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Determinants of yam production and profitability in Edo State, Nigeria

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ABSTRACT: The study examined the determinants of yam production and profitability in Edo State, Nigeria. Data used for the study were obtained using structured questionnaire administered to 120 randomly selected yam farmers from Ovia South West and Ovia North East Local Government Area of the state. Descriptive statistics, Gross Margin analysis and Production function analysis using the Ordinary Least Square (OLS) criterion was used to estimate the parameters of the production function. Result showed that majority of the farmers was male, ageing, with little or no formal education and a modal family size of 7 – 11 people. Budgetary analysis revealed that yam production is profitable in the study area with an average gross margin of ₦58,400. Farm size, staking, yam sets and the operating cost were found to be positively related to output, with Labour as the major determinant. The result further showed a return to scale of 4.582 indicating an increasing return to scale, implying inefficiency in the use of resources in the enterprise as production was in the irrational stage (stage 1) of production.

Keywords: Yam Production, Return to Scale, Profitability, Determinants.

Introduction

The Agricultural sector has always been an important component of Nigerian economy with over 70 percent of the population engage in agriculture and agricultural related activities (Obasi & Agu, 2000). The sector is almost entirely dominated by small scale resource poor farmers living in rural areas, with farm holdings of 1- 2 hectares, which are usually scattered over a wide area. These farms dominated by these small scale farmers are responsible for about 95% of the total production (Awoyemi, 1981). In addition, small scale agriculture has in the time past suffered from limited access to credit facilities, modern technology farm input and inefficient use of resources.

Root and tubers crops comprise crop covering several genera. They are staple food crops, being the being the source of daily carbohydrate intake for the large populace of the world. The term refers to any growing plant store edible materials in subterranean root, corm or tuber (Oke, 1990). Yam is a member of this important class of food. Yam is an important food crop especially in the yam zones of West Africa, comprising Cameroon, Nigeria, Benin, Togo, Ghana and Cote d' Ivoire. This zone produces more than 90% of the total world production which is estimated at about 20 – 25million tons per year (Sanusi and Salimonu, 2006). Nigeria is the main producer of yam in the world with about 71% of the world output followed by Ghana, Cote d' Ivoire, Benin and Togo (FAO, 2002). Available data also shows that yam is one of Nigeria leading root crop (FAO, 1999).

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As a food crop, the place of yam in the diet of the people in Nigeria cannot be overemphasized. It contribute more than 200 dietary calorie per capital daily for more than 150 million people in west Africa while servicing as an important source of income to the people (Babaleye, 2003). Yam has some inherent characteristics, which make it attractive, first, it is rich in carbohydrate especially starch consequently has a multiplicity of end use. Secondly, it is available all year round making it preferable to other seasonal crops (FAO,1987)

According to Oyenuga (1968), yam contains a higher value in protein (2.4%) and substantial amount of vitamins (Thiamine, Riboflavin and Ascorbic acid) and some other minerals like calcium, phosphorus and iron than any other common tuber crop. It is also comparable to any starchy root crop in energy and the fleshy tuber is one of the main source of carbohydrate in the diet of many Nigerian. CGIAR (1996), also reported that yam tends to be higher in protein and minerals like phosphorus and potassium than sweet potatoes though the latter is richer in Vitamin A and C. Yam is a preferred food and a food security crop in some Sub-Saharan African countries (IITA, 1998).

Yam could be eaten as boiled yam or fried in oil. It can also be processed into yam flour or pounded yam. Moreover, yam is also a source of industrial starch, the quality of which varies with the species, although the quality of starch of some species is said to be comparable to cereal starchy (Osisioogu and Uzo,1973). Apart from this, yam also plays vital roles in traditional culture, rituals and religion as well as local commerce of the African people (Coursey, 1967). Yam is reported to be part of the religious heritage of several Nigeria tribe and up to date often play a key role in religious ceremony (Sanusi and Salimonu, 2006). Worthy of note is the fact that many important cultural values are attached to yam, especially during wedding and other social ceremonies. In many farm communities in Nigeria and other West Africa countries, the size of the yam enterprise that one has a reflection of one social stature. Due to the importance attached to yam many communities celebrate the new yam festival annually.

Yam production in Nigeria has more than tripled over the past 40 years from 6.7 million tonnes per annum in 1961 to 27 million tonnes per annum in 2001(FAO, 1999). This increase is however attributed to larger hectares of land planted to yam than to increased productivity. This decline in average yield per hectare in Nigeria has been rather drastic dropping from 14.9% in 1986 -1990 to -2.5% in 1999 (CBN, 2002). Since yam remains a major staple food in Nigeria based on based on its cultural role (Nweke *et al*, 1992), contributing immensely to rural and regional economies (Kalu and Erhabor,1992) and its significance among the food crops in Nigeria. It is therefore important to take a critical look into the factors that affects the production of yam and its profitability.

In view of the foregoing, the study is designed to examine the socio economics characteristics of yam farmers in the study area, examine the determinants of production of yam, the profitability of the yam enterprise and the constraints that affects yam farmers in the study area.

Materials and Methods

Study Area - The study was carried in Edo State. The state has a population of about 3,218,332 (NPC, 2006). It lies roughly between longitude $06^{\circ} 04^{\prime} E$ and $06^{\circ} 43^{\prime} E$ and latitude $05^{\circ} 44^{\prime} N$ and $07^{\circ} 34^{\prime} N$. The state is agrarian and well suited for the production of arable crops such as cassava, yam and maize.

Sampling Procedure – the data mainly from primary sources were collected from two Local Government Areas (LGA) which were purposively selected because of the prevalence of the crop in the area using multistage sampling technique. The first stage involved the purposive sampling of Ovia South West and Ovia North East Local Government Areas. The second stage involved the a simple random selection of 60 farmers from each of the LGAs, thus, making 120 respondents. The data were collected with the use of well structured questionnaire designed in line with the objectives of the study.

Method of Analysis - Descriptive Statistical and quantitative methods were used to analyse the data collected. The descriptive statistics used were frequency distribution and tables. The quantitative method employed were the ordinary least square to caption the determinants of production, Gross Margin analysis which was used to determine the profitability, the t – test was used to test for the statistical significance of the variables.

Results and Discussion

(1) SOCIO ECONOMIC CHARACTERISTICS

Table 1, shows the age distribution of respondents in the study area. Results showed that the age of respondent range between 31 – 70 years. The majority of the farmers however fall between 51 – 60 years age group constituting 55% of the total respondents. This shows that the yam farmers are ageing.

Results also showed that majority of the farmers in the study are without formal education. Table 2 shows that 58% of the respondents had no formal education, while 32% and 10% had primary and secondary education respectively. This could have negative impact on the adoption of new techniques of production by the yam farmers in the study area.

Table 3 shows that 92% of the respondents were male while the female were 8%. This may be due to the labour intensive nature of yam production hence female farmers may prefer to grow other crop with lesser labour requirements. Further socio economic analysis indicated a modal family size of 7 – 11 as shown in Table 4.

Table 1: AGE DISTRIBUTION OF THE RESPONDENTS.

AGE	FREQUENCY	PERCENTAGE
31 – 40	2	3
41 – 50	15	25
51 – 60	33	55
61 – 70	9	15
71 – 80	1	6
TOTAL	60	100

Table 2: EDUCATIONAL STATUS OF RESPONDENTS

EDUCATIONAL STATUS	FREQUENCY	PERCENTAGE
No Formal Education	35	58
Primary Education	19	32
Secondary Education	6	10
Others	-	-
TOTAL	60	100

Table 3: SEX DISTRIBUTION OF RESPONDENTS.

SEX	FREQUENCY	PERCENTAGE
Male	55	92
Female	5	8
TOTAL	60	100

Table 4: DISTRIBUTION OF RESPONDENT BY FAMILY SIZE.

AGE	FREQUENCY	PERCENTAGE
31 – 40	2	3
41 – 50	15	25
51 – 60	33	55
61 – 70	9	15
71 – 80	1	6
TOTAL	60	100

(11) PROFITABILITY ANALYSIS

The profitability analysis is presented in table 5. The result shows that the variable cost incurred included cost of labour, planting material such as yam setts and chemicals. The analysis shows that labour accounted for the highest portion of the total variable cost. The total variable per hectare was ₦78,500 while the total revenue per hectare was ₦ 136,900 to arrive at a gross margin of ₦ 58, 400.00. The result shows that yam production enterprise is profitable in the study area.

Table 5: PROFITABILITY ANALYSIS.

ITEM	AMOUNT(₦)
Gross Return	136,900.00
Planting material	15,000.00
Cost of chemicals	22,800.00
Labour Cost	36,000.00
Total Variable Cost	78,500.00
Gross Margin/ha	58,400.00

(111) PRODUCTIVITY ANALYSIS

The production function analysis presented in Table shows that positive a relationship exists between total output and farm size, staking, yam sett and operating cost. This implies that as more of these variables are employed, a resultant increase in total output of yam will be attained.

However, the test of significance shows that labour is the major determinants of yam production. The input elasticities as presented in table 7 shows a return to scale of 4.582 which indicates an increasing return to scale and indicate that yam production was in the irrational stage (Stage 1) of the production function implying inefficiency in the use of resources in the enterprise. At the given level of production each additional unit of input added more to total output than previous unite, therefore, overall production should be intensified and expanded.

Table 6: ESTIMATES OF THE PRODUCTION FUNCTION ANALYSIS.

VARIABLE	PARAMETER	COEFFICIENTS	t-
Constant	B ₀	4.126	5.626
Farm Size	B ₁	0.364	0.850
Stalk	B ₂	0.089	0.462
Yam sett/seed	B ₃	0.079	0.859
Operating Cost	B ₄	0.288	1.712

Table 7: ELASTICITY OF PRODUCTION AND RETURN TO SCALE (RTS).

VARIABLE	PARAMETER	ELASTICITY
Farm Size	B ₁	4.126
Stalk	B ₂	0.089
Yam sett/seed	B ₃	0.079
Operating Cost	B ₄	0.288
RTS		4.582

(111) CONSTRAINTS TO YAM PRODUCTION

Table 8: CONSTRAINTS IN YAM PRODUCTION.

CONSTRAINTS	NO OF FARMERS	PERCENTAGE
Unavailability of yam sett	*42	70
Inadequate staking material	*54	90
Inadequate capital	*51	85
Marketing	*48	80
Pest attack	*27	45

*Multiple Responses

Table 8 presents the result of constraints faced by farmers in the study area as identified by the respondents. The study revealed that the most critical problems facing the farmers includes, inadequate staking materials (90%), inadequate capital to invest(85%) and other problems identified by the farmers. These constraints need to be relaxed in order to achieve appreciable increase in yam production.

Conclusion

The study revealed that yam production was profitable in the study area and that a positive relationship exists between total output and farm size, stalk, yam sett and operating cost which imply an increase in total production of yam as more of these variables are employed. However labour was noted be the major determinants of yam. The overall productivity of yam production (RTS) was however in the irrational zone of the production function (satge 1) giving room for future expansion in the productivity and output. Inadequate staking materials and inadequate capital were noted by yam farmers as part of constraints faced by them.

Therefore to ensure improvement in yam production the following issues are recommended.

- Farmers should be assisted with credit facility as a means of increasing production scale
- Farmers should have more access to extension services in order to improve their knowledge of farm management.
- Farmers should be introduced to formal education through adult literacy education and establishment of demonstration farms.

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