result is however different from the results of Anigbogu, Agbasi and Okoli (2015) and Maikasuwa and Ala (2013) who analysed the relationship between farm size and output and got the results that showed positive significance. Whilst their analyses focused on productivity, the profitability index revealed more information about the concept of costing which farmers consider before making investment decisions. The coefficient of the variables of cost of fertilizer was negative and significant at 0.015 (5%) levels suggesting an increase in yam profitability as the cost incurred in using fertilizer decreases and vice versa. The possible reason for this is that as cost incurred in fertilizer decreases, farmers would be able to use the extra fund for other profitable farming activities. This result is also contrary to Maikasuwa and Ala (2013) whose result showed positive significance because productivity was their focus. The coefficient of cost of pesticide was positive and significant at 0.030 (5%) levels suggesting an increase in profitability as cost of pesticide increases. This is so because once the pests that affect yam have been destroyed, yam would grow well which would hence translate to better yield and more profit. The coefficient of transportation cost was positive and significant at 0.000 (1%) levels suggesting an increase in profitability as transportation cost increases. This could be adduced to the fact that the yam marketing

commands higher prices away from the production sites. The coefficient of sorting was positive and significant at 0.002 (1%) levels. This indicates an increase in profitability as sorting increases. This is because sorting helps in separating the yam tubers of similar sizes for better and higher pricing.

The results in table 3 showed some of the factors that influenced the profitability of yam production in the State.

Variable	B	Standard error	T	Significant level
Farm size	-1.554592	0.3248227	-4.79	0.000
Cost of seedling	-8.76E-08	2.76E-07	-0.32	0.752
Cost of staking	7.59E-06	8.57E-06	0.89	0.381
Cost of harvesting	2.56E-06	2.14E-06	1.20	0.237
Cost of fertilizer	-0.0000256	0.0000101	-2.54	0.015
Cost of pesticide	0.0000813	0.0000361	2.25	0.030
Transportation cost	9.83E-06	2.60E-06	3.78	0.000
Sorting	0.0000581	0.0000178	3.27	0.002
R <sup>2</sup>	0.9835			
Adjusted R <sup>2</sup>	0.9803			
F	312.34***			

Source: Data Analysis, 2017

Table 3: Factors influencing profitability of yam production in Anambra State, Nigeria

#### IV. CONCLUSION AND RECOMMENDATIONS

This paper investigated the factors influencing the profitability of yam production by small scale yam farmers in Anambra State, Nigeria. From the findings, it was revealed that majority of the yam farmers were males and relatively old and uneducated (54%). Also, yam production in the study area was profitable but marginal as also revealed by the profitability index. The key factors that affected yam production in the study area were farm size, cost of fertilizer, cost of pesticides, transportation cost and sorting. Farmers could be encouraged to be more involved in the marketing of their tubers by engaging in sorting the tubers into similar lots as this would increase profitability. Finally policy interventions aimed at encouraging production of yam through subsidising the costs of fertilizer and pesticides by the government could improve the profitability of the enterprise.

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