SOCIO-ECONOMIC DETERMINANTS OF MAIZE PRODUCTION IN YEWA NORTH LOCAL GOVERNMENT AREA, OGUN STATE

By

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Abstract

This study was carried out on the Socio-Economic Determinants of Maize Production in Yewa North Local Government Area of Ogun State. A total of one hundred and twenty questionnaires were personally administered on maize farmers in the study area. The data obtained during the field survey were used to identify the influence of socio-economic factors on maize production and determine the technical efficiency level of maize farmers using descriptive statistics and stochastic production frontier functions. The results showed that 87.5 percent of the respondents are men who are involved in maize production than women (12.5 percent), with the modal age between 18-45 years. 66 percent of the respondents had formal education with the household size of 1-5 members. The findings also revealed some of the constraints encountered by the maize farmers to be lack of capital, inadequate land acquisition, bad roads, high transportation and lack of equipment to improve on maize production. It is therefore recommended that farmers should combine their inputs efficiently so as to give reasonable level of output and combat the problems militating against efficient maize production.

Maize **(***Zea mays)* is one of the most important staple food crops in Nigeria. It is the second most common cereal foodcrop after Rice. Maize is a very important food crop for human beings and for livestock. It provides energy, vitamins and negligible amount of protein. Maize is a multipurpose crop because it can be put into different form of uses, such as raw materials for local industries to produce feed for livestocks. Primary maize can also be consumed as food. Also, high calorific value is expressed in different uses to which maize can be put locally, which include: ogi, mesa kokoro, popcorn, etc. Maize can also be used for the production of local breweries alcohol drinks such as pitto, shekette. (Alimi, 1991).

Furthermore, this crop also serves as raw materials to small-scale industries, such as flourmills for production of corn-flour, popcorn industries, starch producing industries, breweries e.g Nigeria Breweries Plc. Output of maize has continued to increase in Nigeria. For example, in 1986 about 13365 metric tonnes of maize was produced (Central Bank of Nigeria, 2002). The livestock industry consumes more than half of the total annual maize production. During the era of commodity boards, the Nigerian Grain Board coordinated marketing of maize in Nigeria, maize accounts for about 40 percent of daily calories and per capita consumption is 98 kilograms. The poorest households spend 28 percent of their income on maize production. African maize is produced in almost all the agro-ecological zones either under mono-crop or an intercrop system. It is grown for commercial, subsistence or dual purposes (Seyoum, 1998).

Though, maize is grown in almost all agro-ecological zones, the highest productivity is in the high potential and central highland zones while the lowest potential for increasing is in the lowland regions. The socio-economic characteristics and resources of individual household have been identified as basic factors influencing the maize production status of households. Rural households continue to fake poor economic condition which affects their living standard and maize production situation. The returns to land in terms of output have been on the decrease especially where increased population and non-agricultural uses complete for land use (Babatunde and Omotosho, 2007).

Factors Affecting Maize Productivity

The continued cultivation of maize as a lucrative agribusiness enterprise is however threatened by a number of problems, including those of diseases and pests. For instance, most of maize varieties grown in Nigeria are highly susceptible to downy mildew diseases (Iken and Amusa, 2004), other diseases of the crop include: maize rust, leaf blight, maize streak, maize mottle/chronic stunt, carvularia leaf spot, stalk and ear rots. In addition, maize parasite weed, known as *striga* has been reported to be a serious threat to increased maize production, thereby causing economic losses in Northern Guinea. Insect pests, such as stem borers, army warm, silk warms, grasshoppers, termites and weevils also affect the yield of the crop.

Effective control of these pests and diseases requires the use of chemical pesticides, whose level of use has been found to depend on price, risk, credit availability and cropping pattern (George and Hugo 2005). Price is particularly important here, since most of the chemicals are usually imported into the country. For instance, the low exchange rate of the Nigerian currency against major currencies has been pushing the prices of these chemicals upwards. It is therefore expected that Nigerian farmers will respond to changes in the prices. They are also expected to be efficient in utilizing these chemicals if they are to be rational.

However, the production of the crop has fluctuated over the years, partly due to climatic conditions and policy constraints. Some of the main reasons for the dwindling performance in maize production are associated with the following challenges: poor access to credit after the collapse of the Agricultural Finance Cooperation and Cooperative Societies that had been mandated to provide inputs in credits, inadequate use of recommended technologies, high cost of inputs, lack of agricultural extension services, poor flow of information from the research stations to farmers, limitations in the development of infrastructure, low prices from the maize market reforms resulting in lower input use, a general decline in performance of the economy, high level of technical and allocative inefficiency (Betty 2005).

Lack of credit translates into inadequate working capital, and therefore, farmers are unable to purchase productivity-enhancing inputs such as seeds, fertilizers, pesticides and land preparation. One way of reducing the cost of production is to increase farm output by increasing technical efficiency. In the regard, it is necessary to quantify current levels of technical efficiency so as to estimate losses in production that could be attributed to inefficiencies due to differences in socio-economic characteristics and management practices. In the study area, some of the main reason of low performance in maize production is price fluctuation, disease and pest, poor storage facilities, poor access to credit, high cost of input, poor flow of information from the research station. Despite its numerous benefits and uses to human and livestock very few people are engaged in maize production.

It is pertinent to ask the following questions: Does farmer's socio-economic characteristics affect their production level? What are the factors influencing maize production? What are the management practice and adoption level of new technology by the maize producers? What are the constraints encountered by the maize producers? The attempt to answer these questions informs the objectives of the study.

Therefore, the broad objective of the study is to examine the socio-economic determinants of maize production in Yewa North Local Government Area, Ogun State; while the specific objectives are to

identify socio-economic factors that influence maize production; and determine the technical efficiency level of maize farmers in the study area.

Methodology

Study Area and Methods of Data Collection

The area of study is Yewa North Local Government Area of Ogun State. Both the primary and secondary data were used for the study. Primary data were collected through the use of structured questionnaires. Information collected bordered on socio-economic characteristics such as: household size, age, sex, education, farm size etc.; while secondary data were obtained from various publications relevant to the study such as bulletins, journals, statistical reports, e.t.c.

Sampling Techniques

Multistage sampling technique was employed in this study. In the first stage, five wards were chosen randomly out of the 11 wards in Yewa North Local Government Area. The second stage involved the selection of twelve villages. The last stage, involved the random selection of 10 farming households from each of the selected villages, thus giving a total of 120 respondents.

Methods of Data Analysis

Descriptive statistics were used to analyze the socio-economic characteristics of maize farmers in the study area such as, frequency distribution, table, mean, median, mode, etc. Regression analysis was used to identify the socio-economic factors influencing maize production in the study area e.g. farm size, education, farming experience, age, fertilizer, labour etc. The general formular is as follows:

$Y = \beta_o + \beta_i X_i + U$

Y = Maize output in kg

X_i = Independent variable socio-economic characteristics.

β_o = Intercept parameters.

β_1 = Slope of estimated parameters.

U = Error term

$Y = \beta_o + \beta_1 X_1 + \beta_2 X_{2+} \text{--------} + \beta_8 X_8 + U$

X_1 = Age of the Respondent (years)

X_2 = Sex of the Respondents (dummy)

X_3 = Martial Status

X_4 = Educational Qualification (years)

X_5 = Farm Size (ha)

X_6 = Farming Experience (years)

X_7 = Household Size (no. of persons)

X_8 = Labour Hired (manday)

U = Error term

Stochastic Frontier

Frontier production model was used to determine the technical efficiency level of maize farmers in the study area. The production frontier model that was used is stochastic production frontier model which is of these forms (Idiong, 2007).

$Y = F(X_{1}\text{----------}X_{n})$
$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \text{----------}\beta_nX_n + V\text{-}U$
Where: $e = V\text{-}U$

V = Asymmetric random error which will capture the effect of weather luck and other factors outside the control of the farmers.

U = Technical efficiency i.e. what is left for the farmer to reach the outer bound of the production frontier or operate on the frontier.

Where: Y = Total output of maize (tons)

X_1 = Farm Size (hectares)

X_2 = Family Labour (Manday)

X_3 = Seed (No.)

X_4 = Capital (₦)

X_5 = Hired Labour (Manday)

Inefficiency Model
$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \text{----------}+\beta_8X_8$

Z_1 = Age of Farmer (years)

Z_2 = Farming Experience (years)

Z_3 = Educational level (years)

Z_4 = Credit Size (₦)

Z_5 = Household Size (No. of person)

Z_6 = Sex (Dummy)

Z_7 = Major Occupation

Z_8 = Marital Status

Results and Discussion

Table 1 showed that gender distribution of the respondents for males indicating that males dominate the maize production in the study area. The finding also showed that 50.8 percent of the respondents have above 10 years farming experience; this implies that they are quite knowledgeable about the production system that can enhance their maize production efficiency. The age distribution of the farmers showed that majority (82.5 percent) of the respondents are below the age of 60 years, which implies that they are young, able-bodied and can involve themselves in the tedious activities, thereby

increasing maize productivity level. 90.8 percent of the respondents have formal education, which enhances their production activities.

It was found that 93.3% of the respondents are married and have family responsibilities which make them to crave for more income through maize production. Also, the size of the household will determine the contribution of household labour to farmers work. The household size of 43.3 percent of maize farmers is over 5 persons signifies the likelihood of employing family labour for most of the farming activities. Production of maize is mostly done manually rather than mechanical activities simply because most of the farmers are still very conservative, not easily adopting the new modern ways of maize production.

Majority (85.8 percent) of the maize farmers are into mixed cropping rather than monocropping in order to reduce risk and increase income. Most (57.5 percent) of the maize farmers planted local varieties of maize than improved varieties indicating that the farmers in the study area are not adopting the new innovation of the improved hybrid seeds of the maize. Therefore, extension agents are to intensify efforts in educating the maize farmers on the need for adoption of the modern technologies for maize production in the study area.

Table 1: Socio-Economic Characteristics of the Respondents

Items	Frequency	Percentage	Cum. Percentage
Sex			
Female	15	12.5	12.5
Male	105	87.5	100.0
Farming Experience			
1-5 years	20	16.7	16.7
6-10 years	39	32.5	49.2
11-15 years	31	25.8	75.0
16-20 years	17	14.2	89.2
Above 20 years	13	10.8	100.0
Age			
18-45 years	50	41.7	41.7
46-60 years	49	40.8	82.5
Above 60 years	21	17.8	100.0

Education Status			
Non formal	11	9.2	9.2
Primary education	66	55.0	64.2
Secondary education	25	20.8	85.0
Tertiary education	18	15.0	100.0
Occupation			
Farming	24	20.0	20.0
Trading	30	25.0	45.0
Artisan	44	36.7	81.7
Civil servant	20	16.7	98.3
Others	2	1.7	100.0
Marital Status			
Single	2	1.7	1.7

Married	112	93.3	95.0
Divorced	2	17	96.7
Widow	4	3.3	100.0
Household Size			
1-5 members	68	56.7	56.7
6-10 members	51	42.5	99.2
Above 10 members	1	0.8	100.0
Farming Practices			
Manual	103	85.8	85.8
Mechanical	1	0.8	86.7
Both	16	13.8	100.0
Source of Information			
Fellow farmers	42	35.0	35.0
Farmers association	25	20.8	55.8
Extension agent	16	13.3	69.2
Personal interest	28	23.3	92.5
Family & relatives	8	6.7	99.2
Others	1	0.8	100.0

Items	Frequency	Percentage	Cum. Percentage
Farm Size			
Less than one hectare	81	67.5	67.5
1-2 hectares	34	28.3	95.8
Above 2 hectares	5	4.2	100.0
Cropping Pattern			
Mono cropping	17	14.2	14.2
Mixed cropping	103	85.8	100.0
Types of maize Seed			
Improved seed	45	37.5	37.5
Local seed	69	57.5	95.5
Hybrid seed	6	5.0	100.0
Sources of Labour			
Family labour	6	5.0	5.0
Hired labour	82	68.3	73.3
Self labour	14	11.7	85.0
Family & hired labour	18	15.0	100.0

Source of Capital			
Bank	1	0.8	0.8
Co-operative	15	12.5	13.3
Loan/gift/relative	5	4.2	17.5
Personal savings	92	76.7	94.2
Co-operative & Personal savings	1	0.8	95.0
Loan/gift/relatives & Personal savings	6	5.0	100.0
Constraints			
Capital	43	35.8	35.8
Labour	20	16.7	52.5
Land	9	7.5	60.0
Equipments	1	.8	60.8
Capital & labour	28	23.3	84 .2
Capital & land	5	4.2	88.3
Capital & equipments	2	1.7	90.0
Labour & land	11	9.2	99.2
Labour & equipments	1	0.8	100.0

Solution			
Good food	31	25.8	25.8
Capital assistance	51	42.5	68.3
Prov. of farm & implements	16	13.3	81.7
Farm input	22	18.3	100.0
Total	**120**	**100.0**	**100.0**

Source: Field Survey, 2010

Regression Results of Socio-Economic Factors' Influence on Maize Production

The regression results showed the socio-economic factors that influence maize production. These variables were fitted into regression model. Four functional forms (linear, semi-log, exponential and double-log) functions were tried as shown in Table 2. The F-values (which are overall equation model) associated with the four functional forms are significant at 1 percent. Out of the four functional forms tried, semilog was chosen to be lead equation based on having the highest adjusted R-square, highest level of significance and expected signs. The adjusted R-square value of 0.695 obtained indicates that 69.5 percent of the observed variation in maize production could be attributed to the combined influence of the socio-economic variables included in the regression equation.

It was found that age, educational level, farm size and experience, household size were positive and significant variables which influenced the maize production in the study indicating that increase in these variables will increase the production level of the maize, while other variables such as gender, marital status and hired labour have negative influence on maize production implying the over utilization of these variables, that is increase in them may decrease the production level of maize.

Table 2: Regression Results of Socio-Economic Variables Influence on Maize Production

Variables	Linear	Semi-log	Exponential	Double Log

Constant	1227.715	634.712	7.152	6.618
	(2.360)	(0.433)	(15.349)	(5.064)
Age	-0.034	0.023	-0.086	-0.086
	(-0.262)	(0.175)*	(-0.720)	(-0.689)
Gender	-0.217	-0.219	-0.368	-0.355
	(-2.285)**	(-2.207)**	(-4.135)*	(-3.845)*
Marital Status	-0.052	-0.39	-0.52	-0.039
	(-0.562)	(-0.413)	(-0.593)	(-0.433)
Educational Level	0.041	0.048	0.011	0.025
	(0.419)	(0.502)	(0.119)	(0.274)
Farm Size	0.221	0.212	0.250	0.277
	(2.190)**	(2.078)	(2.638)	(2.911)*
Farming	0.017	0.015	0.116	0.101
Experience	(0.126)	(0.108)*	(0.929)**	(0.762)
Household Size	0.094	0.071	0.138	0.090
	(0.996)	(0.727)	(1.569)	(0.993)***
Hired Labour	-0.225	-0.64	-0.232	-0.163
	(-2.220)**	(-1.705)***	(-2.436)**	(-1.816)
Adjusted R^2	0.260	0.695	0.512	0.677
F-value	1.628*	1.493*	3.792*	3.781*

Figures in par*enthesis are T- values; *=1% level of significance; **=5% level of significance;* ***=10% level of significance. Source: Field Survey, 2010.

Maximum Likelihood Estimates (MLE) of Maize Production on Stochastic Production Frontier

As shown in Table 3, the results indicated that the estimation of farm size, farm labour, hired labour and capital are critical inputs in maize production. The output elasticity of hired labour turned to be negative and significant. An examination of the labour data revealed that there was actually excess utilization of labour on maize production. In Ordinary Least Square (OLS) and Maximum Likelihood Estimates (MLE), coefficient of farm size and production with modern inputs are significant at 1 percent, meaning that this factor was significantly different from zero and thus become an important variable in maize production.

The estimates of co-efficient for the technical inefficiency variables are of particular interest in the study, the estimate of the variance parameters are significant at 1 percent. This implies that the inefficiency effects are significant in determining the level and the variability of maize production output of farmers in the study area. The coefficient of age of farmers, sex education, household size, credit size, farming experience, are positive and significant, while marital status and major occupation are negative and significant, suggesting that they negatively influence efficiency level of maize production. The estimate of the over-all model variance (σ^2) and gamma (γ) give adequate information on the efficiency of the explanatory variables in farm output and the mean technical efficiency is 0.6048 (60 percent). This implies that the efficiency of the inputs used is low and there is 40 percent inefficient usage of production resources. Many of the maize farmers' operations are inefficient.

Table 3: Maximum Likelihood Estimates (MLE) for Maize Production using Stochastic Production Frontier

Variables	Parameters	OLS	MLE
Production frontier			
Constant	β_o	2.4392	3.1439
		(O.4376)	(3.329)*
Farm size	β_1	1.0399	0.8184
		(3.9186)*	(4.4498)*
Farm labour	β_2	0.992	0.4361
		(0.3287)	(2.5022)**
Hired labour	β_3	-0.9890	-0.1128
		(-3.2665)*	(-0.6097)
Capital	β_4	0.4165	0.3641
		(1.7777)*	(2.4490)**
Technical inefficiency equation			
Constant	δ_0		-4.733
			(-1.8786)***
Age of farmers	δ_1		0.0488
			(0.9293)
Sex	δ_2		-1.3491
	δ_3		(-1.3499)
Education.			0.5721
	δ_4		(4.4635)*
Household size			-0.0705
	δ_5		(-0.9167)
Credit size			1.7449
	δ_6		(1.7042)***
Farming experience	δ_7		0.1375
			(0.7048)
Marital status	δ_8		-4.5589
			(-4.6803)*
Major occupation			-7.7911
			(-5.4184)*
Variance parameter			6.1561
Sigma-squared ($\sigma^2=\sigma_u^2+\sigma_v^2$)	σ^2	1.8668	(8.6413)*
Gamma ($\gamma^2=\sigma_u^2/\sigma_u^2+\sigma_v^2$)	γ		0.9142
			(4.5987)*
Loglikelihood function	LF	-0.3248	-0.2599
LR test	LR		129.7357
Technical efficiency(mean)			0.6048

Note: Figures in parenthesis are t-values of the estimates
*significant at 1 percent; ** significant at 5 percent; ***significant at 10 percent
Source: Field Survey, 2010

Conclusion and Recommendations

This study has provided information on maize production in Yewa North Local Government Area, Ogun State, Nigeria. These include varieties grown, maize management practices and other socio-economic variables such as age, farming experience, educational level, household size, credit size and labour are found to be common determinants for increase in maize production. Based on the findings, the following recommendations are made:

(i) Credit facilities should be provided to the farmers to increase their farming activities. Appropriate market should be created for farmers and the purchase of agricultural inputs.
(ii) Research agents should be sent out from time to time to enlighten the farmers on the need for adoption of modern techniques of maize production.
(iii) Government should organize adult education for farmers, so as to increase the productivity level of maize farmers.

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