

INFLUENCE OF SOCIO ECONOMIC CHARACTERISTICS ON PROFITABILITY OF YAM PRODUCTION IN ETCHÉ LOCAL GOVERNMENT AREA OF RIVERS STATE, NIGERIA

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ABSTRACT

The paper investigated the influence of socio economic characteristics on profitability of yam production in Etche local government area of Rivers State, Nigeria. Data were collected with the aid of structured questionnaire from 120 randomly selected yam farmers in the study area. Data analysis was by use of regression. Findings revealed that the mean age is 47years and mean size of the household farmer is 6 persons. Farmers are quite experienced in yam cultivation with a mean of 15years in the study area. The economic returns of yam production in the study area is very low from the mean the initial capital that was realized from yam production per annum is ₦65,000.00 while the annual income is ₦140,00.00 per annum. Findings revealed that annual income, equity, farm size are significant at 1% alpha levels while household is significant at 5% alpha level. Marginal increase in these input variables lead to increase in the profit level posted by the yam farmers surveyed. The negative coefficient of the variable representing annual income which was -0.262 means that, a relative change in the annual income of the farmers resulted in decrease profit of yam production. The positive coefficient of equity and farm size variables means an increase in the profit level of yam production. An increase in household size will increase the profit level of yam production because there will be efficient cheap labour that will enhance productivity. The R-square 0.78 recorded by the model implied that 78% of the variation in the level of Yam production could be explained by the explanatory variables while the remaining 22% was due to other factors not specified in the model. The average profit obtained by yam farmers in the study area was one hundred and seventy thousand seven hundred and fifty two Naira (₦170, 752.00). An average farm in the area is about 0.8ha. The findings show that yam production is profitable in the study area.

Key words: yam production, food security, farmers, Etche

INTRODUCTION

Yams (*Dioscorea* species) constitute the predominant starchy staple in sub-Saharan Africa where food security for a growing population is a critical issue Regina *et.al.*, (2011). Yam production in Nigeria has witnessed increased output yet has not been able to meet the demand of the people FAO, (2002). Based on (FAO, 2005) statistics, 48.7 million tons of yam were produced worldwide about 97% of these came from sub-Sahara Africa. Nigeria has been regarded as the leading producer of yam with 34 million tons followed by Cote d'Ivoire (5 million tons), Ghana (3.9 million tons) and Benin (2.1 million tons). Annually, Ghana exports the largest quantity of yams (about 12,000 tons). Benin has the highest average yam consumption per capita per day (364 kcal) followed by Cote d'Ivoire (342 kcal), Ghana (296 kcal) and Nigeria (258 kcal). This

trend must be reversed in order to allow Nigeria be one of the top economies in the year 2020; achieve its potentials and meet the millennium goals. Furthermore, in Nigeria, due to rise in population, the demand for agricultural products is continually rising. This has resulted in the need to allocate farm resources efficiently. Yams, annual or perennial tuber-bearing and climbing plants are native to warmer regions of both hemispheres. The genus *Dioscorea* has over 600 species but only a few are cultivated for food and medicine. The major edible species of African are white Guinea yam (*D. rotundata*), yellow Guinea yam (*D. cayenensis*), Trifoliate yam (*D. dumetorum*), Water yam (*D. alata*) and lesser yam (*D. esculenta*) are edible species that originated from Asia. Also cush-cush yam (*D. trifida*) is native to America. By virtue of its excellent palatability, yam is a high value crop cultivated throughout the tropics. It is planted as sole crop but unusually intercropped with melon, pepper, okra and *amaranthus*. The most important part of the yam plant is the tuber. It can be grown in all tropical countries provided water is not a limiting factor. It is a primary commodity in West Africa and New Guinea. In terms of cultivation and utilization, White Guinea yam and water yam are the most important food yams. It has been observed that in Africa, consumer demand for yam is generally very high and despite its high cost of production, yam cultivation is very profitable.

Nigeria is a leading producer of the yam crop FAO, (2008). On the part of its importance, yam tuber crop forms a staple food for most people of the tropics. yam is rated as an important tuber at least when it compares with cassava. This is because it contains a higher percentage of protein and vitamin C. Babaleye, (2005) observes that yam contributes more than 200 dietary calories per capita daily for more than 150 million people in West Africa while serving as an important source of income to the people. However, the production of yam in Nigeria is substantially short and cannot meet the growing demand at its present level of use. It also has an important social status in gatherings and religious functions, which is assessed by the size of yam holdings one possesses. Yam is a preferred food and a food security crop in some sub-Saharan African countries IITA, (2008). The nutritional composition of yam varies with species and cultivars but on the typical example is as follows; water (moisture content) seventy percent (70%), starch carbohydrate twenty five percent (25%), sugar one percent (1%) and protein 3 – 4% (Onwueme, 2008).

Yam tubers may be eaten with sauce direct after roasting, boiling or frying in oil. The tubers may also be pounded into a thick paste after boiling and is eaten with soup. It may be processed into flour or cooked into pottage with added protein sauce and oils. In addition, cultural values are attached to yam, in Nigeria. During weddings and other social and religious ceremonies, the size of yam tubers presented reflects one's social status. Even yam festival is celebrated annually by some communities in West Africa. Over the years, the price of yam has remained generally high, since low production has kept them scarce. According to International Institute of Tropical Africa, yams are produced on 5 million hectares in about 47 countries in tropical and subtropical regions of the world.

Nigeria is the largest producer of yam (34 million tonnes) but Ghana which is the third largest producer exports the largest quantity of yam about 12000 tonnes IITA, (2009). This is due to a number of reasons which include using of soils low in fertility and quality and hence quality of yam produced in Nigeria is very poor. With the position of Nigeria as one of the largest producers of yam in the world, one would expect yam to complement oil as a major foreign exchange earner in Nigerian economy. Agricultural research stations in Nigeria are developing many strategies to support mass production of high quality yams, for instance, IITA

is working on providing a more constant flow of improved seed. Nigeria found that roughly 70% of yam production costs were for planting materials. As the campaign for household food security gains momentum all over the world and since extreme poverty and hunger must be eradicated by year 2015, yams are some of the food crops whose production has got to be emphasised. Yam is an important food crop for at least 60 million people in West Africa Babaleye, (2005). In recent time, observations as well as studies have shown that yam production in Etche local government area of Rivers state has experience significance decline since the last decades due to lack of improved planting materials, advisory services on soil management strategies by the Agricultural development agency, as well as inadequate market outlay which has negatively affected farmers in terms of marketing of their produce and has reduced thier motivation for yam production. Considering the importance of yam to households in Rivers state, it therefore becomes compelling to assess the ascertain the influence of socio economic characteristics on profitability of yam production in the study area. The study analysed the socio economic characteristics of selected yam farmers in the study area.

Hypothesis

There is no significant influence of yam farmers' socio- economic characteristics on profitability of yam production.

RESEARCH METHODOLOGY

The study was carried out in Etche Local Government Area of Rivers State, Southern Nigeria. According to Wikipedia (2011), Etche is one of the 23 Local Government Areas of Rivers State. It was created on 3rd March 1989 and located East of Rivers State (Etche Local Government Council 2011). It is located between latitude 4^o59'27N and 4.990^oN and between longitude 7^o03'16^oE and 7.004^oE. It has an area of 805 square kilometer and population density of 310.5In/km². According to population census, (2006), the area has a population of 249,939. Etche local government area is known to be one of the major sources of urban foods in Rivers state, yet it is faced with enormous challenges of underdevelopment as observation revealed.

Four hundred and eighty (480) Yam farmers in Etche Local Government Area were registered with Agricultural Development Programme (ADP), and form the study population. Five (5) communities that were predominantly involved in yam production out of the thirty-eight (38) communities were selected in the study area. Simple random sampling technique was used to select twenty four (24) yam farmers from the five (5) communities in Etche Local Government Area. Hence the sample size for the study was 120. Multiple regression was used to ascertain the influence of socio-economic characteristics on profitability of yam production. The implicit form of the regression model was:

$$Y = f (X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, \mu).$$

The Explicit presentation of linear model is as follows:

$$Y = (\beta_0 + \beta_1X_1, + \beta_2X_2, + \beta_3X_3, + \beta_4X_4, + \beta_5X_5 + \beta_6X_6, + \beta_7X_7, + \beta_8X_8, + \beta_9X_9, + \beta_{10}X_{10}, + c)$$

$$Y = \text{Quantity of yam produced in kg ha}^{-1}$$

$$X_1 = \text{Age (years)}$$

$$X_2 = \text{Annual income (₦)}$$

$$X_3 = \text{Educational level (years in school)}$$

X ₄	=	Equity (₦)
X ₅	=	Farm size (ha)
X ₆	=	Household size (number of persons)
X ₇	=	Marital status (dummy 1, 2)
X ₈	=	Occupation (dummy 1, 2)
X ₉	=	Farming experience (years)
X ₁₀	=	Sex (dummy 1, 2)
b ₀	=	Intercept
b ₁ to b ₁₀	=	Regression coefficients
C	=	Error terms

Table 1: Socio Economic Characteristics of yam farmers in the study area

Variable	Percentage
Gender	
Male	65
Female	35
Marital status	
Marital	67.50
Single	4.17
Divorced	8.33
Widow	7.50
Widower	12.50
Education level	
No formal education	68.33
Primary	24.17
Secondary education	6.67
Tertiary education	0.83
Off farm occupation	
Petty trading	53.33
Artisan	4.17
Hunting	7.50
Carpentry	8.33
Restaurant operator	7.50
Civil servant	19.17

Source: Field Survey, (2012)

Results shows that the minimum age of farmers in the study area is 23 while the maximum age is 70 but the mean age is 47 indicating an ageing farming population which is consistent with the assertions of (Okwuokenye, 2011) that farming in the rural areas of Nigeria is dominated by older farmers because of the outmigration of youths to urban centers in search of white collar jobs. The results indicated that the mean size of the household farmer is 6, implying that they have access to costless labour thereby reducing the labour cost. The small operational scale of the farmer had 0.8 ha (8000m/sq) which limit output and constrain adoption of modern technology facilities (Oniah, 2012) in the study area the land are not given in plots rather they

prefer to share the inherited land in lines with the kindred member which limit the literate farmers from adopting mechanized farming such as tractor to make heaps. Farmers are quite experienced in yam cultivation with a mean of 15years in the study area. The economic returns of yarn production in the study area is very low from the mean the initial capital that was realized from yam production per annum is ₦65,000.00 while the annual income is ₦140,00.00 per annum.

Table 2: Distribution of Socio-economic Characteristics of Yarn Farmers in the study area

Variable	Minimum	Maximum	Mean	Standard deviation
Age				9984
Household size				1.780
Farm size				0.076
Farming experience				2.06
Initial capital	10,000	120,000	65.000	37951.935
Annual income	30,000	250,000	140.000	103000.991

Source: Field Survey, (2012)

Influence of socio economic characteristic on profitability of yam production

After comparing the performance of the four regression models, the researchers finally select the linear model as the lead equation (Table 3). The choice was based on the high number of coefficients' agreement or with the number of t-value that was significant with theoretical expectation in the model compared to the rest in addition to other econometric model selection criteria fulfilled such as R – squared and F - statistics. According to Greene, (2008) and Gujarati (2003) when models that are similar are being compared, the ones with the highest R- squared or if the coefficients' signs are in consonance with *a priori* expectation will be selected as the lead equation. It is in this note that the researcher selects the linear model which could be based on theoretical as well as these econometric criteria. The F - ratio was also used to select the leading equation from the four functional forms it was observed that the highest value of the F – ratio was denoted which implies that linear model best fits the analysis based on conformity with Koutsoyanis, (2001) which states that selecting lead equation should be based with more than one criteria. From table 3, annual income, equity, farm size and household size are statistically significant. Annual income, equity, farm size are significant at 1% alpha levels while household is significant at 5% alpha level. Marginal increase in these input variables lead to increase in the profit level posted by the yam farmers surveyed. The negative coefficient of the variable representing annual income which was -0.262 means that, a relative change in the annual income of the farmers resulted in decrease profit of yam production. The positive coefficient of equity and farm size variables means an increase in the profit level of yam production. An increase in household size will increase the profit level of yam production because there will be efficient cheap labour that will enhance productivity. The R-square 0.78 recorded by the model implied that 78% of the variation in the level of Yam production could be explained by the explanatory variables while the remaining 22% was due to other factors not specified in the model.

The test for presence of severe multicollinearity was done using variance inflation factor (VIF) which was computed using Stata 11 econometric package. According to Gujarati (2003) cited in Onoja & Herbert, (2012) any VIF of above 10 indicates a problem of severe multicollinearity for the particular variable in the model.

Table 3: Influence of socio economic characteristics on profitability of yam production

Variable	Linear form Coefficient	Semi log form Coefficient	Double form Coefficient	log Exponential form Coefficient
Age (X1)	-529.155 (-0.195)	0.000 (-0.038)	0.205 (0.359)	152131.200 (0.709)
annual income (X2)	-0.262 (-3.816) * * *	0.000 (-0.357)	-0.057 (-0.202)	-18856.140 (-0.171)
Educational level (X3)	17454.630 (0.497)	-0.165 (-1.069)	-0.012 (-0.266)	18504.610 (1.230)
Equity (X4)	2.331 (3.782)***	0.000 (1.399)	-0.329 (-1.203)	39189.330 (0.383)
Farm size (X5)	256344.800 (5.997)* * *	0.517 (3.377) * * *	2.436 (6.256)* * *	654467.800 (4.286)* * *
Household size (X6)	31231.720 (2.110)* *	0.040 (0.622)	-0.070 (-1.148)	-12472.950 (-0.558)
Marital status (X7)	-10391.000 (-0.597)	-0.089 (-1.148)	-0.304 (-1.794)	-92511.880 (-1.456)
Occupation (X8)	7197.793 (0.576)	-0.017 (-0.303)	-0.100 (-0.716)	25671.740 (0.485)
Gender (X9)	17957.520 (0.339)	0.319 (1.347)	0.036 (1.473)	4160.557 (0.452)
Farming experience (X10)	-8235.706	0.086	0.181	-14645.700
Constant	(-0.600) 525541.100 (3.548)***	(1.411) 9.856 (14.341)***	(1.201) 13.953 (3.764)***	(-0.260) -781395.500 (-0.542)
R squared	0.776	0.469	0.516	0.427
F – statistic	37.770	8.111	9.819	8.135

Source: Field Survey (2012)

***significant at 1%, **significant at 5%; figures in parenthesis are t-values

In this analysis, it was observed that the pooled mean of VIF was 1.69 which implies that the model is fit for the analysis since all the explanatory variable are less than 10. From the lead equation, the null hypothesis was rejected and the alternative hypothesis was accepted since some of the variables are statistically significant at ($p < 0.01$ or < 0.05), thereby implying that socioeconomic characteristics significantly influenced profitability of yam production in the study area.

Cost and Returns of yam production in the study area

In this objective, attempts were made to examine the profitability of yam production in the study area. The input used cost, yield or output data generated from yam farmers were used to undertake the cost and return analysis of yam farmers.

Table 4: Estimated average costs and returns of yam production in the study area

Items	Unit price(₦)	Quantity(kg)	Amount(₦)
Total sales of yam	53.41667	5337.5	284,900.00
Variable cost			
Cost of yam setts			102,167.00
Labour expenses			7655.15
Cost of transport			1260.00
Cost of fertilizers			2304.17
Maintenance of farm tools			761.66
Total variable cost			114,148.00
Gross margin			170,752.00

Source: Field Survey, (2012)

Results of profitability analyses are presented in Table 4. The average profit obtained by yam farmers in the study area was one hundred and seventy thousand seven hundred and fifty two Naira (₦170, 752.00). An average farm in the area is about 0.8ha. The findings show that yam production is profitable in the study area. This corroborates earlier studies in other parts of Nigeria which held that crop production is a very profitable enterprise Okoruwa & Ogundele, (2006) cited in Onoja & Herbert, (2012). Therefore there are great potentials in yam production as a source of livelihood especially in the area of poverty alleviation.

CONCLUSION AND RECOMMENDATIONS

Based on the findings, yam production is a profitable enterprise and venturing into it can serve as good source of livelihood to farmers in the study area. Majority of the yam farmers were identified to be male due to the intensive labour requirement of yam cultivation. The implication is that a proportional increase in those variables with positive coefficients leads to a more than proportional increase in the value of yam output. Based on the findings the following are recommended:

- A land redistribution policy that will increase the farm size of the farmers as well as removal all distributional bottlenecks, which affect the availability and prices of improved seeds and fertilizers at the grass root.
- Also, extension agents should be adequately trained and equipped to help the farmers imbibe the culture of sound agronomic practices that would ensure increased yam production in the study area.
- Farmers should be assisted with credit facilities as a means of increasing production scale, also Agricultural credit guarantees scheme innovations such as self help group linkage programme (SHLGP), Trust fund model(TFM), Interest draw back programme (IDP) should be properly disseminated for efficient adoption in the study area
- There should be improvement in extension services delivery. The provision of improved rural infrastructures and enabling policies (such as making available all agricultural

inputs required at the right time and affordable prices) among others, are also required in order to enhance efficiency.

REFERENCES

- Babaleye, T. (2005). Improving yam production technology West Africa, ANB- BI supplement Issue/Edition Nr 463.
- Food and Agriculture Organisation (FAO) 2002. Food & Agricultural Organization. *Production Year Book*. Trade vol. 13(16), pp 32 – 39.
- Food and Agriculture Organisation (FAO) 2005. Food & Agricultural Organization. *Production Year Book*. Trade vol. 46(115), pp 18- 24.
- Food and Agriculture Organisation (FAO) 2008. Food and Nutrition, creating a well fed world, FAO, Rome, Italy. Food and Agriculture Organisation year book Volume 56, pp 13 - 18.
- Gujurati, N.D. (2003). *Basic Econometrics*. New Delhi: Tata Mc Graw Hill publishing company
- International Institute of Tropical Agriculture Annual Report IITA (2008). Research Highlight on Plant density of yam miniset, International Institution of Tropical Agriculture Pp 114-118
- International Institute of Tropical Agriculture Annual Report IITA (2010). Improved Productivity and Increased Production from Better Roots and Tubers. Pp 44 – 47.
- International Institute of Tropical agriculture annual report IITA (2011). Yam (*Dioscorea* spp) Archival reports (1989-93) Part III. Root & Tuber Improvement Programme. Crop Improvement Division. IITA Ibadan. Pp 20-85.
- Koutosoyiannis, A. (2001). Theory of Econometrics: An introductory exposition of econometric Model. Second edition forward By C.F Carter, replica press india pp 16 - 22
- Okoruwa, V.O, & Ogundele, O.O. (2006). Technical efficiency differentials in rice production technologies in Nigeria. A research paper presented at a workshop organized by The Nigerian Institute of Social and Economic Research (NISER) Ibadan, Nigeria.
- Okwuokenye, G. F. & Onemolease, E. A. (2011). Influence of socio economic characteristics of yam sellers on marketing margins among yam wholesalers. *Journal of agriculture and Social research (jars)* 11(1), 23 – 27
- Oniah, M. O. & Kuye, O. O (2012). Econometric analysis of factors affecting yields of small scale farmers on inland valleys of Obubra Local Government Area, Rivers State. *Journal of Tropical Agriculture, Food, Environment and Extension* 5(2), 52 -58.
- Onoja, A. O. & Herbert, B. C.(2012). Econometric evaluation of rice pro fitability determinants in Kogi state, Nigeria. *Journal of Agricultural extension and rural development* 4(5) 107 -118 Doi: 10,5897/JAERD11.071
- Onwueme, I.C. (2008). The Tropical Tuber Crops-yams ,Cassava, Sweet Potato and Cocoyams. John Wiley and Sons. Chichester.UK pp 3-101.
- Wikipedia, (2011). Yam wikipedia, the free Encyclopedia. URL <http://www.nipost.gov.ng/postcode.aspx>.retrieved 2011-11-20