SOCIO-ECONOMIC DETERMINANTS OF SWEET POTATO PRODUCTION IN KOGI STATE, NIGERIA

[1]EKWE, K.C., TOKULA, M.H, ONWUKA, S., ASUMUGHA, G. N AND NWAKOR, F.N.

1. National Root Crops Research Institute Umudike, Abia State.

Corresponding author: kcekwe@yahoo.com.

ABSTRACT

The study examined the determinants of sweet potato production in Kogi state, Nigeria. A total of 80 farmers were selected across the State using the simple random Sampling technique. Data, which comprised information on the socio-economic characteristics and other quantitative variables relevant to the study, were collected using a well-structured questionnaire and personal interviews. The socio-economic characteristics were analyzed using descriptive statistics such as percentages and frequencies; the ordinary least square (OLS) of multiple regression technique was used to analyze the production functions of sweet potato farmers. The results obtained, revealed that R^2 value was 0.737 indicating that 73.7% of variation in sweet potato production was accounted for by the variables considered in the study. Specifically, age of the farmers (x_2), the occupation (x_3), annual income (x_4), farming experience (X_5), level of education of farmers (x_6), labour input (x_9) and fertilizer input(X_{10}) were all significant and are important variables that affected the production of sweet potato in the study area. Given the enormous potentials of sweet potato production in the study area, it has become so imperative that youths be encourage to participate effectively in sweet potato farming, seeing that majority of the farmers are aged and will retire from active farming. This is to ensure food security. Also an effective structure should be put in place for the input and credit facilities provided by the government, this will ensure that these facilities get to those who need it and will in turn help the farmers expand their production. This study, although based in Kogi state, may have implications for other states with similar situation. This will help the state meet self-sufficiency in food production and so be able to feed her teeming population.

Keywords: Socio Economic, Determinants, of Sweet Potato, Production.

INTRODUCTION

In view of the serious challenge of feeding a World population of over 6.1 billion people, it has become imperative to pay more attention to food production issues (DESA, 2000). About 215million (43%) sub-Saharan African population is chronically undernourished and unless strong action is taken this may increase to around 315 million in the year, 2010 (World Food Programme, 1995). If food production is to keep pace with rapid population growth and demand for food, a new and creative approach to agricultural development must be developed. In a country where millions of people are not adequately fed, Nigeria's unexploited food resources must be unearthed and utilized. The rural farmers constitute the backbone of the Nigerian agricultural sector producing about 80% of the total national agricultural output (Fayinka, 2004) by using traditional methods under rain-fed conditions.

It is important to emphasize that despite the potential benefits stemming from the expansion of the agricultural sector through various government efforts, its overall productivity remains low

and the poor performance of agriculture is most clearly evidenced by the low standard of living of these small-scale rural farmers (Dogon-daji, 2005). Sweet potatoes offer a particularly significant potential for increasing food production and income in Nigeria. Like other agricultural crops, sweet potato has a role to play in the developing economies. Tewe, *et al*, (2003) reported that among the root and tuber crops in sub-Saharan Africa, sweet potato had a positive per capita annual rate of increase in production. Sweet potato has a high yield potential that may be realized within a relatively short growing season and adaptability to a wide ecological range of 0 to 2000 meters above sea level and 300 N to 30^{o}s.Presently, it does not find much use as food in most parts of Africa except in Burundi, Rwanda and Zaire, which accounted for over 46 percent of African sweet potato production in 1984.

The high agronomic potential of Sweet potato has been esta at the International Institute of Tropical Agriculture (IITA) and the National Root Crops Research Institute (NRCRI), which are both located in the humid zone of Nigeria (Tewe *et al*, 2003). Its production provides job opportunity for the farmers, thus raising their income. Sweet potato is consumed without much processing in most parts of the Tropics. It is either eaten boiled, roasted, or fried. Although sweet potato is a crop that is consumed in all parts of the country, its level of production still remains low. The crop ranks among the five most important food crops in over 50 developing countries (All about sweet potatoes, 2008).

The roots can also be slightly fermented in water for 2-3 days to reduce the sweetness, then sun dried and milled, mixed with either yam or cassava flour for eating. The leaves and tender shoots of sweet potato are used as vegetable food. The leaf contains, on dry-matter basis, about 8% starch, 4% sugar, 27% protein and vitamins and therefore are very nutritious. It also contains about 56mg carotene per 100g dry matter. The leaves are usually eaten boiled or incorporated into soup and stews (Mathew et al, 2008).

Industrially, sweet potato flour can be used to substitute wheat in bread making or maize flour in balanced feeds. Baby foods have been formulated using sweet potato while some bakeries blend 15-30% of sweet potato flour for making bread and 20-30% for pastries. It is also used in the brewing of alcoholic drinks and as sweeteners in non-alcoholic drinks. (Agbo and Ene, 1992). Sweet potato starch can also have medicinal value. According to Hartwell (1971), the leaf decoction is used in folk remedies for tumor of the mouth and throat. Reported to be alterative, aphrodisiac, astringent, bactericide, demulcent, fungicide, laxative and tonic, Industrial potentials of sweet potato have not been fully exploited due mainly to a chronic lack of awareness of the commercial benefits derivable from sweet potato (Azogu and Olomo, 2002). Little research is known to have been undertaken on the economics of sweet potato production compared to other roots and tubers like cassava and yam (Azogu and Olomo, 2002). Cultivation of root and tuber crops in Nigeria as in most African countries is threatened by the low prices of the crops and their products. With the rising cost of labour and transportation, rural farmers can hardly sustain their farming systems considering the meagre returns from their harvest. It is therefore advantageous to diversify the use of rootcrops beyond those of the traditional food industry in African countries. Because sweetpotato surpasses other rootcrops in terms of agronomic potentials, diversification into other food, feed and industrial uses will increase demand, ensure attractive prices and consequently encourage farmers to sustain and expand their rootcrop farming units.

This study therefore investigates the socio-economic determinants of sweet potato production in, Kogi State, Nigeria.

METHODOLOGY

A field survey was conducted in Ida, and Ayemgba agricultural zones of Kogi State, in 2008 to examine factors determining sweet potato production in the study area. The two out of the three agricultural zones in the area study were purposively selected based on strategic importance of sweet potato in the farming systems of the sampled zones in the area. In each zone, two Local Government Areas were selected by simple random sampling technique from the list of all LGAs in the area. Then in each LGA, two communities were similarly selected by random sampling technique, and in each community, 10 sweet potato farmers were equally selected through the same sampling technique. Thus 40 respondents were obtained from each agricultural zone making up a sample size of 80 respondents for the entire study area. Using structured questionnaires, relevant data on household sweet potato production were collected from the respondents. Data were analyzed with both descriptive and the four functional model s of multiple regression statistics.

Production Function Model

The multiple regression model used in this work was specified implicitly as;

$Y=f(X_1,X_2,X_3,X_4,X_5,X_6,X_7,X_8,X_{9,}) + e_i$…….(1)

Where:

Y= Quantity produced of sweet potato.
X_1=sex (in dummy scores of 0=female; 1=male)
X_2= age. (In absolute number of years)
X_3= occupation (where1=part time farmer; 2=full time farmer)
X_4= Annual income (Amount earn in naira)
X_5= Farm Experience (in absolute number of years)
X_6= Educational Status (in absolute number of years spent at school)
X_7= Farm Size (Expressed in hectares)
X_8= Planting Material (Money spent in procuring planting materials)
X_9= Labour (amount spent in labor or its household equivalent)
X_{10}= Fertilizer use (money spent in procuring fertilizer)
e_i= Error term.

Four functional forms of multiple regression were employed in order select the one that has provided the best fit. The functional forms tried were; linear, double-log (Cobb-Douglass), semi-log and exponential. The choice of the best functional form was based on the magnitude of the R^2 value, the significance, size and the sign of the regression coefficients as they relate to a-priori expectation. The functional forms were specified implicitly as follows;

RESULT AND DISCUSSION

Socio-Economic Characteristics of the Respondents

Results in Table 1 revealed that majority (67.8%) of the farmers in the area were above 40 years of age as against 28.3% who were below. This implies that there were more ageing farmers than the young ones. This could be attributed to rural-urban drift prevalent in Nigeria. Many young people always seek white collar jobs in the cities rather than farming in the villages. This has policy implication. Nigeria is actually recognized as one of the countries in the world with very high rural-Urban dichotomy. The numbers of rural inhabitants that migrate to cities is

unprecedented (Nwokocha, 2008). Also, farm innovations might not be easily adopted because of the old farmers who are conservative and more resistant to change.

Majority (82.7%) of the respondents were male farmers, while only 17.3% were females. Onyenweaku (1991) reported that naturally, male farmers exert authority over females and that they are more likely to adopt innovations faster than their female counterparts who would first seek permission from their husband before taking any serious farm decisions.

Table 1 also indicates that most (91.4%) respondents were married, while 8.6% were unmarried. The married respondents obviously have family members that constitute the farm households in the area. This implies that more women and children would be added to the family labour (Mathew *et al*, 2006).

Family size is an important source of family labour. About 76.6% of the respondents have over 5 persons in their family. Average household size is 8 persons/household. About 13.6 % of the respondents have their family size to be greater than the average. This implies a likely reduction in the cost of hired labour as many more household members would be available to freely offer the labourthat could have been paid for. Also, the educational status of farmers in the study area was relatively high as evidenced by majority of respondents (55%) who had both primary and secondary education. Uwakah (1983) remarked that high educational status facilitates adoption as it makes one to be more objective in evaluating innovation which positively influences production of sweet potato.

About 86.4% of the farmers have farming as their main occupation. The few that were engaged in farming on part time were mainly school teachers, bricklayers, carpenters and traders. The average number of years of farming experience of the farmers is 14years. Over 72.6 % of the respondents have been planting sweet potato for the past 10 to 20 years. This indicates that the farmers are highly experienced in the cultivation of sweet potatoes.

Determinants of Sweetpotato Production

The OLS regression analysis results for sweet potato production are summarized in Table 2. The Linear functional form was chosen as the lead equation because its R square value was the highest at 0.737 indicating that 73.7% observed variations in the resultant output, are explained by the included variables. Seven (excluding the constant) of the explanatory variables were significant at 1% and 5% levels. This implies that for any 1% or 5% increase in the explanatory variables, there is a commensurate increment in percentage by the coefficient of the Y variable. Specifically, the regression analyses showed that the age of the farmers had strong positive relationship with the quantity of sweet potato produced in the study area. This implies that as the farmers increased in age, the quantity produced of sweet potato may increase due to gain in expertise and knowledge of technology application.

Furthermore, the result showed that occupation had a positive relationship with the quantity produced of sweet potato in the study area. This implies that increase in number of full time farmers brought about increase in the quantity of sweet Potato produced in the study area.

Table 1: Distribution of Respondents according to Sex, Age, Marital status Farm Size Occupation Farming Experience and Educational Status of Sweet Potato Farmers in Kogi State

Variables	Frequency	Percentages	Variables	Frequency	Percentages
Sex			**Occupation**		
Male	66	82.7	Full time	70	86.4
Female	14	17.3	Part time	10	13.6
Total	80	100	Total	80	100
Age(Years)			**Farming experience**		
< 40	23	28.3	<10 years	15	18.5
40-50	31	39.5	10-20 years	59	72.6
> 50	26	32.0	>20 years	6	8.9
Total	80	100	Total	80	100
Marital status			**Education**		
Married	74	91.4	<6 primary school	15	14.5
Single	6	8.6	6-12 secondary school	55	67.9
Total	80	100	>12 post secondary school	10	10.6
Farm Size(hectare)			Total	80	100
< 5	8	9.9			
5-10	61	76.6			
>10	11	13.5			
Total	80	100			

Survey Data, 2008

Annual income had strong positive relationship with the quantity produced of sweet potato in the study area. This implies that as the farmers' income increased, the quantity produced increased also. This is in line with a priori expectation according to Onyebinama (2000), which says as the income of consumers increases, their demand for products also increases.

Farming experience was also positively related to quantity of sweet potato produced showing a strong implication for increase in sweet potato production, as the year of farming experience grows, production increased. The number of years spent in production gives an indication of the practical knowledge acquired (Nwaru, 1993).

More so, the level of education of the farmers had a positive relationship with the quantity produced of sweet potato. This is because the more educated the farmer becomes the more ability he gains to understand and apply improved technological innovations that move his farm enterprise forward. According to Onwuka *et al* (2009), educational status informs the type of job and standard of living one has, and this impacted directly on the sweet potato production.

The result also revealed that labour input was highly significant. The positive relationship indicates labour effectiveness which means as farmers in the study area increased labour, their sweet potato production also increased. Hence increased production depends highly on labour effectiveness.

Fertilizer input also showed strong negative relationship with the quantity of sweet potato produced in the study area. This implies that fertilizer as an input factor greatly influenced the total output of the farmer and must be considered for sweet potato production in the study area. The result implies that as fertilizer cost increased, quality of sweet potato produced decreased. Thus indicating the urgent need to streamline the structure for efficient distribution of fertilizer to enhance farmers' access and use as well /as reduce costs.

The value of R^2 (73.7%) that there are still other variables which affect sweet potato production in the study area, which were not included in the model. This could include qualitative factors like customs and traditions as well as other exogenous factors like government policies. The F-ratios for all the functional forms were statistically significant showing that the people in these study area produce sweet potato substantially, hence justifying the research work in this area.

Table 2: Multiple Regression Analysis on the Determinants of Sweet potato Production in Kogi State, Nigeria.

VARIABLES	LINEAR	SEMI-LOG	EXPONENTIAL	DOUBLE-LOG
Constant	-1229176***	2.152	-93700.5	220061.3**
	(-1.678)	(.531)	(-.535)	(2.440)
Sex (X_1)	-122672	.186	-16746.8	-25132.6
	(-1.181)	(-.148)	(.634)	(2.440)
Age(X_2)	12699.63***	5.189E-02	-18938.0	-3329.862***
	(3.279)	(1.105)	(-.449)	(-2.948)
Occupation(X_3)	360591.6**	1.615	465.896	-10162.4
	(2.979)	(1.100)	(.015)	(.581)
Annual Income(X_4)	.624***	3.868E-06*	14000.054	7063.855
	(4.042)	(2.066)	(1.609)	(.299)
Farm Exp. (X_6)	9839.393*	7.856E-02	17622.807	-2882.877
	(2.027)	(1.335)	(.980)	(-.897)
Edu.Status(X_7)	10016.579**	.118**	3849.805	9169.027
	(2.295)	(2.234)	(.525)	(.319)
Farm Size(X_8)	-78488.5	.882	-13362.1	-2.27E-02
	(-.931)	(.863)	(-.675)	(-.387)
Planting Mat. (X_9)	4.459	8.765E05	1999.392	3858.675**
	(758)	(1.228)	(.860)	(2.243)
Labour(X_1)	107.865***	4.632E-04	-381.040	-4311.582**
	(3.800)	(1.346)	(-.0.106)	(-2.243)
Fertilizer(SP) (X_{10})	-172.569***	-7.82E-04	-609.749	1.109
	(-4.562)	(1.706)	(-.227)	(.933)
R^2	0.737	0.647	0.404	0.278
R Adjusted	0.477	0.294	0.279	0.143
F. Statistics	2.826x	1.831	3.240***	2.061**

Survey Data, 2008 ***Significant at 1%, ** Significant at 5%, *Significant at 10%

CONCLUSION AND RECOMMENDATIONS

The result of the multiple regression analysis showed that the linear functional form largely explained the variations in the quantity of sweet potato produced in the study area more than double-log, exponential and semi-log functions and hence was used for further analysis of the data.

In the regression analysis, the age of the farmers (x_2), the occupation (x_3), annual income (x_4), farming experience (X_5), level of education of farmers (x_6)and labour input (x_9).However fertilizer input(X_{10}) had a strong negative relationship with quantity of sweet potato produced. By implication these variables were critical determinants of sweet potato production in Kogi State. Given the enormous potentials of sweet potato production in the study area, it has become so imperative that youths be encourage to participate effectively in sweet potato farming, seeing that majority of the farmers are aged and will retire from active farming. This is to ensure food security. Also an effective structure should be put in place to enable the farmers benefit from the subsidy on fertilizer provided by the government, this will ensure that fertilizer get to those who need it and will in turn help the farmers expand their production.

Encouraging education among the farmers will also enhance the ability to adopt inproved farming techniques and boast their production.

This study, although based in Kogi state, may have implications for other states with similar situation.

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