

SOCIO-ECONOMIC DETERMINANTS OF THE ADOPTION OF IMPROVED YAM PRODUCTION TECHNOLOGIES IN IMO STATE, NIGERIA.

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ABSTRACT.

This study was designed to investigate the adoption of improved yam production technologies by farmers in Imo State during the 2012 /2013 cropping season. 60 Yam farmers were selected from the three agricultural zones in the state using multi-stage random sampling technique. The mean age of yam farmers was 55.6 years, mean number of members of the family available for yam production was 5.4 , their mean farm size was 2.53hectares, mean farm size devoted to improved yam production was 1.08 hectares, mean farming experience was 32.2 years, while mean income per annum was ₦121,217.00. The rate of adoption of the improved yam production technologies in the state was 42.1%. The results of the linear multiple regression analysis showed that educational level was negatively and significantly associated with adoption. The farm size was positively and significantly associated with adoption. There was no clear cut relationship that existed between adoption and age of farmers, gender, farming experience, family labour, and frequency of extension visits.

The R^2 was 0.742 indicating that the independent variables in the model can explain about 74.2% of the variability in adoption of improved yam production technologies in the study area. The F-ratio was 16.00 and significant at 1% level which implies goodness of fit of the regression line.

Formal education should be encouraged among yam farmers to enhance adoption of improved technologies and also yam farmers should increase their farm size as this will improve their productivity and income.

Keywords: Socio-economic, Adoption, Improved, Production technologies, Imo State.

INTRODUCTION

Yam is one of the principal tuber crops in the Nigerian economy, in terms of land under cultivation and in the volume and value of production (Ugwumba and Omojola, 2012). Average statistics shows that the West African Yam belt produced 95% of the world's output of 34 million metric tonnes of yam in 2001 and Nigeria alone produced 75% of West African output (Shehu, Iyortyer, Mshelia & Jongur, 2001).

In South Eastern Nigeria, the cultivation and consumption of yam dates back several centuries. In this area yam is a totem of masculinity and the center of annual harvest celebrations. Successful farmers in this area, who produced the requisite number of yam tubers (several thousands) in one cropping season, are conferred with the little Ezeji (king of yams). Yam is an important item in the bride price in traditional marriage contracts among the Tiv in the Middle Belt of Nigeria.

A Tiv farmer demonstrates his maturity and ability to get married by the number of stands or heaps of yams he can plant in a season (Orkwor, Asiedu & Ekanayake, 1998).

Nweke, Ugwu, Asadu & Ay, (1992) found out that 42% of the world output of yam was produced in southeastern Nigeria.

Also yam had a positive elasticity of demand at all income levels and exhibited price elasticity in this part. Hence it was concluded that, yam will continue to have a high market potential in south eastern Nigeria.

Yam tubers can be eaten boiled, roasted, fried or pounded and could be chipped, dried and processed into yam flour for the preparation of "Amala" (Usongo, Idisi, Innocent & Daniel, 2014), Ume, Kadurumba, Onuh, Okoroafor, Nwaneri & Okelola, 2013).

The production of yam is constrained majorly by high cost of seed yam (Ironkwe, 2010), high cost of labour, staking materials, inadequate and high cost of agrochemicals (Ezedinma, 2006, Ugwumba and Omojola 2012, Ume et al, 2013, and Ewuziem, Ironkwe, Tokula & Onyenobi, 2015).

The improved yam production technologies include:

- Yam miniset technique
- Improved yam staking methods
- High yields
- Pest and diseases resistance and
- Fertilizer application.

The objective of this paper was to investigate the adoption of improved yam production technologies in Imo state, Nigeria. However, the specific aims include:

- To determine the socio-economic characteristics of yam farmers in the study area.
- To determine the rate of adoption of improved yam production technologies in the study area.
- To determine the factors that influence farmer's adoption of improved yam production technologies in Imo state.

THE METHODOLOGY

1. The Data

The data used in this study were primary data collected by means of structured questionnaire from a sample of sixty yam farmers in Imo state during the 2012/2013 cropping season.

Multi-stage random sampling technique was used in selecting a block, a circle, a sub-circle and subsequently a village from each of the tree sub-zones in Imo State. In Orlu sub-zone, Arondizuogu block, and Ohiauchu circle, Ikpaoja sub-circle and Ohiauchu village were randomly selected. 20 yam farmers were randomly selected from the list of yam farmers in this village.

In Owerri sub-zone, Oke-Uvuru block, Uvuru circle, Okwunakuwa sub-circle and Akuwa village were randomly selected. 20 yam farmers were randomly selected in this village.

In Okigwe sub-zone, Mbaa block, Umunkwo circle, Ezeopara sub-circle and Ezeopara village were randomly selected from the list of yam farmers in this village. 20 yam farmers' were randomly selected from the list of yam farmers in this village.

2. Method of Analysis

The data collected were analyzed with the use of descriptive statistics tools as well as production function analysis.

Descriptive statistics such as percentages and frequencies were used to summarize the socio-economic characteristics of the yam farmers and the rate of adoption of the improved yam production technologies. Production function analysis was employed to estimate the parameters

of the regression model. The multiple regression equation was used to estimate the production function for yam production in the study area.

The regression function is implicitly specified as follows:

$$Y = F(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, e_i) \quad (1)$$

Where

Y = Farm size of improved yam production technology (Hectare)

X₁ = Age (years)

X₂ = Gender (male = 1, Female = 0)

X₃ = Educational level (years)

X₄ = Farm size (Hectare)

X₅ = Farming Experience (Years)

X₆ = Family labour (Number)

X₇ = Frequency of meeting (Number)

X₈ = Income (₦)

X₉ = Frequency of Extension contact (Number)

e_i = Error term

The model specified was subjected to four functional forms and the lead equation was selected based on the relative magnitude of the coefficient of multiple determination (R²) which gives the explanatory power of the model, number of significant estimated regression coefficients, conformity of signs of estimated regression coefficients with a priori expectation, relative magnitude of estimated coefficients and the overall significance of the R² value given by the F-ratio.

The four functional forms fitted were linear, semi-log, Cobb-Douglas and exponential. Explicitly, the four functional forms are shown below:

Y_i = b₀ + b₁X₁ + b₂X₂ + + b₉X₉ + e_i.....Linear

Y_i = log b₀ + b₁logX₁ + b₂logX₂ + + b₉logX₉ + e_i - Semi log

Log Y_i = log b₀ + b₁logX₁ + b₂logX₂ + + b₉logX₉ + e_i Cobb-Douglas

Log Y_i = b₀ + b₁X₁ + b₂X₂ + + b₉X₉ + e_i.....Exponential

Where,

b₀ = Constant

b₁ – b₉ = Regression Coefficient of X₁ – X₉

e_i = Stochastic error term

RESULTS AND DISCUSSION

1. Socio-Economic Characteristics of the Sampled Yam Farmers

- a) **Age of Farmers:** The mean age of the sampled 60 yam farmers in the state was 55.6 years. 32% of the farmers were of the 49-56 years age bracket, 27% were between 57 and 64 years old, 20% each were in the 31 – 48 years and 65 to 72 years age brackets respectively, while 1% was between 73 and 78 years old.
- b) **Farmer's level of Education:** Out of the 60 farmer's sampled, 17% had no formal education, 58% had attended primary school, and 15% had secondary education, while only 10% had tertiary education.

- c) **Farm size:** The mean farm size of the sampled farmers was 2.53 hectares. 58% had farms ranging between 1 and 1.9 hectares, 18% had farm lands of 3 -3.9 hectares, 17% had farm sizes of between 4 and 4.9 hectares, 5% had farm lands of 5 - 5.9 hectares, while 2% had farm size of 2 - 2.9 hectares.
- d) **Farmers' Farming Experience:** The mean experience in yam production was 32.2 years. 45% of the farmers had 30-39 years farming experience, 23% had 40 – 49 years experience, and 17% had 20 – 29 years experience, while 15% had 10 – 19 years farming experience.
- e) **Family Labour Available:** 62% of the yam farmers sampled had 2 – 5 members of their family available for yam production, 32% had 6 – 9 members available for yam production in the study area while 3% had 10 – 13 members and 14 – 16 members available respectively. They had a mean of 5.4 members available for yam production.
- f) **Frequency of Attendance to Meetings:** All the yam farmers were regular at farmers meetings.
- g) **Annual Income of Yam Farmers:** 73% of the yam farmers sampled earned between ₦65,000 and ₦105,000 per annum from the yam business, 10% earned between ₦188,000 and ₦228,000, 5% each earned between ₦106,000 and ₦146,000 and between ₦229,000 and ₦269,000 respectively, while 7% earned between ₦270,000 and ₦310,000 per annum from the yam business. Their mean income was ₦121,217 per annum.
- h) **Frequency of Extension Visits:** 88% of the sampled yam farmers received 5 visits per annum from Extension Agents, while 12% received 4 visits.
- i) **Farm Size Devoted to Improved Yam Production Technologies:** 58% of the yam farmers sampled devoted less than one hectare of their land to yam production using improved technologies, 37% devoted 1 - 1.9 hectares, while 5% devoted 2 - 2.3 hectares to improved yam production technologies.

2. Farmers Adoption of the Improved Yam Production Technologies

All the farmer's sampled adopted the improved yam production technologies. The adoption index is measured by the intensity of adoption, where intensity of adoption is defined as the proportion of a farmers' farm devoted to the improved yam production technologies.

The total farm size of the sample of 60 yam farmers studied was 161.2 hectares, while the total farm size devoted to the improved yam production technologies was 67.8 hectares. So the intensity of adoption was: $67.8\text{ha} / 161.2\text{ha} \times 100 / 1 = 42.1\%$.

The rate of adoption of improved yam production technologies in Imo State was 42.1%.

3. Regression Results of Factors that Influence Adoption of Improved Yam Production Technologies:

The results of the linear multiple regression analysis on factors that influence adoption of improved yam production technologies in Imo State is presented in Table 1. The coefficient of education level (X_3) is negative and significant at 5%. This is contrary to a priori expectations. Education is expected to be positively related to adoption of new agricultural practices. This is because education improves the ability to derive, evaluate and to access new information in addition to improving labour quality.

The coefficient of farm size (X_4) is positive and significant at one percent. This agrees with a priori expectation because farm size is expected to be positively related to adoption. Small farmers with their limited resources will be more reluctant to take risks than the larger farmers.

However, no significant relationship seemed to exist between the intensity of adoption of improved yam production technologies and such factors as, farmers' age, gender, family Labour, frequency of meetings, income and frequency of extension visits.

Table 1: Regression results of factors that influenced farmers adoption of improved yam production technologies in Imo State.

S/N	Explanatory Variables	Regression Coefficient	t-ratio
1.	Farmers' Age (X_1) years	-0.003	-0.021
2.	Gender (X_2) Male =1, Female =0	-0.061	-0.771
3.	Education (X_3) years	-0.170	-2.032**
4.	Farm Size(X_4) Hectare	0.843	5.559***
5.	Farming Experience (X_5) years	-0.057	-0.356
6.	Family Labour (X_6) No	-0.057	-0.610
7.	Frequency of Meetings (x_7) No	-0.054	-0.680
8.	Income (x_8) ₦	0.080	0.604
9.	Frequency of Extension Visits (X_9) No	-0.060	-0.732
	Intercept	0.967	1.534
	R^2	0.742	
	F-ratio	16.00***	
	No of Observation (n)	60	

Significant at 5%, * Significant at 1%

The R^2 of 0.742 indicated that 74.2% variability in intensity of adoption of improved yam production technologies is explained by the independent variables included in the production function model.

The F- value of 16.00 was significant at 1% level indicating goodness of fit of the regression line.

CONCLUSION

The major aim of this study was to investigate the adoption of improved yam production technologies by yam farmers in Imo state during the 2012/2013 cropping season. The results of the study showed that the rate of adoption was about 42.1%. The results of the linear multiple regression analysis showed that educational level was negatively and significantly associated with the adoption of improved yam production technologies, while farm size was positively and significantly associated with adoption. However there was no clear cut relationship between

adoption and the following factors- age of farmers, gender, farming experience, family labour, and frequency of meetings, income and frequency of extension visits.

The mean age of yam farmers was 55.6 years, the number of family members available for yam production was 5.4, their mean farm size was 2.53 hectares, mean farm size devoted to improved yam production was 1.08 hectares, mean farming experience was 32.2 years, while mean income per annum was ₦121,217.00. R^2 was 0.742 and F-ratio was 16.00 and significant at 1% level.

RECOMMENDATIONS

The following recommendations will enhance farmers' adoption of improved yam production technologies in Imo State:

- a) Formal Education should be encouraged among yam farmers to enhance adoption of improved technologies in the study area.
- b) Farmers should be encouraged to increase the farm size given to improved yam production technologies. This will enhance their productivity and income.

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