



COSTS AND RETURNS OF YAM PRODUCTION IN SOUTHERN TARABA STATE, NIGERIA

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ABSTRACT

The study analyzed the costs and returns of yam production in southern Taraba State; specifically, the study described the socio-economic characteristics of yam farmers, determined the cost and returns of yam production and described the constraints faced by yam farmers in the study area. A multi-stage purposive and simple random sampling were employed in the study. Data were collected with the aid of structured questionnaire. Descriptive statistics and net farm income were used in analyzing the data. The result of the analysis showed that the respondents have a mean age of 49 years and 83% of them were male. Majority (73%) of the farmers were literate and have a mean household size of 12. About 69.8 % of the farmers did not participate in any cooperative association. Majority (85%) of the farmers had no access to extension service, 61% of them had no access to credit. The average hectare of land cultivated was 3 ha. Majority (57.2%) had 10 years and above farming experience. Yam farming was profitable with a return per naira investment of 1.30 and a net farm income of ₦365,367.5k. Insecurity, inadequate fund or access to credit, high cost of labour, lack of extension service and lack of improved yam sett were the major constraints faced by the farmers in the study area. It was recommended that farmers should embrace cooperative association so they can take advantage of economies of scale purchase to reduce production cost. Also, extension services should be revived in the State.

Keywords: Costs, Net-farm-income, Returns, Southern Taraba, Yam.

INTRODUCTION

Yam is a major food item for millions of people in West Africa and contributes significantly to rural food security. Yam also provides income for semi-subsistence and commercial producers and a source of export income for nations and accounts for about 32% of farm income earned from crops (Simpa and Nmadu, 2014). There is a direct relationship between yam production and economic development of yam producing regions in Nigeria (Migap and Audu, 2012).

In recent years, yam has become expensive as production has not kept pace with population growth, and the demand exceeds supply. Yam production faces several constraints that significantly affect its potentialities to support rural development and meet consumers' needs as an affordable nutritional product (Migap and Audu, 2012). These challenges in yam production include production cost which include high cost of labour and planting materials. This rising cost of yam production consequently affects its realizable revenue from its production. Others include weed pressure, decline in soil fertility, soil borne pests and diseases, leaf disease, storage pests and diseases, barn making and lack of staking materials, use of traditional technology for production of seed yam, scarcity of planting materials (Simpa and



Nmadu, 2014). Kleih *et al.* (2012) stressed that low soil fertility, lack of improved yam varieties, poor road networks, high cost of labour and lack of finance to carry out necessary farming activities were the constraints to productivity and profitability.

One of the assumptions underlying factor-product relationship is that farmers are aiming at maximizing their profits. It was against this backdrop that this study was undertaken to empirically ascertain the cost and returns of yam production in the study area. Other specific objective of this study was to examine the socio-economics characteristics of yam farmers in the study area and determine constraints to yam production in the study area.

MATERIALS AND METHODS

The Study Area

The study was conducted in southern Taraba State, Nigeria. The southern Taraba is made up of five Local Government areas (Takum, Wukari, Donga, Ussa, and Ibbi) and one special Development Area (Yangtu). The area covers an area of 14,099 Km² land mass with a population of about 687,077 people as at 2006 (National Population Commission [NPC], 2006). The National Population Commission had projected an annual growth rate of 3.5% which brought the population figure to 1,074,558.24 people as at 2019. Southern Taraba State has a tropical wet and dry season. Its dry season lasts for a minimum of four months (December to March) while the wet season spans early March to late November in the south (Oruonye and Abbas, 2011).

Sampling Procedure

The study employed the use of multistage purposive and simple random sampling procedures in the selection of the study area and the respondents. In stage one, Southern Taraba state was purposively selected based on its yam farming activities. In stage two, three (3) local government areas were purposively selected from southern Taraba State based on their predominance in yam production in the area. They are Donga, Wukari and Takum. In stage three, three accessible yam producing communities were purposively selected from each of the selected local government areas based on concentration of yam farmers. In the last stage, farmers were selected using simple random sampling in proportion to the population of the farmers in each selected community. The Taro Yamane sample size formula was used to determine the sample size of 170 respondents and 159 questionnaire were retrieved from the respondents and used for data analysis. The Taro Yamane formula for sample size calculation used is presented as follows:

$$n = \frac{N}{(1+N\varepsilon^2)} \quad \dots (1)$$

where; n = sample size, N = Population of yam farmers, and ε = adjusted margin error (7%)

Method of Data Collection

Data for this study were collected basically from primary sources. The primary data were collected using structured questionnaire.

Analytical Techniques

Descriptive statistics was used to examine the socio-economic characteristics of groundnut farmers and constraints to yam production in the study area while Net farm Income (NFI) was used to examine the cost and return of yam production in the study area. The choice of NFI was necessitated because it takes into consideration the fixed variables. The net farm income is the difference between the gross income and the total cost of production (fixed and variable cost).

$$NFI = \sum_{i=1}^n P_{yi} Y_i - \sum_{j=1}^m P_{xj} X_j - \sum_{k=1}^k F_k \quad \dots (2)$$



where; NFI = Net farm income (₦), Y_i = Gross output (Kg), P_y = Unit price of product Y_i in (₦), X_j = Quantity of variable input X_j (Where $j = 1, 2, 3, \dots, M$) (measured in Kg, Lt and Man-day), P_{xj} = Price per unit of variable input X_j in (₦), F_k = Cost of fixed input (Where $K = 1, 2, 3, \dots, k$ Fixed inputs) (₦), Σ = Summation sign. Depreciation on farm tools and implements owned by respondents was determined to assist in computing net farm income using the equation as follows:

$$D = \frac{P-S}{N} \dots (3)$$

where;

D = Depreciation value (₦), P = cost of implement/tools (₦), S = Salvage value of tools or implements (₦) = 10% of its original cost and N = Life expectancy/useful life of implement/tool (year).

Returns per naira invested (RNI) was obtained by dividing the net farm income (NFI) by the total cost (TC). Therefore,

$$RNI = NFI \div TC \dots (4)$$

where; RNI = returns per Naira invested, NFI = net farm income and TC = total cost.

Decision Rule: $RNI > 1$, implies that the enterprise is profitable; $RNI = 1$, implies that the farmer is operating at breakeven point and $RNI < 1$, that the farmer is operating at loss (Olukosi and Erhabor 1988).

The use of a 5-point Likert scale was employed to determine the degree of seriousness of the yam production constraints in the study area as: highly very serious = 5; very serious = 4; serious = 3; moderately serious = 2 and Less serious = 1.

$$\bar{X} = \Sigma f / n \dots (5)$$

where; \bar{X} = Critical mean score, f = total scale score (that is, 5, 4, 3, 2, 1), n = scale points.

Hence, $\frac{5+4+3+2+1}{5} = 3$. The mean score was compared with the critical mean, 3. If the calculated mean of a constrain is greater than the standard critical value, that constraints is regarded a very serious. The variable mean score is given as follows:

$$\bar{X}_i = \Sigma I / n \dots (6)$$

where; \bar{X}_i = variable mean score, I = variable (Constraints 1, 2, 3, 4, 5, 6, 7, 8 of yam production) and Σi = total score of all the respondents on the variable, n = number of respondents.

RESULTS AND DISCUSSION

Socio-economics Characteristics of Yam Farmers

The result in Table 1 revealed that majority (37.1%) of the yam farmers fall within the age range of 48 and 57 years and have a mean age of 49 years. This implies that they were in their economic active age hence were agile and productive and can make positive contribution to agricultural production. The result also revealed that 83% of the farmers were males, while 17% were females. This implies that more males than females were involved in yam production in the study area. This may be connected to the laborious nature of yam production which most females cannot contend with. The finding is in agreement with the finding of Zaknayiba and Tanko (2013) who observed that men dominated the workforce in Nigeria agricultural communities while women generally play vital roles in the actualization of the household farm target. On educational level, it was revealed that few (27 %) of the respondents had no formal education while majority (73%) of the farmers had one form of formal education or another. The result on household size revealed that the mean household size was 12. This implies that there was a reasonable supply of family labour for farm operations in the study area as most



respondents have relatively large families. This result is in tandem with the finding of Toluwase and Sekumde (2017). The result (Table 1) on credit access further revealed that 39% of the yam farmers had access to credit while 61% had no access to credit. This implies that majority of the farmers studied had no access to credit facilities, thus were using their personal saving for farm operations. This could be attributed to the fact that government seldom grants financial credit to farmers and even when it does, it is mostly inadequate and inaccessible to rural farmers (Rukwe and Zubairu, 2019). The results on extension service showed that 85 % of yam farmers in the study area had no access to extension service while 15 % had access to one or more meetings with extension agents. This implies that majority of the farmers had no access to extension services. This could be attributed to low or lack of extension agent-farmers' ratio in the study area. On cooperative membership, the result showed that about 69.8 % of the yam farmers did not participate in any cooperative association while 30.2% of the farmers were members of cooperative association with a mean year of participation of 2 years. This implies that majority of the yam farmers in the study area were not members of any cooperative society thus did not benefit from assumed benefits accrued to cooperative participation. On farming experience, about 57.2% of the respondents had 10 and above years of farming experience while 42.8% of the farmers in the study area had less than 10 years of farming yam with a mean of 14 years. This implies that yam farmers in the study area all have a significant level of experience in yam production and that the managerial ability of the farmers can be inferred to be reasonably good. The result on farm size showed that about 68.8% of the respondents cultivated ≤ 3 hectares of land while 31.2% cultivated > 3 hectares of land. The average hectare of land cultivated was 3. This implies that majority of farmers are small scale yam farmers. The finding is in agreement with Ochi *et al.* (2015) who reported that farmers operates on farm holdings of less than or equal to two hectares (2 ha).



Table 1: Socio-economics Characteristics of Yam Farmers

Variables	Frequency	Percentage	Mean
Age (years)			
18 – 27	5	3.1	
28 – 37	34	21.4	
38 – 47	50	31.5	
48 – 57	59	37.1	49
58 – 67	11	6.9	
Sex			
Male	132	83	
Female	27	17	
Educational level			
No-formal	43	27.0	
Primary	10	6.3	
Secondary	52	32.7	
Tertiary	54	34.0	
Household size			
1 – 7	26	16.4	
8 – 14	132	83	12
15 and above	1	0.60	
Access to credit			
Yes	62	39	
No	97	61	
Access to extension service			
Yes	24	15	
No	135	85	0.2
Cooperative membership			
Non members	111	69.8	
Members	48	30.2	2
Farming experience			
Less than 10 years	68	42.8	
10 years and above	91	57.2	14
Farm size (ha)			
< 1	11	6.9	
1.0 – 3.0	97	61.0	3
3.1 – 5.0	30	18.9	
5.1- 7.0	11	6.9	
Above 7.0	10	6.3	
Total	159	100	

Source: Field survey, 2019.

Cost and Returns of Yam Production in the Study Area

The cost and returns associated with yam production were investigated to ascertain the viability of the various cost components, namely, the variable and fixed cost items identified as shown in Table 2. The results revealed that the total variable cost was ₦211,179.5 per hectare in yam production. Yam sett comprised 38.3%, labour 14.5%, fertilizer 15.5% and herbicide/insecticide 5.8% of the total cost in yam production. The average cost incurred on



yam sett of ₦109,520 was the highest among other costs. This shows that the farmers spent more on yam sett than other inputs. The total revenue obtained per hectare was ₦648,873.5. The total fixed cost of yam production per hectare was ₦72,326.5. This was obtained by depreciating the fixed cost items using the straight-line depreciation formula. It was revealed that the total fixed cost accounted for only 25.5% of the total cost in yam production in the study area. This implies that variable costs (74.5%) were the highest cost items in yam production in the study area compares to the fixed cost items. This result considerably agrees with the finding of Zaknayiba and Tanko (2015) who reported that yam farmers spent over 78.9% of the total cost of production on variable inputs. The table further showed that the net farm income was ₦365,367.5. The return per naira invested (RNI) was ₦1.30k which implies that yam production is a profitable enterprise in the study area since RNI was greater than one.

Table 2: Average Costs and Return (in Naira) per Hectare for Yam Production

Variable	Unit Price (₦)	Total unit/ha	Value in ₦/ha	% of TC
Yam revenue (TR)	150/kg	4325.8kg	648,873.5	
Variable Cost				
Yam sett	40/kg	2738.5kg	109,520	38.3
Labour	580/MD	71M/D	41,195.5	14.5
Fertilizer	140/Kg	313.6kg	43,904	15.5
Herbicide/insecticide	1200/litre	13.8litres	16,560	5.8
Total variable cost (TVC)			211,179.5	74.5
Fixed Cost				
Land renting	13500/ha	3ha	40,500	14.3
Interest on loan			28,599.4	10.1
Depreciation on hoe			560.7	0.3
Depreciation on wheelbarrow			450.3	0.16
Depreciation on head-pan			300.4	0.11
Depreciation on knapsack sprayer			895.3	0.32
Depreciation on cutlass			350.2	0.12
Depreciation on spade			670.2	0.24
Total fixed Cost (TFC)			72,326.5	25.5
Total Cost (TC) = (TVC + TFC)			283,506.00	100
Gross Margin (GM) = (TR - TVC)			437,694.00	
Net Farm Income (NFI) = TR - TC			365,367.5	
Return per ₦1 invested = (NFI/TC)			1.30	

Source: Field survey, 2019

*MD=Man/day

Constraints faced by Yam Farmers in the Study Area

The constraints to yam production in the study area were ranked according to their degree of seriousness. As indicated in Table 3. Insecurity was top in the rank. This was attributed to the ethnic crises that had befallen the study area which has consequently affected



farming activities as farmers could not access larger farmland for farming and when they do, the fear of being attacked in the field affected them from carrying out some farming operations which would have boosted more yam yield. Inadequate fund or access to credit was identified and ranked the second major constraint. The implication of this result is that the acquisition of production inputs might be difficult by farmers and consequently, this may pose a challenge to overall yield of yam in the study area. High cost of labour was ranked the third in the study area. This has constrained smallholder yam farmers from enhancing productivity. This is in agreement with the finding of Izekor and Alufobai (2014) who reported high cost of labour as a major constraint to yam production. Lack of extension service was considered the fourth major constraints. This was attributed to lack of or inadequate extension service in the study area which was also heightened by the insecurity faced in the area. Consequently, Yam farmers' inadequate knowledge of new farming techniques have reduced their productivity. This agrees with the finding of Akerele et al. (2019) who reported lack of extension service as a major challenge to yam productivity. Lack of improved yam sett was rated the fifth major constraint in the study area. Other constraints were below the critical mean value; hence they were considered less serious by the farmers. These results implied that farmers in the study area were faced with constraints that limited their increase in production for that cropping season.

Table 3: Constraints to Yam Production in the Study Area

Constraints	Mean	Ranking
Insecurity	4.6	1
Inadequate fund or access to credit	4.3	2
High cost of hired labour	4.0	3
Lack of extension services	3.3	4
Lack of improved yam sett	3.1	5
Inadequate farm inputs	2.7	6
Problem of pest and disease	2.7	7
Lack of storage facilities	2.5	8

Source: Computed from data survey, 2019.

CONCLUSION AND RECOMMENDATIONS

Majority of the yam farmers were literate and experienced with a net farm income of ₦365,367.00 and return per naira investment of ₦1.30k per hectare in the production year. Yam sett was a major item of cost in yam production in the study area. Findings from the study also revealed that majority of the farmers had relatively small farm sizes of between 0.5-3 ha had poor extension contacts and had no access to credit. Nevertheless, in the light of these findings it can be concluded that yam production is profitable in the study area giving the returned per naira invested realized per hectare. Based on the findings of this study, the following recommendations were made:

1. Farmers should embrace cooperative association so that they can pool their resources together to take advantage of economies of scale purchase, thereby reducing cost of production.
2. Extension services should be revived in the state through which farmers will be updated on current knowledge of production techniques that will help improve their yam output level.
3. Farmers should also intensify effort in accessing extension services; and Government should encourage the public and private sectors to support and invest in yam production as it is a profitable venture which could alleviate poverty.



4. Finally, Government should properly address problem of insecurity in the country by working with community head to foster peaceful co-existence among communities.

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