Full Length Research Paper

An analysis of the supply for seed yams in Nigeria

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This study was conducted to examine the supply of seed yam in major yam producing areas of northern and southern Nigeria using the supply function analysis. A cost -route approach was adopted in eliciting data from 120 seed yam farmers and marketers spread across the six states studied in 2006 using the multi-stage random sampling technique. Results show that age had a significant relationship with seed yam supplied at the 1.0% level. Need for disposable income was significant at the 5.0% level, while labour cost and supplier experience were negatively related with seed yam supplied at the 10.0 and 1.0% levels respectively. The elasticity of supply for seed yam with respect to income is positive and inelastic. Price of seed yam had positive elasticity. The study also shows that there were no commercial structures for supply of seed yam in Nigeria. The rural assemblers and wholesalers limit purchases and supplies to accessible rural markets. Farmer's only sell seed yams after satisfying own requirements.

Keywords: Seed yams in Nigeria, Determinants of supply, supply elasticities.

INTRODUCTION

With growing demand, yams have assumed great importance in Nigeria. Nigeria produces about 31.5 mil-lion metric tonnes of yam annually (CBN, 2003). The entire production and marketing chain offer vast employ-ment opportunities. The supply of yam offers prospects for income generation due to the number of people involved and the value attached to it. The marketing system, which affects the prices received by the farmers and those paid by buyers, has a profound impact on food security. In predominantly small farm agriculture, the marketing system is reported to assemble the small surpluses of farmers (FAO, 2003).

In Nigeria, yam is becoming more expensive and rela-tively unaffordable in urban areas as production has not kept pace with population growth leading to demand exceeding supply (Kushwaha and Polycap, 2001).

Yam production in Nigeria is quite high. Nigeria is known to be the largest producer of yam in the world. Annual production of yam in the country is estimated at

26.587 million metric tones (FAO, 2006). Nigeria account-ted for 75% of world production (Manyong et al., 2001). The annual growth rate for the same period was 6% for the yield and 10% for the area planted. The major yam growing areas of Nigeria extend from the rain forest zone to the southern limit of the northern Guinea Savannah. There is still need for increased production and supply of yam to satisfy domestic and export demand. Increased production of yam in Nigeria is believed to be constrained mostly by high cost of seed yam (NRCRI, 2004). A large quantity of edible yam, up to 30% (3 - 5 tonnes per hectare) of the previous year's harvest may be used to plant a new crop (Okoli and Akoroda, 1995). This makes seed yams account for over 40% of yam production cost (Ugwu 1990; Nweke et al., 1991). The three major inputs in yam production are seed yams, labour, and staking materials. According to Ezeh (1991), these inputs account for 45, 21, and 16% of yam production costs respectively.

The high labour requirement (300 - 400 man days per hectare) for various production operations such as land preparation, weeding, training the vines, fertilizer applica-tion, harvesting, barn preparation, post harvest handling, transportation, control of pests and diseases in the field and in storage have been variously reported as con-

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constraints (Lyonga, 1980; Orkwor et al., 1992).

The minisett technique (involving the use of about 25 g cut setts to produce whole tubers which serve as "seed" of yam (Okoli and Akoroda, 1995) was developed to address the problem of high cost of seed yam. The supply of yam is also complex and risky due to mode of transportation (mainly in trucks and Lorries), seasonal production and bulkiness.

Three types of seed yams were identified in Nigeria (Asumugha et al., 2007). These are milked seed yam, cut setts (minisetts) and small whole tubers. Farmers may produce seed yams for sale, for own production or both. Most farmers sell seed yams only after meeting their own production needs, suggesting limited specialization in seed yam production. Seed yam is a major item of cost in yam production. The minisett technique of seed yam production holds a lot of prospects for reducing the cost of seed yam. In light of these issues the paper examines the supply of seed yam in Nigeria. The objective is to analyze the supply for seed yams in major yam producing areas of Nigeria.

The specific objectives include to:

i. Examine the socio-economic characteristics of the various participants in the seed yam sector.
ii. Estimate and analyze the supply for seed yams in the major producing areas.
iii. Estimate the relative supply elasticities for yam.
iv. Make policy recommendations for increasing the supply of seed yams.

METHODOLOGY

The study area

The study was conducted in the major yam producing northern and southern states of Nigeria: Benue, Nasarawa, and Federal Capital Territory (FCT) in the north as well as Delta, Enugu, and Ebonyi states in the south.

Sampling Procedure

The multi-stage random sampling procedure was adopted in the choice of states and seed yam traders. In the second stage, an agricultural zone was chosen from the list of agricultural development project (ADP) zones in each of the selected states. In the third stage, 20 seed yam traders from each zone were studied making a total of 120 yam traders.

Data collection

Primary and secondary data were used in the study. Primary data were generated through a set of well structured questionnaire administered on the target respondents. Data collected generally were seed yam traders' characteristics and employment, expenditure on seed yams, prices of seed yam and close substitute, disposable income, as well as experience in seed yam marketing. Others were age and education, major and minor occupation, gender, farm sizes, labour, fixed inputs, value of credit (if any), storage cost and value of losses during storage, membership of traders' association or cooperatives, income level, and transporttation means. Secondary data were sourced from literature and relevant research works in the area.

Data analysis

Supply function analysis via a cross-sectional model was employed to assess the influence of these variables on the value of seed yams supplied. Descriptive statistics and linear regression models were used to estimate the effect of the above variables on the value of seed yams supplied. Partial derivative of the elasticity formula was estimated.
Implicitly, the supply function is specified;

SS = f (GD, ED, I, HHS, P, PS, C42, LAB, AGE, EXP, e)
$$\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$
Where:

SS = value of seed yams supplied in Naira
GD = gender of the supplier
ED = educational level in years
I = disposable income in Naira
HHS = household size
P = price of seed yams in Naira
PS = price of substitute in Naira
C42 = value of credit received in Naira
LAB = labour in mandays used
EXP = experience in seed yam business in years
AGE = age of the trader in years
e = error term

Supply elasticity for seed yam

Supply elasticity is defined as the responsiveness of quantity supplied to changes in price. For linear functions, price elasticity of supply can be written thus;

$$E_d = s_{q/} \, s_P \times p/q$$
$$= s. \, P_i/q_i$$

Where;

E_d = elasticity of supply
s_q = change in quantity supplied
s_P = change in price
P_i = mean value of the explanatory variables
q_i = mean value of the dependent variable s_i
= coefficient of the variables

RESULTS AND DISCUSSION

Table 1 shows the descriptive statistics and socio-economic profile of seed yam suppliers in Nigeria. The average age was about 47 years. This indicates that most of the seed yam suppliers were middle aged. This is the active farming and trading group. The mean number of years of schooling was about 14 while experience in seed yam business in years was about 20 which imply that they are literate as well as experienced. Experience influences decision making in relation to risk aversion. The suppliers were mostly males. About N98, 254 worth of seed yams are supplied by an average seed yam pro-

Table 1. Mean values of descriptive statistics for supply of seed yam.

Variables	Mean values
Gender	0.92
Age	46.93
Education (Ed)	13.93
Experience (Exp)	19.98
Income (i)	170,610.62
Price of seed yam (P)	33.89
Price of substitute (Ps)	161.18
Variable inputs (Vi)	2,455.86
Fixed inputs (Fi)	0.02
Access to credit (C41)	0.23
Amount of credit (C42)	15,798.61
Loss of seed yam (N)	1,167.86
Value of supply (ss)	98,254.12
Storage (St)	0.42
Variety of seed yam used (va)	3.09
Labour cost (lab)	2,559.86
Cooperatives (coop)	0.37

Source: derived from survey data, 2006.

Table 2. Determinants of supply of seed yam in Nigeria.

Variable	Regression coefficients
Constant	206107.794**(-3.314)
Gender (GD)	20701.232(0.773)
Educational Level (ED)	3714.797(1.431)
Income (I)	0.186**(3.338)
Household size (HHS)	1093.220(0.712)
Price of Seed Yam (P)	1694.292***(10.836)
Price of Substitute(PS)	-89.434(-1.035)
Credit (C42)	-0.323(-1.283)
Labour cost (LAB)	-89.943*(-2.351)
Age	6633.791***(6.134)
Experience (Exp)	-6385.584***(-4.946)
R2	0.978
Adjusted R2	0.941
F – value	26.507***

Source: derived from survey data, 2006.
Note: *** is significant at 1%, ** is significant at 5%, * is significant at 10%. Values in parentheses = t – values.

ducer with a mean price of about N34 per seed yam.

Supply for seed yam

Table 2 shows the linear regression analysis for supply of seed yams in Nigeria. The regression model explained 98% of the total variation in seed yam supply. The estimated slope coefficient was significantly different from one at 95% confidence level. Disposable income of the supplier, price of seed yams, labour cost, age and expe-

Table 3. Estimated elasticities of supply for seed yams in Nigeria.

Variables	Elasticity
Gender	0.194
Age in years	3.170
Education in years	0.527
Experience in years	-1.299
Income in Naira	0.323
Price of seed yams ($\mathcal{N}$)	0.600
Price of substitute ($\mathcal{N}$)	-0.150
Credit	-0.00
Labour	-2.34
Age	3.17
Total	**3.872**

Source: derived from survey data, 2006.

experience of the supplier exerts effect on the supply of seed yams in the country at various levels of significance.

Disposable income was found to be a significant determinant of the quantity of seed yams supplied at 5% level. Thus income is required by the suppliers to increase supply of seed yams.

Price of seed yam was very significant at 1% level and is a major determinant to seed yam supply. The wholesalers usually have better access to price information in terms of normal or expected price of yam at any time. At the village markets, therefore, they fix the price level below the expected price, while at the wholesale/retail levels they force prices above the expected levels. This is the point where the efficiency of the price mechanism is undermined. In all the markets visited in the northern states, seed yams were sold in heap of 100 tubers and prices fixed based on tuber sizes.

Age and experience in seed yam trade also significantly affect seed yam supply in Nigeria. This is at 1% level. The average age was about 47 years. Most of the seed yam suppliers were middle aged. This is the active trading and adventurous group. The rural assemblers and wholesalers limit purchases and supplies to accessible rural markets and transport yam using pick -up vans. In other instances, they buy from the farmers on the spot and sell to available semi-urban and urban market wholesalers at a mark-up on buying price. The rural assembler is, however, characterized by a large geographical area covered, as well as the size of his purchase.

Experienced growers are now diversifying to other farm enterprises as alternative sources of income as indicated by the negative sign of the coefficient.

Elasticity of seed yam supply

Table 3 shows that elasticity of supply of seed yam with respect to income is positive and inelastic. Thus increases in income will lead to a less than proportionate

increase in seed yam supply. The elasticity of supply with respect to years of experience and labour were negative and elastic. For labour, the reduction in supply may be as a result of more labour cost which affects increased supply. Experienced farmers may want to diversify to supply of other crops. Seed yam supply, from the result of this study, is localised. Seed yam had positive price elasticity indicating that seed yam supply will increase with increase in price. Total value of elasticity was 3.872 which is greater than unity indicating that changes in the socio-economic variables together will bring about a more than proportionate change to seed yam supplied.

Conclusion and Recommendations

Supply of seed yams in Nigeria is localised. Farmer's only sell seed yams after satisfying own requirements. Relevant variables influencing supply for seed yams in Nigeria include farm size, education level and the disposable income of the farmers. Others are experience in seed yam production and labour availability. Thus, for the commercialisation of the seed yam sector, farmers should be educated especially on the benefit of seed yam enterprise through extension services. There should be more campaigns on the need for commercial outfit on seed yam production and supply. These set of farmers can be assisted with soft loans to address capital deficiency to increase farm sizes for seed yam production and access farm inputs. Currently, there are no commercial structures for supply of seed yams in Nigeria.

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