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Determinants of Profit Inefficiency among Small Scale Yam Farmers in Nasarawa State, Nigeria: A Stochastic Translog Profit Function Approach

Tanko, L.

Department of Agricultural Economics and Extension Technology,
Federal University of Technology, Minna, Niger State, Nigeria

Abstract

This study examined the determinants of profit inefficiency among small scale yam farmers in Nasarawa State, Nigeria. Data for the study were elicited from primary sources with questionnaire. Multistage sampling technique was used to select one hundred and twenty (120) respondents for the study. The results showed that 85 % of the respondents were within the active age bracket of 25 to 55 years, 97.5% were married, 95.8% were males and 93.3 % cultivated between 0.1 and 1 hectare. Educational level, farm size, extension contact, membership of cooperative and household size with coefficients of -4.704, -1.544, -1.456, -1.121 and -2.56 respectively, significantly affected profit inefficiency in yam production in the study area at the ($p \leq 0.01$) probability level. Constraints faced by the yam farmers include lack of access to inputs, high cost of inputs, poor producer prices and inadequate cultivable farmland in decreasing magnitude of importance. It is recommended that there should be continued education of yam farmers on improved production technologies through concerted extension efforts as well as the encouragement of farmers to belong to organized farmer groups such as cooperatives in order to enhance their profit efficiency or reduce inefficiency.

Keywords: profit, inefficiency, yam, farmers**,** production.

INTRODUCTION

Yam can be grown in nearly all tropical countries provided water is not a limiting factor. In Nigeria, it is grown within the coastal region up to latitude 12^0N and corresponds to the rain forest, wood savanna belt. This is the region where the annual rainfall exceeds 800mm in amount and 4 months in duration. Nigeria is at the centre of the world yam production controlling more than 59% of the total output (Ibeawuchi*, et al.,* 2008). It is grown in traditional cropping system as the first crop after virgin forest or after a long period of fallow yielding about 10 tons of fresh tubers per hectare per year (Carsky *et al.,* 2001).

The production of yam in West Africa has been declining partly because the underground tuber which is the source of food is also the source of planting material and this compels the farmers to retain materials for next year production (Welch, 2008). Inefficiency in yam production has been attributed to militating factors such as disease and pest attack, low soil fertility, shortage of finance to carry out the necessary farming activities, high cost of inorganic fertilizer and poor knowledge of farm management (Agwu and Alu, 2005). Accordingly, a study by Inoni and Ike (2006) on the determinants of farm production and economic efficiency among small holder yam farmers in southeastern Nigeria, using stochastic frontier production function for instance, indicated that education, farming experience and access to credit significantly affected inefficiency among yam producers. Nigeria produces about half of the world's total yam supply, yet, yam production is seriously being threatened by losses due to dry and wet rot disease especially during storage (Agwu and Alu, 2005).

The production of yam tubers in Nigeria is in the hands of small-scale farmers who use simple production techniques such as bush-fallow cultivation and cultivate one and a half to two hectares and they contribute two-thirds of yam tuber production. With this trend, the demand for yam tubers in Nigeria still exceeds its supply (Andreas, 2003). More importantly, lack of appropriate pricing for yam tubers, non availability of improved yam sets/seed to increase farmers productivity, decline in productivity owing to marginal lands, inefficiency in the allocation of existing resources and increasing labour demand all tend to discourage the production of yam in recent times. There are post-harvest losses due to the ignorance of farmers storing yams beyond the natural storage time (generally shorter than 12 months) which reduces the quality of yam resulting in the fall in price of the yam tubers (Andreas, 2003). According to Madukwe *et al.,* (2000), both the area under yam cultivation and total yam output were declining. Okoronkwo (2006), for instance found that there has been a consistent decline in the output of yam in Ebonyi state Nigeria. Efficiency in resource allocation has a direct bearing on the poverty status of farmers. Enhancing the capacity of these farmers could ameliorate widespread poverty by enhancing their technical competence especially in the area of efficient resource allocation. The findings of this study can be useful in the farm advisory extension education services disseminated to the farmers.

The main objective of the study was to analyze profit inefficiency of yam farmers in the study area. The study is desirable given the dearth of documented evidence of investigations of this nature in the State, a major producer of yam in Nigeria. The specific objectives are to describe the socio-economic characteristics of yam farmers and analyze factors that affecting profit inefficiency among yam farmers. The study was limited to yam farmers in Nasarawa State. However, the findings could be useful for other farmers who share similar socioeconomic characteristics, are operating at a similar level of technology and within the context of similar geographical positioning.

METHODOLOGY

The study was carried out in Nasarawa State which is located in guinea savanna zone of the country. It lies between latitude $08^0 35^{'}$N and longitudes $08^0 32^{'}$E and shares common boundaries with Benue state to the south, Federal capital Territory (FCT) Abuja to the West, Kaduna State to the north and Plateau State to the East. The indigenes of the state are engaged in farming, trading and civil service (Binbol and Marcus, 2007). The State consists of three agricultural development programme zones, namely, Southern, Central and Western zones respectively. All the zones were considered for this study.

A multistage sampling technique was used. In the first stage, two Local Government Areas (LGAs) each were randomly selected from each of the zones giving a total of 6 LGAs. The second stage involved the random selection of two villages from each of the LGAs. In the third stage, ten (10) small scale yam farming households' heads were randomly selected from each of the village giving a total sample size of 120 respondents.

Data were collected using well-structured questionnaire and interview schedules. Data collection lasted for four months (January - April, 2012). Information were elicited on the socio-economic characteristics of yam farmers such as age, gender, educational level, marital status, household size, access to credit, extension contact, input-output data and constraints faced by yam farmers in the study area.

Analytical Technique

Socio-economic characteristics were analyzed using descriptive statistics. The transcendental logarithmic stochastic profit function model was used in analyzing the profit inefficiency of respondents.

The implicit profit function model was specified as follows:

$$\pi_i^* = \pi/p = fi\ (qiZ)\ \exp e_i \quad \ldots\ (1)$$

$$e_i = vi+ui \quad \ldots\ (2)$$

Where πi^* = Normalized profit of the i^{th} farm, q_i = vector of variable inputs, Z = vector of fixed inputs, e_i = composite error term.

V_i's are assumed to be identically normally distributed with mean zero constant variance as N (O, δ^2, μ =K). Ui's are one-sided disturbance term used to represent profit inefficiency and it is independent of V_i's and i = 1, 2…, n is the number of farms in the sample.

In the context of the stochastic frontier profit function, the profit inefficiency of the i^{th} firm is defined as the ratio of predicted actual profit to the predicted maximum profit for the best-practice yam farmer as follows:

Profit efficiency (Eπ)

$$= \frac{\pi}{\max} = \frac{\exp\ [\pi(P, Z)]\ \exp\ (InU)\theta}{\exp\ [\pi(P, Z)]\exp\ (InV)\theta} \quad (3)$$

From equation (3), firm specific profit efficiency is the mean of the conditional distribution of Ui given by Eπ which takes a value between 0 and 1. If Ui=0, that is, the farm is operating on the frontier, it implies obtaining potential maximum profit given the prices it faces. If Ui>0, it implies that the firm is inefficient and loses profit as a result of inefficiency.

Following Battese and Coelli (1995), the maximum likelihood model was used to estimate the unknown parameters with the stochastic frontier and the inefficiency effect functions estimated simultaneously. The likelihood function is expressed in terms of the variance parameter δ^2V-δ^2U.

The parameter V represents the share of inefficiency in overall residual variance with values in interval of 0 and 1. A value of 1 suggests the existence of deterministic frontier, whereas a value of zero can be seen as evidence in favour of Ordinary Least Squares (OLS) estimation.

The explicit empirical stochastic frontier profit function model for the study is specified as:

$\ln \pi p^* = \ln A^* + \alpha_1^* \ln q_1 + \alpha_2^* \ln q_2 + \alpha_3^* \ln q_3 + \alpha_4^* \ln q_4 + \alpha_5^* \ln q_5 + \alpha_6^* \ln q_6 + \alpha_7^* \ln q_7 + 0.5\, \alpha_{11}^* \ln (q_1)^2 + 0.5\, \alpha_{22}^* \ln (q_2)^2 + 0.5\, \alpha_{33}^* \ln (q_3)^2 + 0.5\, \alpha_{44}^* \ln (q_4)^2 + 0.5\, \alpha_{55}^* \ln (q_5)^2 + 0.5\, \alpha_{66}^* \ln (q_6)^2 + 0.5\, \alpha_{77}^* \ln (q_7)^2 + \alpha_{12}^* \ln (q_1)^* \ln (q_2) + \alpha_{13}^* \ln (q_1)^* \ln (q_3) + \alpha_{14}^* \ln (q_1)^* \ln (q_4) + \alpha_{15}^* \ln (q_1)^* \ln (q_5) + \alpha_{16}^* \ln (q_1)^* \ln (q_6) + \alpha_{17}^* \ln (q1)^* \ln (q_7) + \alpha_{23}^* \ln (q_2)^* \ln (q_3)\ \alpha_{24^*} \ln (q_2)^* \ln (q_4) + \alpha_{25}^* \ln (q_2)^* \ln (q_5) + \alpha_{26} \ln (q_2)^* \ln (q_6) + \alpha_{27}^* \ln (q_2)^* \ln (q_7) + \alpha_{34}^* \backslash\ln (q_3)^* \ln (q_4) + \alpha_{35} \ln (q_3)^* \ln (q_5) + \alpha_{36}^* \ln (q_3)^* \ln (q_6) + \alpha_{37}^* \ln (q_3)^* \ln (q_7) + \alpha_{45}^* \ln (q_4)^* \ln (q_5) + \alpha_{46}^* (q_4)^* \ln (q_6) + \alpha_{47}^* \ln (q_4)^* \ln (q_7) + \alpha_{56}^* \ln (q_5)^* \ln (q_6) + \alpha_{57}^* \ln (q_5)^* \ln (q_7) + \alpha_{67}^* \ln (q_6)^* \ln (q_7) + Vi - Ui \ldots (4)$

Where πP^* = Normalized profit in Naira is defined as gross revenue less total costs of production normalized by price of yam output per farmer, q_1^* = Normalized cost of planting material in (₦/kg), q_2^* = Normalized cost of fertilizer in (₦/Kg), q_3^* = Normalized cost of labour input in (₦/man day), q_4^* = Hectarage of cultivated land (Ha), q_5^* = Annual depreciation on fixed inputs (in ₦), q_6^* = Normalized cost of staking material (₦/No), q_7^* = Normalized cost of herbicides (₦/liters) and Ví- Uí = composite error term (e_i).

The socio-economic determinants of profit inefficiency were modeled in terms of the socio-economic characteristics and institutional variables believed to affect the profit inefficiency of the farmer and the model is specified as follows:

$\mu = \beta o + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + e_i \ldots (5)$

Where: μ = profit inefficiency of the $_1$th farm, X_1= age farmer (in years), X_2 = level of education (number of years spent in school), X_3 = Gender (male = 1, female = 2), X_4 = farming experience (in years), X_5 = farm size (in hectares,) X_6 = extension contact (number of times farmer was visited in the year), X_7 = credit status (Access =1, no access=0), X_8 = membership of co-operative societies (member =1, non-member =0), X_9 = household size (number), ε= error term. The co-efficient of the unknown parameters are to be estimated by the method of maximum likelihood using computer program FRONTIER version 4.1(Coelli, 1994).

RESULTS AND DISCUSSION

The result of the analysis of the socio-economic characteristics of yam farmers is presented in Table 1. Majority (85%) of the respondents were within the age bracket of 25 – 55 years with only 1.7% of them below the age of 25 years and 13.3% of them over 55 years. The age distribution implies that the vast majority of farmers in the study area were in their productive years. The males among the respondents were up to 95.8% while the female farmers were 4.2% and the married among them were 97.5%. This finding agrees with Ademsa and Djato (1996), who earlier observed that men dominate the workforce in Nigeria agricultural communities but women generally play vital roles in the actualization of the household farm target. Furthermore, 86.7% of them had one form of educational attainment or the other. Education is an important human capital resource necessary for boosting the production, productivity and obviously the rate of adoption of modern farming system by yam farmers. Onyenweaku and Igwe (2005) corroborated this by affirming that education affects the speed with which new technologies are being diffused and accepted by the farmers.

The inaccessibility of up to 90% of the respondents to credit is a major problem of the yam farmers in the study area. Accessibility to credit can enhance profit efficiency if bottlenecks such as rent-seeking, inadequate training programmes, lack of adequate supervision and poor accessibility of credit by the poor are tackled by formal credit institutions (Zeller *et al.,* 2002). Most of the respondents (74.2%) did not have access to extension service. Only 25.8% of respondents had access to extension agent. This is an indication that the majority of the yam farmers in the study area did not have access to extension education. This can greatly affect the productivity level of the yam producers. In Table 1, 52.5% of the respondents had 11 to 20 years of farming experience while 14.2% had 1 to 10 years of farming experience. Only 6.6% of the respondents had experience in yam production spanning over 30 years. Experience is expected to increase the planning horizon of the farmer and subsequently the achievement of the targeted profit efficiency (Alibi and Aruna, 2006).

The household size composition of respondents indicated that a total of 45.8% had 6 to 10 persons in their households, 37.5% had 1 to 5 persons, 11.7% had 11 to 15 persons and only 5% had over 16 persons per household. Large household size is important to yam farmers as it is the main source of unpaid family labour services, as yam production is highly labour intensive. In small scale farming, the availability of family labour is greatly influenced by household size and the age structure (Ajibefun and Abdulkadri, 2004).

Farm sizes ranged from 0.1 to 3 hectares out of which 93.3% of the respondents had farm land not exceeding 0.1to1hectare. Land holdings of small scale farmers which acquired land by inheritance (72.5%), borrowing (12.5%), purchase (10.8%) and hiring (4.2%) were typically small. The study also indicated that majority (70.8%) of the yam farmers in the study area did not belong to any cooperative society. Only about 29.2% of yam farmers are members of organized farmer groups

Table 1: Socio-economic characteristics of yam farmers in the study area

Variables	Frequency	Percentage
Age		
<25	2	1.7
25 – 40	58	48.3
41 – 55	44	36.7
>55	16	13.3
Total	120	100.0
Gender		
Male	115	95.8
Female	5	4.2
Total	120	100.0
Marital status		
Married	117	97.5
Single	3	2.5
Total	120	100.0
Educational attainment		
Quranic	1	0.8
Primary	41	34.2
Secondary	35	29.2
Tertiary	24	20.0
Adult education	3	2.5
None of the above	6	13.3
Total	120	100.0
Access to credit		
Yes	12	10.0
No	108	90.0
Total	120	100.0
Extension contact		
Yes	31	25.8
No	89	74.2
Total	120	100.0
Years of experience		
1 – 10	17	14.2
11 – 20	63	52.5
21 – 30	32	26.7
31 and above	8	6.6
Total	120	100.0
Household size		
1 – 5	45	37.5
6 – 10	55	45.8
11 – 15	14	11.7
16 and above	6	5.0
Total	120	100.0
Farm size		
0.1 – 1	117	93.0
1.1 – 2	7	6.0
2.1 – 3	1	1.0
Total	120	100.0
Method of land acquisition		
Inheritance	87	72.5
Purchase	13	10.8
Hired	5	4.2
Borrowing	15	12.5
Total	120	100.0
Membership of cooperative		
Yes	35	29.2
No	85	70.8
Total	120	100.0

Source: Field Survey Data, 2012

Estimates of Production Variables Affecting Profit Inefficiency of Yam Farmers

The Maximum Likelihood Estimates (MLE) of production variables affecting profit inefficiency of the yam farmers are presented in Tables 2, 3 and 4. Table 2 show the production factors, while Tables 3 and 4 are squared and interaction terms among production variables respectively. Sigma squared ($_{\delta}^{2}$) estimated as 3.496 was significant at 0.01 probability level. The gamma (γ) value was 0.999 and significant at 0.01 probability level, implying that 99.9 % of the total variation in yam output was due to production inefficiency. This is in line with the findings of Onyenweaku and Igwe (2005), which indicated that the total variation in food crop output was due to technical inefficiency in Imo State of Nigeria. For the production factors in Table 2, the normalized price of planting materials, staking materials, labour and herbicides were significant at 0.01 probability levels. Other significant variables at 1% level of significance include farm size and depreciation. The normalized prices of planting materials, fertilizer labour and herbicides in Table 3 were all significant at 1% level of probability except staking materials, when squared. Depreciation and farm size were also significant at the same level of probability, but different estimates of coefficients. Out of the estimates reflecting interaction among the variables of the general model in the Table 4, only the normalized price of planting materials X depreciation was not significant. In all the cases, negative coefficients was an indication of an inverse relationship while positive coefficients depict that an increase of a unit of production variable led to an increase of equal magnitude with the coefficient. The different levels and combinations of the variables give an insight of their use to reduce profit inefficiency.

Determinants of Profit Inefficiency in Yam Production

The maximum likelihood estimates of the inefficiency model are presented in Table 5. A negative sign of the estimate means that the associated variable had a positive effect on profit efficiency, that is, it reduced profit inefficiency and vice versa. The coefficient of age was 4.867 and significant at 0.01 probability level.

Table 2: Maximum Likelihood Estimates (MLE) of Production variables affecting Profit Inefficiency as a general model

Variables	Parameter	Coefficient	t-ratio
Constant	α_0	-180.308	-182.86***
Normalized cost of planting materials (kg)	α_1	2.142	2.899***
Normalized cost of fertilizer (kg)	α_2	-0.007	-0.009
Normalized cost of labour (man days)	α_3	2.686	2.754***
Hectarage of farm (ha)	α_4	-6.622	-6.983***
Annual depreciation of fixed inputs	α_5	37.058	69.815***
Normalized cost of staking materials	α_6	-5.793	-6.843***
Normalized cost of herbicide (N/lit)	α_7	-15.328	-18.212***

Source: Field Survey Data, 2012

Table 3: Maximum Likelihood Estimates (MLE) of Production variables affecting Profit inefficiency as a general model squared

Variables	Parameter	Coefficient	t-ratio
Normalized cost of planting materials X normalized cost of planting Materials	α_{11}	-9.344	- 4.278***
Normalized cost of fertilizer X normalized cost of fertilizer	α_{22}	0.429	7.398***
Normalized cost of labour X normalized cost of labour	α_{33}	-0.707	-4.580***
Hectarage of farm X hectarage of farm	α_{44}	0.344	2.016**
Annual depreciation of fixed inputs X annual depreciation of fixed inputs	α_{55}	-2.002	-35.399***
Normalized cost of staking materials X normalized cost of staking materials	α_{66}	-9.363	-1.271
Normalized cost of herbicide X normalized cost of herbicide	α_{77}	-0.587	-6.393***

Source: Field Survey Data, 2012

That is, an increase in the age of the yam farmers led to an increase in profit inefficiency of the yam farmer. The coefficient value of education was -4.704 and significant at 0.01 probability level. This means that as the level of education increases, profit inefficiency reduces. Education enhances the acquisition and utilization of information on improved technology by the farmers' as well as innovativeness. In consonance with this finding, Onyenweaku and Igwe (2005) had earlier observed that there existed a correlation between profit efficiency and educational level. Gender, farm size, extension contact, membership of cooperatives and household size with coefficients of -6.267, -1.544, -1.456, -1.121 and -2.566 respectively also reduced technical inefficiency significantly being significant at 1% levels respectively. This finding agreed with Ajibefun and Aderinola (2003), who affirmed that increases in the farm household size reduced the technical inefficiency of food crop farmers.

Distribution of Yam Farmers According to Profit Inefficiency

The frequency distribution of respondents according profit inefficiency in the study area is presented in Table 6. The mean profit inefficiency was 0.517 while the remaining 0.483 is an indication that there is room for reducing inefficiency and enhancing profit efficiency of yam farmers. The profit inefficiency level ranged from less than 0.11 to 0.99. Furthermore, 20 % of the respondents were within the range of 0.91 to 0.99. About 61.7 % 0f the respondents had profit inefficiency level that ranged from 0.11 to 0.90, while the remaining 18.3 % of the respondents had profit inefficiency level of less than 0.11. This result is similar to the findings of Agwu and Alu (2005) who investigated inefficiency in yam production in Ushongo Local Government Area of Benue State, Nigeria and found that yam farmers were inefficient in terms of profit maximization

Constraints Faced by Farmers

The constraints encountered in production activities are presented in Table 7. Results show that lack of access to inputs (100.0%), high cost of input (100.0%), poor producer prices (100.0%), lack of capital (100.0%) and incidences of pests and diseases (100.0%) were affirmed by all the respondents to have posed as challenges. Other problems in decreasing magnitude of importance were poor transportation facilities (95.8%), pilfering (85.8%), inadequate extension services (74.2%), lack of improved yam varieties (62.5%) and inadequate farm land (37.5%). Addressing these problems at the policy front and farmer initiatives could help raise the efficiency levels of the farmers

Table 4: Maximum Likelihood Estimates (MLE) of Production variables affecting Profit inefficiency with interaction among the variables

Variables	Parameter	Coefficient	t-ratio
Interaction among production variables			
Normalized cost of planting materials X normalized cost of fertilizer	α_{12}	0.359	7.227***
Normalized cost of planting materials X normalized cost of labour	α_{13}	-0.993	-10.543***
Normalized cost of planting materials X hectarage of farm	α_{14}	0.422	3.735***
Normalized cost of planting materials X annual depreciation of fixed inputs	α_{15}	-6.852	-0.738
Normalized cost of planting materials X normalized cost of staking materials	α_{16}	9.158	1.565*
Normalized cost of planting materials X normalized cost of Herbicide	α_{17}	0.378	4.309***
Normalized cost of fertilizer X normalized cost of labour	α_{23}	0.651	-5.060***
Normalized cost of fertilizer X hectarage of farm	α_{24}	-0.211	-1.521*
Normalized cost of fertilizer X annual depreciation of fixed inputs	α_{25}	0.722	5.950***
Normalized cost of fertilizer X normalized cost of staking materials	α_{26}	0.576	7.129***
Normalized cost of fertilizer X normalized cost of herbicide	α_{27}	-0.431	-3.561***
Normalized cost of labour X hetarage of farm	α_{34}	0.837	4.047***
Normalized cost of labour X annual depreciation of fixed inputs	α_{35}	-0.743	-4.893***
Normalized cost of labour X normalized cost of staking materials	α_{36}	-0.707	-4.762***
Normalized cost of labour X normalized cost of herbicide	α_{37}	2.169	7.410***
Hectarageof farm size X annual depreciation of fixed inputs	α_{45}	1.166	7.645***
Hectarage of farm size X normalized cost of staking materials	α_{46}	1.020	7.592***
Hectarage of farm size X normalized cost of herbicide	α_{47}	-1.729	-6.768***
Annual depreciation of fixed inputs X normalized cost of staking materials	α_{56}	0.376	3.423***
Annual depreciation of fixed inputs X normalized cost of herbicide	α_{57}	0.746	78.012***
Normalized cost of staking materials X normalized cost of herbicide	α_{67}	-1.088	-10.651***
Diagnostic statistics			
Sigma-squared (δ^2)		3.496	8.373***
Gamma (γ)		0.999	3.800***
Log likelihood test		-111.845	

Source: Field Survey Data, 2012.

Note: *** implies significant at $p < 0.01$ probability level, ** at $p < 0.05$ probability level, and * at $p < 0.10$ probability level.

Table 5: Maximum Likelihood Estimates of determinants of profit inefficiency in Yam Production

Variable	Parameter	Coefficient	t-ratio
Constant	β_o	-8.302	-7.484***
Age	β_1	4.867	6.508***
Educational level	β_2	-4.704	-5.890***
Gender	β_3	-6.267	-5.437***
Farming experience	β_4	-0.171	-0.230
Farm size	β_5	-1.544	-3.803***
Extension contact	β_6	-1.456	-4.877***
Credit status	β_7	-0.926	-0.969
Member of cooperative society	β_8	-1.121	-2.108**
Household size	β_9	-2.566	-3.624***

Source: Field Survey Data, 2012.

Note: *** implies significant at the $p < 0.01$ probability level, ** at $p < 0.0$ 5 probability level and * at $p < 0.$ 10 probability level.

Table 6: Frequency Distribution of farmers according to profit inefficiency

Inefficiency level	Frequency	Percentage
< 0.10	22	18.30
0.10-0.50	44	36.67
0.51-1.00	34	28.33
Minimum inefficiency	0.003	
Maximum inefficiency	0.998	
Mean profit inefficiency	0.517	

Source: Field Survey Data, 2012.

Table 7: Percentage Distribution of Respondents According to the Constraints Faced in Yam Production

Constraints	Frequency*	Percentage	Rank
Lack of access to inputs	120	100.0	1
High cost of inputs	120	100.0	1
Lack of capital	120	100.0	1
Incidences of pests and diseases	120	100.0	1
Poor transportation facilities	115	95.8	2
Pilfering	103	85.8	3
Inadequate extension services	89	74.2	4
Lack of improved yam varieties	75	62.5	5
Inadequacy of farm land	45	37.5	6
Total	**1134***		

Source: Field Survey Data, 2012. Note; * implies that multiple responses were recorded

CONCLUSION AND RECOMMENDATIONS

Based on results of this study, it is concluded that yam production in Nasarawa state is of small-scale nature considering the hectarage devoted to the crop by the yam farmers. The study also indicated that yam farmers in the study area are not fully profit efficient and their overall profit efficiency level could be improved substantially by reducing their inefficiency.

The study analyzed the factors that affected the profit efficiency of yam farmers. Substantial improvement in profit efficiency is still required. Optimal use of the right combinations of production variables for instance, expansion of farm sizes, appropriate and renumerative and guaranteed prices, acquisition of requisite formal and extension education by the farmers, encouragement of the involvement of both sexes in yam production to curb unemployment, hunger and ensure food security and encouraging producers to belong to organized farmer groups such as cooperatives are hereby recommended. These actions are expected to improve the profit efficiency of the yam farmers.

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