RESOURCE USE AND ECONOMIC EFFICIENCY FOR YAM PRODUCTION IN OYO STATE, NIGERIA

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ABSTRACT

The study estimated the economic efficiency for yam enterprises in Oke-Ogun area of Oyo State, Nigeria, employing a stochastic profit function approach. (90) Ninety yams farmers were purposely selected in the three (3) local government areas which are agricultural zones, of the state. The stochastic frontier profit function was used to analyzed economic efficiency levels in the area of study. The results revealed that cost of weeding, hired labour, farm size, and production per hectare determine profit level in the enterprises. Furthermore, level of education, farming experience, age and gender were shown as major factors influencing economic efficiency of the enterprise. It is recommended that the farmers could be assisted by the government in securing loans from Agricultural Banks to acquire necessary tools, implement and equipment to enhance their productivity.

Keywords: Resource Use, Economic Efficiency, Yam Production, Oyo State, Nigeria.

INTRODUCTION

Depending on the country, the term "yam" is used to embrace many tubers, including the sweet potato, which is no relation. Yams were successfully grown in Europe to relieve the distress caused by the potato famine of the 1840s, but it never became very popular. Yam is the common name applied to plants of about 500 species of the genus *Dioscorea* of the Dioscoreaceae family. True yam plants are climbing perennial vines with heart-shaped leaves. Underground tubers vary in size and shape, averaging 3-8 pounds but sometimes reaching 60 pounds or more. Aerial tubers may develop in the axils of the leaves, especially when vines run on the ground. The species occur rather abundantly in tropical and subtropical regions of the world. Several species occur here in Florida and in temperate regions as wild plants (Stephens, 2009)

According to Akoroda (1995), the production of yam in Nigeria is grossly inadequate and cannot meet the ever-increasing demand for it under present level of input use. In order to meet this level of demand and even surpass it, there is need to assess the level of efficiency and its determinants (Awoniyi and Omonona, 2006). A recent study on yam has shown that the absolute level of production in West Africa and the world globally have remained static for the last three decades (Scott, *et al.,* 2000):

This static or declining trend may not be unconnected with productive resources, which are not being efficiently utilized, leading to low productivity (Fasasi, 2006). Inefficient resource

allocation could limit the level of returns to an enterprise and in turn affect its attractiveness for resource allocation (Ugwu, 1990). Parikh and Mirkalam, (1995), in a study carried out discovered that inefficiency in developing country agriculture is as a result of the subsistence needs, socioeconomic and demographic characteristics of the farmers. According to him, other factors are experience, accessibility to information, supervision contact and credit availability to the farmers. This study seeks to estimate the farm production function of yam, with a view to deriving the economic efficiency of resource utilization in yam production.

METHODOLOGY

The areas of the study include Saki west, Saki East, and Atisbo Local Government Area of Oyo State. Oyo State Agricultural Development (OYSADEP) has grouped the state into four zones namely, Ibadan/Ibarapa, Ogbomoso, Saki and Oyo zones, where the study was conducted. Give the name "food basket of the state" having enjoyed the services of Agricultural Development Project for close to two decades now. The zone has agricultural as it's major traditional occupation and crafts as secondary occupation. The headquarters' have various towns and villages surrounding them and headed by a block extension officer under the Agricultural Development programme Administration.

Multi stage sampling was employed for the purpose of this research in Saki East, three (3) towns were chosen from the five towns, within the Local government, while one town was chosen in the Saki West Local Government, and three (3) towns were chosen in Atisbo Local government out of six (6) towns. A total number of ninety five (95) questionnaire were administered in all the three local government. The respondents in this study were drawn in a two-stage sampling process through the selection of samples from yam producing communities purposively from each of the selected local government areas. In the second stage, samples of farmers were drawn from each community and the sample size was dependent on the size of the population in each community. Descriptive analysis was used to describe, the socio-economic variable of the respondents. Data collected consisted of socio-economic characteristics of the farming households, the quantity and value of inputs as well as output, the farm size cultivated, the quantity of agrochemicals applied among others. All data on resource use, production cost and output were converted to per hectare equivalent, and there after analyzed. Cobb-Douglas functional form was fitted for the yam enterprise embracing the stochastic frontier profit function. The functional form is explicitly expressed:

In $\prod p^* = InA^* + \theta_1^* \ In + \theta_2^* \ In + \theta_3^* \ In + \theta_4^* + In \ \beta_1^* + In \ \beta_2^* + In \ \beta_3^* + ln\beta_4^* + ln\beta_5^* + ln\beta_6^* \ ln\beta_7^* \ V_1 - U_1$ (Equation 1)

Where,

$\prod P^*$ = Normalized profit in Naira per yam enterprise defined as revenue less variable cost normalized by the price of yam output.

A^* = Intercept or constant term

$\theta_1^*, \theta_2^* \ldots \ldots \theta_4^*$ are the regression parameters to be estimated

$V1$ = Normal random errors which are assumed to be independent and identically distributed having N $(0\partial^2)$

U_1 = Non-negative random variables associated with the economic efficiency of the enterprise. It accounts for inefficiency and are also under the farmers control

While $\beta_1, \beta_2 \ \beta_3, \beta_4, \beta_5, \beta_6, \ldots \ldots \ldots \ldots \ldots \beta_7$, are the efficiency factors, parameter to be estimated.

RESULTS AND DISCUSSION

Table 1 shows the results of Spear man rank correlation coefficient. The results show that there was significant relationship between age and number of dependants; marital status and level of education; genger and level of education; age and level of education; and level of education and experience.

Table 1: Spearman Rank Correlation Coefficient of Socio Economic Variable

	Gender	Marital	Age	No of Dependant	Education	Experience
Gender	1					
Marital	0.075	1				
Age	-0.284	0.111	1			
No of Dep	-0.151	-0.037	0.425*	1		
Education	-0.219*	-0.290**	-0.414***	-0.452**	1	
Experience	-0.380**	0.118	0.667**	-0.542**	-0.504**	1

Table 2 shows that the coefficient for costs of yam sets was 0.037. The negatively signed conformed to *a prior* expectation which implies that it has an inverse relationship with profit level of the enterprise. A unit increase in cost of input reduces profit level by 0.037. The cost of weeding supplements appeared to be the most important variable input that determines profit level in yam enterprises in the study area. It was rightly signed and statistically significant ($p \leq 0.05$) with a coefficient of 0.123. This showed the indispensable nature of cost in yam production. However, implies that a 10% increase of costs of inputs would depress profit level of the enterprise by 1.2%. Pitt *et al* (1998) observed that availability of hired labour at economic price was the most salient condition for profitable yam production.

The coefficient of farm size was found to be positively signed which conformed to a-prior expectation. Farm size was statistically significant at 0.01 levels with coefficient of 0.643 implying that it was a major determinant of profit level in the enterprise. The positive sign and inelastic nature of the coefficient explains the importance of farm size as fixed assets on yam production. The results however showed that a 10% increase in farm size would lead to increase in profit level by 6.43% which is normal as proportionate increase.

Determinants of Economic Efficiency in Yam Enterprises

From the estimated results on efficiency factors in table 2 below, age of the farmers, level of education, farm size, and house hold size were found to be statistically significant at different levels even though some were wrongly signed theoretically. Age variable had a positive sign with a coefficient of 3.231. These results are consistent with the findings of Pitt *et al* (1998). The positive and statistically relationship between farm size and economic efficiency from the estimated results support the notion that medium to large size farms have an efficiency advantages over small farms. Effiong (2005) stressed that the link between efficiency and farm size had been the subject of much discussion in the literature.

Table 2: Economic Efficiency of the Stochastic Frontier Profit Function for Yam Enterprises

Function factor	Parameter	Estimate Coefficient	Standard Error	T-Value
Constant	A*	13.610	15.63	0.87
Cost of Weeding	$\theta 1^*$	0.123	0.000	1.967
Production per Ha	$\theta 2^*$	-0.162	0.000	1.989**
Yam set per Hect	$\theta 3^*$	0.032	0.005	0.497
Cost of yam sets	$\theta 4^*$	-0.037	0.000	-0.478*
Hired labour	$\theta 1^*$	0.181	0.342	1.708
Family labour	$\theta 2^*$	0.133	0.659	1.902
Farm size	$\theta 3^*$	0.643	0.090	5.735**
Efficiency Factors				
Constant	A0	-25.511	14.031	-1.320**
Age	$\beta 1$	3.231	1.051	1.342**
Level of Education	$\beta 2$	2.411	0.723	2.324***
Farming experience	$\beta 3$	1.325	0.832	1.341
Farm size	$\beta 4$	1.633	1.004	1.553
Access to credit	$\beta 5$	-1.485	1.113	-1.673
Gender	$\beta 6$	2.873	2.035	1.345***
Household size	$\beta 7$	5.632	2.143	2.755***
Diagnostic Statistic				
Sigma-squared	$\partial 2$	2.231	0.488	4.831**
Gamma	Ý	0.839	0.012	83.235**
Log likelihood function		-33.255		

Source:***, **, ***** Statistically significant at 10%, 5%, and 1% respectively

Table 3 shows the challenges facing yam production in Oke-Ogun, Oyo state, Nigeria. Inadequate finance is the major (43.1%) challenges/problem facing the farmer in the area, while inadequate transportation, bad roads and unavailability of enough hired labours which are 19.1%, 18.1% and 11.8%. These factors are the major factors affecting yam production in Oke-Ogun.

Table 3 Challenges facing yam farming in Oke-Ogun, Oyo state

Constraints	Percentage (%)
Inadequate land	1.0
Inadequate finance	43.1
Unavailability of enough hired labour	11.8
Inadequate family labour	4.4
Pest infestation	1.0
Outbreak of yam diseases	0.0
Inadequate transportation	19.1
Bad roads	18.1
Inadequate marketing system	1.0
Low demands	0.5
Total	100

Source: Field survey 2009

CONCLUSION AND RECOMMENDATIONS

The economic efficiency estimates for yam production enterprise revealed that cost of yam set, was rightly and negatively with a value of – 0.037 and production per hectare with a value of -0.162. The results also showed that cost of weeding, hired labour, farm size and family labour were statically significant and rightly signed as well. Other variables such as cost of yam sets, production per hectare, cost of weeding were rightly signed theoretically but statistically insignificant. The result of the efficiency model indicated that age, level of education, farm size and household size had positive value. Based on the findings it is recommended that the farmers could be assisted by the government in securing loans from Agricultural Banks to acquire necessary tools, implement and equipment to enhance their productivity.

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