



PROFITABILITY OF YAM PRODUCTION IN PAIKORO LOCAL GOVERNMENT AREA OF NIGER STATE, NIGERIA

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ABSTRACT

The study examined the profitability of yam production among small-holder yam farmers in Paikoro Local Government Area of Niger State. Primary data were collected from 90 yam farmer's selected using simple random sampling technique. The data were collected with the aid of a well-structured questionnaire and oral interview. Data collected were analyzed using descriptive statistics and budgetary techniques. The results of the socio-economic characteristics shows that majority (50%) of yam farmers were male, within the age range of 46- 55 years. Majority of the farmer had farm size less-than 1 hectare with at least 10 years farming experience. The total revenue was ₦582,588.72 per hectare while the total cost was estimated to be ₦218,197.98 per hectare. The net farm income was ₦364,390.74 per hectare. The return on investment was 1.67 meaning that on ₦1 invested on the yam production will yield ₦1.67 per hectare meaning that yam production was profitable in the study area. The major constraints faced by the yam farmers were inadequate access to credit facilities, poor transportation network, pests and diseases, poor storage facility and high cost of labour. It could be concluded that yam production in the study areas was economically viable, and among the constraints identified in the study areas, majority of the respondents attested to the fact that inadequate access to credit and poor transportation network were major constraints faced. It was therefore, recommended that, infrastructure facilities like good road network should be provided for the yam farmers in the study area. The concept of cooperative movement should be encouraged in the study area so as to solve the problem of credit facilities to the farmers. It is also recommended that effort should be made to intensify the number of extension visits as this signifies a strong factor in yam production in the study area.

Keywords: Net Farm Income, Niger State, Paikoro, Profitability, Stochastic Frontier, Yam.

INTRODUCTION

Yams (*Dioscorea species*) is an annual root tuber plant bearing above 600 species of which about six are economically and socially accepted in terms of food, cash and as well as medicine (International Institute for Tropical Agriculture [IITA], 2009). Agriculture is a major resource in which activities in terms of labour and capital utilization has the potential of increasing Nigeria's food self-sufficiency (Bamire and Amujoyegbe, 2010). Yams are majorly grown and produced in tropical and savannah regions of West Africa, where rainfalls are distributed into wet and dry seasons (Verter and Bečvářová, 2015). Nigeria stand as the number



one largest producer of yams in the world, with Ghana second, Côte D'Ivoire, Benin, Togo, and Cameroon 3rd and 5th respectively (Food and Agriculture Organization [FAO], 2013). Sources available shows that food sufficiency ratio of Nigeria was sometime less than one from the year 1997 to 2010. The actual yield of some major food tubers are lower than their potential yields (Rahji, 2012). Yam is therefore one of the primary root tubers in terms of under land cultivation, while in volume and value of production in Nigeria. It is one of the food rich in carbohydrate and nutritionally superior to most root tubers in terms of proteins and minerals like Calcium, Magnesium and Potassium. (Ebewore *et al.*, 2013). Tuber crops, like yam have high relative value per unit of land used in its cultivation in comparison to some crops above all, cereals (Mbah, 2010). Yam as tuber crop possess some unique characteristics. First, it has high content of carbohydrates especially starch and could have multiplicity of use. Secondly, it could be resistant to drought, pest and disease and likely adjust to different climatic conditions (Ugwumba and Omojola, 2012).

Yam comprises of about 32% of farmers gross income for tuber crop farmers in the middle belt and eastern part of Nigeria, in terms of share value yam farm gate sales 31% which is second to only cassava with (37%) out of the nine major food tuber crops compared in Nigeria in 2004 (Sanusi and Salmonu, 2010). Over the years, the farm hectare of yam production has increased with equivalent increases in the usage of inputs. Unfortunately, the increment is not commensurable with usage of the input (Jonathan and Anthony, 2012). Nonetheless, Nigerian Government has initiated effort to encourage large investment in the agricultural sector including product such as yam for the purpose of export. It is in line with this that government initiated the Root and Tuber Expansion Program (RTEP) to improve farmers' productivity and profits from root and tuber crops. In 2003, an export subsidy of 10% on agricultural commodities was introduced and remains in place till date (Akande and Ogundele, 2009). Despite the government initiatives, Bamire and Amijoyegbe, 2010 noted that, there have been increasing gap in the level of supply and demand for yam in the South Western Nigeria. The absolute reduction of yam production remained static over the decade as noted by (Oladeebo and Okanlawon, 2010). Though the static trend could not be unconnected with production resources which are not efficiently utilized. It is against these backdrops that this paper tends to access the profitability of yam production in order to meet the level of demand, there is need to assess the level of technical efficiency and its determinants in yam production. Previous studies carried out on food crop production in Nigeria have shown that food crop farmers have low productivity because of inefficiency in resource use (Idiong *et al.*, 2010).

MATERIALS AND METHODS

The Study Area

The research was carried out in Paikoro Local Government Area of Niger State, Nigeria. The area is situated at Latitudes 9°26'N to 6°38'E North and Longitudes 6.9°E to 7.0°E. The headquarter of the research location is Paiko about 25km North to the State Capital Minna, Niger State. The State is covered with an area of land which is approximately 20,066 Square



Kilometers.85% of the land is arable. The area experiences dry and wet seasons with an annual rainfall of 1,100mm in the northern parts to, 600mm in the southern parts, in which the maximum temperature is 34°C is recorded between March and June. The rainy season lasts for about 150 days in the northern parts to about 120 days in the southern parts of the Local Government (National Bureau of Statistics [NBS], 2012).

Sampling Techniques

A multi-stage sampling technique was used for the study. The first stage was purposive selection of Paikoro Local Government Area (LGA) due to its prevalence production of yam. The second stage, include the selection of three (3) villages from the chosen LGA. While the third stage involved a random selection of 30 yam farmers from each of the chosen villages to give a total sum of 90 sampled farmers for the study.

Methods of Data Collection

Data for this study was mainly primary which was obtained through the use of a structured questionnaire administered to the yam farmers in the study area. The data for this study was collected from primary source only. Among the information acquired from the respondents of yam farmers include: age, sex, number of years in farming, educational level, household size, farm size, number of extension visit, membership of associations, land renting, amount of credit received and interest charged, inputs availability and prices, source and quantity of labour and others.

Analytical Techniques

Net farm income analysis was used to achieve cost and return of yam production while descriptive statistics was used to describe the socio economics characteristics of the farmers in the study area. The net farm income model is specified as:

$$NFI = TR - TC$$

where;

NFI= Net farm income

TR = Total revenue

TC = Total cost of production

TC = TVC+TFC

RESULTS AND DISCUSSION

Socio Economic Characteristics of the Farmers in the Study Area

Table 1 reveals that about 50% of the respondents in the study area were within the ages of 46 – 55 years with a mean age of 47 years. This means that they are still in their active productive ages; an economic active age that can make positive contribution to agricultural production. Table 1 further reveals that 14.4% of the respondents had no formal education, 55% had only primary education, and 18.8% had secondary education while 5.6% had tertiary education. However, 85% of the respondents had acquired one form of formal education or another. Notably, formal education is an essential tool for the adoption of modern production technologies and effective communication system that encourages increase in the productivity of any agricultural venture (Ugwumba and Omojola, 2012). About 52% of the respondents had



21-30 years of farming experience with a mean of 23 years. It is of the general opinion that experience farmers would be more efficient, have a better knowledge of climatic conditions and are thus expected to run a more efficient enterprise.

Table 1 also reveals that 46.7% of the respondents did not belong to cooperative association. However, a greater percentage of the respondents (53.3%) are members of cooperative association. The average year of membership is 21 years. The effect of this result was that most of the respondents in the study area enjoy benefits such as having access to credit, market outlets, marketing information and information on new technologies etc. This finding is in line with Musa *et al.* (2012) that cooperative groups ensure that their members derive benefits from the groups which they could have not derived individually.

The results also disclosed that majority (47.7%) of the respondents had family size ranging from 8-10. The average household size is 8. The implication of this is that most respondents have large families. We assume that a relatively large household size are more likely to provide more labour required for farm operations such as weed control, fertilizer application. Table 1 reveals that most of the respondents (56.6%) cultivated less than a hectare of land, while 22.2% cultivated between the ranges of 1–3 hectares. Only 15.6% of the respondents cultivated more than 3 hectares. This shows that farm sizes are relatively small and the implication is to a large extent, farm size determines output level. The finding is in line with (Kolawole and Ojo, 2007) who noted that Nigerian agriculture involves small scale farmers scattered over wide expanse of land areas with small holders ranging from 0.5-3.0 hectares.



Table1: Socio-economic Characteristics of the Respondents

Variable	Frequency	Percentage	Mean
Age			
Less than 30	11	12.22	
30 – 45	16	17.77	
46 – 55	45	50	
Above 55	18	20	
Educational levels			
No formal education	13	14.4	
Primary	55	61.1	
Secondary	17	18.8	
Tertiary	5	5.6	
Farming Experience (years)			
Less than 10	10	6.1	
10 – 20	25	26.1	
21 – 30	43	51.9	
Above 30	12	15.9	23
Number of years in cooperative association			
No membership	42	46.7	
1 – 10 years	10	11.1	
11 – 20 years	14	15.6	
Above 20 years	24	26.6	21
Household size			
Less than 5	9	10	
5 – 7	16	17.7	
8 – 10	43	47.7	
Above 10	22	24.4	8
Farm size (hectare)			
Less than 1.0	51	56.6	
1.0 – 3.0	20	22.2	
3.1 – 5.0	14	15.6	
Above 5	5	5.6	2

Source: Field survey, 2019

Costs and Return Analysis of Yam Production

The items of cost were classified into fixed and variables cost items. The fixed cost items includes: cost of hoes, machetes, spades, head pans, interest on loan and rent on land. While the variable cost items comprised of cost of yam setts, labour, fertilizer and agrochemical. The fixed costs items were depreciated over time while the variable cost items were determined by each producer based on the quantity used for yam production at a particular price. The profitability of yam production enterprise was examined using the estimated costs and return analysis presented in Table 2.

The results in Table 2 indicated that a gross margin realized by a typical small-scale yam farmer was ₦410,269.17 per hectare. This was obtained by subtracting the total variable



cost (₦172,319.55) from the total revenue (₦582,588.72). The total variable cost (₦172,319.55) per hectare in yam production was obtained by multiplying the total units of yam sett (2,150kg), labour (105.45man-days), fertilizer (187.5kg) and agrochemical (4.32litre) by the unit cost prices: (₦45), (₦451), (₦132) and (₦755), respectively. It was discovered from the study area that yam sett comprised of 44.3%, labour 21.8%, fertilizer 11.3% and agrochemical 1.5% of the total cost in yam production. The total revenue (₦582,588.72) was obtained by multiplying the total units of yam output (3664.08kg) per hectare by the unit selling price (₦159). The total fixed cost of yam production per hectare was ₦45,878.43. This was obtained by depreciating the fixed cost items using the straight line depreciation formula. It was discovered that the total fixed cost comprised of 0.2% of hoe, 0.3% of machete, 0.4% of spade, 0.1% of head pan, 9.4% of land renting and 10.7% of interest on loan of the total cost. In all, fixed cost accounted for only 21.1% of the total cost in yam production. This implies that variable costs (78.9%) were the most important cost items in yam production in the study area compares to the fixed cost items. Table 2 further revealed that total cost of production was ₦218,197.98. This was obtained by adding the total fixed cost to total variable cost. The net farm income was ₦364,390.74. This was obtained by subtracting the total cost from the total revenue. The return per naira invested was ₦1.67. This was obtained by dividing the net farm income by the total cost. The result implies that yam production is a profitable enterprise in the study area. The economic implication of these findings is that credits granted to farmers for yam production were of benefit to both lenders and borrowers since returns were high enough to repay such credits and accrued interest.

Table 2: Average Costs and Return (In Naira) Per Hectare for Yam Production

Input	Quantity (kg)	Unit cost (₦)	Amount (₦)	Percentage
Variable cost:				
Yam sett (kg)	45	2,150.00	96,750	44.30
Agrochemical (litre)	755	4.32	3,261.60	1.50
Fertilizer (kg)	132	187.50	24,750.00	11.30
Labour (man-day)	451	105.45	47,557.95	21.80
Total variable cost:			172,319.55	78.90
Fixed cost:				
Land renting	2ha	10300	*20,600	9.40
Interest on loan	-	-	*23,374	10.70
Hoe	2	1,500	*360.03	0.20
Machete	4	900	*506.27	0.30
Head pan	2	1,500	*257.03	0.10
Total fixed cost:			45,878.43	21.10
Gross farm income	159	3664.08	582,588.72	
Gross margin			410,269.17	
Net farm income			364,390.74	

Note: *Depreciable items

Source: Field Survey, 2019



Constraints Faced by the Yam Farmers

The results of Table 3 shows that the respondents considered inadequate access to credit (35.6%) a major constraint and it ranked first among the identified constraints. This is so because credit is important to enhance access to inputs and marketing costs like storage and transportation. Transportation (23.3%) was considered the next problem because yam is heavy and fragile, so transporting it can be difficult and costly. Pest and disease (17.8%) ranked third because they are constraints to the yam farmers both on the field and when in storage. The next is storage (12.2%) a problem because the bulky and perishability of yam requires special space for storage and this is not always available to farmers. The result is that most farmers sell their produce at low prices shortly after harvest. The respondents also considered high cost of labour (11.1%) ranked least because family labour is used to compliment high cost of labour.

Table 3: Constraints in Yam Production

Variable	Frequency	Percentage	Rank
Inadequate access to credit	32	35.6	1st
Poor transportation network	21	23.3	2nd
Pests and diseases	16	17.8	3rd
Poor storage facility	11	12.2	4th
High cost of labour	10	11.1	5th
Total	90	100	

Source: Field Survey, 2019

CONCLUSION AND RECOMMENDATIONS

The study focused on the profitability of yam production among small-holder farmers in selected communities of Paikoro LGA of Niger State. The average costs incurred and revenue obtained per hectare for yam farmers were estimated to determine the profitability or otherwise of yam production in the study area (Table 7). The total revenue (TR) is ₦582,588.72 while the total cost (TVC + TFC) is ₦218197.98. The net farm income is therefore ₦364,390.74. The average rate of return on investment (return per naira invested) is ₦1.67, indicating that for every ₦1 invested in yam production in study areas, a profit of ₦1.67 kobo was made. Thus, it could be concluded that yam production in the study areas was economically viable. Finally, among the constraints identified in the study areas, majority of the respondents attested to the fact that inadequate access to credit and poor transportation network were major constraints faced. The study recommended, infrastructure facilities like good road network should be provided for the yam farmers in the study area. The concept of cooperative movement should be encouraged in the study area so as to solve the problem of credit facilities to the farmers. It is also recommended that effort should be made to intensify the number of extension visits as this signifies a strong factor in yam production in the study area.



REFERENCES

- Akande, S. O. and Ogundele, O. O. (2009). Yam Production in Nigeria. A Policy Analysis Matrix. In: B. Nkamleu, D. Annang, & N.M. Bacco (Eds.). *Securing Livelihoods through Yams Nigeria*: IITA. Pp.10-25.
- Bamire, A. S. and Amujoyegbe, B. J. (2010). Economic analysis of land improvement techniques in small-holder yam-based production systems in the agro-ecological zones of South-western Nigeria. *Journal Human Ecology*, 18(1): 1-12.
- Ebewore, S. O., Egbodion, J. and Oboh, O. O. (2013). Profitability Analysis of Yam Production in Ika South Local Government Area of Delta State, Nigeria. *Journal of Biology, Agriculture and Healthcare*, 3(2): 118-129
- FAO (2013). FAOSTAT database. [Online]. Available at: <http://bit.ly/NmQzZf>. [Accessed: 10. April 2014].
- Idiong, I. C. 2010. Estimation of Farm Level Technical Efficiency in Small-scale Swamp Rice Production in Cross River State, Nigeria. A stochastic frontier approach. *World Journal of Agricultural Science*, 3: 653-658.
- IITA (2013). Healthy yam seed production. IITA Publications. Retrieved from IITA Website <http://www.iita.org/publications>.
- Jonathan, R. and Anthony, D. B. (2012). Resource Use Efficiency in Yam Production in Taraba State, Nigeria. *Journal of Agricultural Sciences*, 3(2): 71-77.
- Kolawole, O. and Ojo, S. O. (2007). Economic Efficiency of Small Scale Food Crop Production in Nigeria. ABU Zaria. *Journal of Social Sciences*, 14(2): 123-130.
- Mbah, S. O. (2010). Analysis of Factors Affecting Yam Production in Ngor-Okpala Local Government Area of Imo State. In: J. A. Akinlade; A. B. Ogunwale; V. O. Asaolu; O. A. Aderinola; O. O. Ojebiyi; T. A. Rafus; T. B. Olayeni and O. T. Yekinni (Eds.). *Proceedings of the 44th Annual Conference of the Agricultural Society of Nigeria, LAUTECH, Ogbomoso, 18th - 22th October, 2010*. Pp. 340-344.
- Musa, Y. H., Onu, J. T., Vosanka, I. P. and Anonguk, I. (2012). Production efficiency of yam in Zing Local Government area of Taraba State, Nigeria. *Journal of Horticulture and Forestry*, 3(12): 372-378.
- Oladeebo, J. O. and Okanlawon, O. (2010). Profitability level of yam (*Dioscorea* spp) production in Oyo State. In: Akinlade, J. A., Ogunwale, A. B., Asaolu, V. O., Ademola, O. A., Oyebiyi, O. O., Rafiu, T. A., Olayeni, T. B. and Yekinni O T (eds) *proceedings of the 44th Annual Conference of the Agricultural Society of Nigeria, LAUTECH, Ogbomoso 18th – 22nd October, 2010*.
- Rahji, M. A. Y. (2012). Dimensions of Rural Poverty and Food Self Sufficiency Gap in Nigeria. *Nigerian Association of Agricultural Economics*; Pp. 33-37.
- Sanusi, W. A. and Salmonu, K. K. (2010). Food Security among Households: Evidence from Yam Production Economics in Oyo, Nigeria. *Agricultural Journal*, 1(4): 235–239.
- Ugwumba, C. O. A. and Omojola, J. T. (2012). Socio-Economic Determinants and Profitability of Yam Production in Ipao- Ekiti, Nigeria. *Journal of Science and Multidisciplinary Research*, 4(22): 96-103.
- Verter, N. and Bečvářová, V. (2015). An Analysis of Yam Production in Nigeria. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 63(2): 659-665.