FARM SIZE AND PRODUCTIVITY OF FOOD CROP FARMERS IN ABEOKUTA NORTH LOCAL GOVERNMENT AREA, OGUN STATE, NIGERIA

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ABSTRACT

This study examined farm size and productivity of food crop farmers in Abeokuta North Local Government Area of Ogun State, Nigeria. The study was based on primary data obtained through the use of structured questionnaires. The survey involved a cross section random selection of 112 farming households from the study area. Data were obtained on the socio – economic characteristic of the farming members of the households, mode of land acquisition, parcels of land available for cultivation, total parcels of land cultivated, resources used, cost and outputs of food crops on parcels of land cultivated. The data was analyzed by both descriptive statistics and stochastic frontier model with the level of land fragmentation measured by Simpson index as well as the number of parcel cultivated. It was found that significant evidence exists to show that most farms cultivated in the study area are relatively fragmented which was caused by inheritance mode of land acquisition and this have effect on food crop production. The farm sizes cultivated by farming households have significance effect on output. Hired labour and cost of intermediate materials used have significant effect on the production efficiency of farmers. The finding revealed that most farming households in the study area were found operating relatively on scattered farm land. On the basis of the above findings, it was recommended that Farmers' accessibility to loans should be addressed by government and to establish farm estate, pattern of land holding and also acquisition of more farmland should be addressed for high production efficiency.

Keywords: Farm Size, Productivity, Food Crop Farmers, Ogun State, Nigeria
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INTRODUCTION

Agriculture has been the only occupation that employs the majority of Nigerian population, about 70 percent (DFID, 2004). Before the advent of crude oil exploitation, agriculture was the major source of foreign exchange earnings for the country. The south-western part of the country was known for their cocoa production, northern part of the country for their groundnut pyramid, while the eastern part of the country was known for their palm oil production. The discovery of crude oil and the returns made from it led to total neglect and decay of agricultural sector in the country. Many fund and activities, as well as policies had been affected by government and concerned NGOs to resuscitate the hailing agricultural sector but all their actives and actions have always proved abortive.

Presently nothing seems working in the agricultural sectors. The country dream for food security has ended up being a mirage, (Durojaye, 2001) in his own submission made it known that the production of stable food in Nigeria has continue to fall shot of the rate of growth in her population. The interpretation of this is that the country is experiencing fast population growth and the level of agricultural activities cannot feed the population. In this prevailing scenario agricultural products importation is inevitable. The inadequacy of the local agricultural markets to provide raw materials to the nations agricultural small scale industries has led to the death of these industries, reducing the nations GDP and becoming infrastructure and amenities for mass unemployment in the country. Agricultural land exploitation in Nigeria has never been encouraging, and this is because the larger percentage of the farming population is made up of small

scale and peasant farmers who farm on small portion of lands to provide food for their families and to sell the remains at a discouraging market price. These farmers have scattered farmlands and with the fact that they can only access limited land for farming makes it difficult for them to practice modern agricultural practices (ie. mechanized farming), and this has been the basis for their low productivity. Nigeria is one the few newly industrialized third world nations whose growth rate in the last two decades has been estimated to 12.8 between 1990-98 and 17.65 (1999-98), (Famoriyo, 1996). Nigeria is, however, an agrarian nation with over 56.8% of her working force engaged in farming (Afolayan, 1998). The importance of this sector in the overall economic development of Nigeria can, therefore, not be overemphasized. Doner and Kanel (1997) emphasized the significant contribution of the agricultural sector towards the overall economic development of underdeveloped countries where more than 50% of the working population is engaged in farming. Many factors in recent times have continued to posse challenges to the dream of Nigerian government and Nigerians for food security. If Nigeria is really serious food security, these challenges must be adequately addressed. These factors which are also challenges to be tackled include but not limited to: lack of storage facilities, poor amenities and infrastructures, poor knowledge of modern agricultural practices, lack of adequate modern farm implement, lack of adequate capital, poor market pricing system, and unfavorable land holding pattern. Land is natural resources where agricultural activities are carried out, the extent to which this land is available for usage has effect on the use of and the form of agricultural system practice and the socio-economic return from this practice. Base of this regard, there arise the need to take the issue of land holding pattern and land fragmentation of the farming populace very important for optimum productivity. Many fund and activities, as well as policies had been effected by government and concerned NGOs to resuscitate the hailing agricultural sector but all their actives and actions have always prove abortive. Many has also criticized that the one of the reasons why the nations agricultural sector is till in its present predicament is because of wrong policy making and lack of direction In policy implementation. Conducting this research will enable individual farm household understand its environment and how it can take advantages of different benefit available in its environment to improve the family socio-economic status. The result will also assist policy makers, government in particular to understand the effect of land holding pattern on the nation's agricultural sector, and the various problems facing the farming populace at the grass root and how they can make reliable and adequate policy to solve the problems. It will also assist in the area of policy implementation by giving a direction on how to reach the farming household in the grass root and also to serve as reference for future research.

Objectives of the Study

The broad objective of this study is to evaluate Farm Size and Productivity of Food Crop Farmers in Abeokuta North Local Government Area of Ogun State, Nigeria.

The specific objectives are to:

(i) describe the socio-economic characteristics of farming households in the study area,
(ii) identify the pattern of landholding system with respect to individual farming households,
(iii) determine the technical efficiency index of the food crop farmers,
(iv) evaluate factors influencing productivity interms of output of food crops, and
(v) evaluate factors influencing technical efficiency of food crop farmers in the study area.

METHODOLOGY

Area of Study

The study is Abeokuta North Local Government Area, Ogun State, Nigeria. It has its headquarters at Akomoje in the Iberekodo area of Abeokuta, the Ogun State capital. The Local Government Area first came into existence in 1981, as Abeokuta South Local Government Area the same year to make up the defunct Abeokuta Local Government Area. It however re-emerged again on 27th September, 1991 when the Federal Government created some new Local Government Areas. Abeokuta North Local Government Area has 16 words which are: Ago-Odo, Ikija, Ago-Oko, Elega, Imala, Iberekodo, Gbagura, Ago-Ika, Lafenwa, Sabo, Oke-Ago-Owu, Totoro, Ita-Osin, Olorunda, Imala and Ibara-Orile. The Local Government Area shares common boundaries with Odeda Local Government Area, in the north, Ewekoro Local Government Area in the South, and Abeokuta South and Yewa North Local Government Area in the East and West respectively. It has a projected population of 201, 389 people (National Population Census 2006). More than 75% of the people live in the urban areas of the Local Government. The people are predominantly farmers most of whom engage in cultivation of arable crops while some engage in live stock and fish farming. The Local Government Area is made up of people from Oke-Ona, Gbagura, Owu and Oke-Ogun. The predominant language spoken is Yoruba language with Egba dialect. Olumo rock is one of the most outstanding historical and socio-cultural land marks in the Local Government Area.(Abeokuta North Local Government Yearly Publication 2008)

Methods of Data Collection

Primary data were used for this study through the used of a structured questionnaire, to obtain information about socio-economic status of farmers, type of agricultural system practice, form of land holding system and how their productivity is influenced by all these factors. While secondary data were obtained from past projects, journals, statistical reports and bulletins.

Sampling Techniques

A two-stage sampling techniques were used in selecting the respondents for this study. In the first stage one village is randomly selected from the 16 political words in the Local Government Area. The second stage involves randomly selection of 7 farming households in the selected villages. The total number of respondents for this study is 112 sampled respondents.

Methods of Data Analysis

Both descriptive and inferential statistics were used to analyze the data collected. Descriptive statistics such as frequency tables, means and percentage was used to describe the socio-economic characteristics of the respondents and forms of agricultural practices adopted by farming households. The inferential statistics such as Ordinary Least Square (OLS), Stochastic Frontier Production function and Simplex Index were to determine the level of farm-land fragmentation, pattern of landholding and relationship landholding and productivity of the farming households.

Model Specification

Stochastic Frontier Production Functions

Following Battese and Coelli (1995), the stochastic production frontier in arable crop production among farming household, the study is specified as follows.

In Qi = b0+b1InX1 + b2InX2 + b3InX3 + b4InX4 + Vi – Ui……. (1)

Where:

Q = Output measured as the gross value of all crops harvested including those consumed at home.
X1 = Farm size (hectares)
X2 = Hired labour (manday)
X3 = Family labour (manday)
X4 = Cost of intermediate materials such as seed, agro-chemical, etc (N)
b1 = Parameter associated with the respective production input which except for the intercept term (bo), represent partial production elasticity with respect to the associated variable.
Vi = Is the stochastic disturbance term,
Ui = Is the non-negative random variable associated with technical inefficiency across farming households.

The parameters of the stochastic production function in (3) as well as the value of the inefficiency term (ui) will be estimated by the limdep econometric software while the technical efficiency of the ith farming household were estimated for each farm household as follows.

TEi = exp(-ui)…….. (2)

Determinants on Technical Efficiency of Food Crop Farmers

To examine the influence of landholding patterns and resource endowment on technical efficiency, the following technical equation will be specified and estimated.

TE = f(Z1, Z2……Zk)……(3)

Where: TE = Technical efficiency level of the ith farming household.
Z1 = Farm size (Ha)
Z2 = Extent of farm fragmentation measured by the Simpson Index (S. I), which following Blare, *et al* (1992) is computed as:

$$S.I = 1 - \frac{\sum A_i^2}{A^2}$$

Where: Ai is the area of the ith lot or farm (ha) and A = ΣAi, is the total area cultivated during the agricultural season. Simpson index is a value between 0 and 1, if the index is zero, it implies complete land consolidation (i.e only one farm parcel was cultivated). The index approach a value of one as farming household cultivates numerous parcels of equal size. (Blare et 1992).

Z3 = Distance of farm from home (km)
Z4= Farming experience of household head (years)
Z5 = Total credits obtained from formal sources (N)
Z6 = Gender of household head (male or female)
Z7 = Educational level of house head (years)
Z8 = Age of household head (years)

RESULTS AND DISCUSSION

Table 1: Demographic and Non-Demographic Variables of the Farming Households

Items	Frequency	Percentage	Cumulative Percentage
Sex			
Male	88	78.6	78.6
Female	24	21.4	100.0
Marital Status			
Single	16	14.3	14.3
Married	83	74.1	88.4
Widow	13	11.6	100
Educational Level			
Formal	15	13.4	13.4
Informal	97	86.6	100.0
Occupation			
Farming	77	68.8	68.8
Civil service	19	17.0	85.7
Trading	16	14.3	100.0
Farm Involvement			
Fulltime	83	74.1	74.1
Part-time	29	25.9	100.0
Residential Building			
Brick house	41	36.6	36.6
Block house	71	63.4	100.0
Residential Building ownership			
Household head	66	58.9	58.9
Rented	21	18.8	77.7
Extended family	25	22.3	100.0
Land Acquisition			
Inherited	89	79.5	79.5
Purchased	14	12.5	92.0
Leased	9	8.0	100.0
Commercial bank	9	8	8
Cooperatives	48	42.9	50.9
Friends and family	35	31.3	82.2
None	20	17.8	100
Hired Labour Quantity			
1 – 9	21	18.8	18.8
10 – 19	54	48.2	67
Above 20	29	25.9	92.9
None	8	7.1	100.0
Average Monthly Income (N)			
1000-5000	1	0.9	0.9
5001-10000	58	51.8	52.7
10001-15000	23	20.5	73.2
15001-20000	30	26.8	100.0

Age of the family heads			
<30 years	17	15.2	15.2
30-40	25	22.3	37.5
41-50	22	19.6	57.1
>50	48	42.9	100.0
Farming Exp. (years)			
<10	16	14.3	14.3
10-20	43	38.4	52.7
21-30	48	42.9	95.5
>30	5	4.5	100.0
Farm Size (ha)			
<1	66	58.9	58.9
1- <2	38	34	92.8
>2	8	7.1	100.0
Farm Distance (km)			
<1	15	13.4	13.4
1.01-1.50	29	25.9	25.9
1.51-2.00	38	33.9	73.2
>2.00	30	26.8	100.0
Total	**112**	**100**	

Source: Field Survey 2019

Demographic and Non-Demographic characteristics of sampled farming households

The findings in Table 1 showed the demographic and non-demographic variables of the farming households. The sex distribution showed that 78.6% of respondents are male, while 21.4% are female, this may be due to the fact that agricultural require lots on energy and thus it is dominated by males in Nigeria, and the study area is not an exception of this, as agriculture is considered to be male occupation.74.1% of respondents are married while 11.6% are single. The fact that majority of farmers in study area are married means that farmers in the area have family responsibility to cater for, and also suggests that majority of farm proceeds may likely go to the family. The result further showed that 86.6% of respondents have informal education, while 13.4% have informal education. This implies that majority of farmers are illiterate, and would lack modern agricultural practices and techniques and would have limited access to information on new agricultural innovations. In term of religion, 66.1% of respondents are Christians, 33.9% of respondent are Muslims. This implies that farmers in the study area have religion responsibility to observe. Influence of religion increases the land fragmentation and scarcity of land for large farming activities. 68.8% of respondents are farmers, while 17.0% are civil servant, 14.3% are into trading. This implies that study area is dominated by farmers who take farming as their main occupation and 74.1% are in to full time farming, 25.9% are into part -time farming. This implies that majority of farmers have farming as their only source of livelihood and thus devote their active hours to farming as a full time job. Concerning farmers' welfare, 58.9 of respondents owned houses, while 18.8% respondents rented houses, while 22.3 leave in extended family house. This implies that majority of farmers in study area have been able to provide shelter for their family buy building their own house.79.5% of respondents acquire land through inheritance, while 12.5% is through purchasing, and 8.0 got land through leasing. This implies that the land used by farmers is passed from generation to generation through inheritance. 14.3% of respondents obtained loan from commercial banks, 54.5% through cooperative, 68.8 through friends and family. This implies that farmers in the study area don't patronize commercial banks to obtain capital. This may be due to the formal and strict process involve in obtain loan from these banks.

The average monthly income revealed that 51.8%

respectively falls between 5001-10,000 months. 26.8% fall between 15,000-10,000. This is an evidence that farmers in Nigeria earn less and hence, the bases for their economy vulnerability. Most farmers (58.1%) are between 30 - 50 years with above 1 - 2 hectares of land and above 50 years is 42.9%. This implies that it is only grown adults that engage in farming in the study area. This may be due to the fact that the youth in the study area will want to engage in other economic activities in the State capital with 52.7% having farming experience of between 10 - 20 years. Farmland distribution revealed that 34% have access to 1- <2 ha, 7.1% have access to >2 ha,. This implies that farmers in the study area were predominantly peasant or small - scale farmers, and this will prevent them from taking advantage of economics of size and mechanized farming, hence lowering their productivity and distance of farm plots and this result in low income earning. This occurs as a result of inadequate access to land which make them involved mostly in mixed cropping.

Table 2: **Simpson Index Estimate of the Land Holding of Respondents**

Simpson Index	Frequency	Percentage	Cumulative Percentage
0.00	84	75	75
0.01-0.50	12	10.7	85.7
0.51 or more	16	14.3	100
Total	**112**	**100**	

Source: Field Survey, 2019

As shown in Table 2, a value of zero indicates complete land consolidation. (i.e, the operation of only one farm parcel, while a value of unity confirms acute farm fragmentation (farms with several parcels) among the study sample. (Blarel *et al* (1992). Majority (75%) of the farmers in the study area operated complete land consolidation. The estimated Simpson index for these farmers was zero. The remaining 25% were found to operate relatively scattered farm land. This practice has the implication of reducing the travel time between field their by increasing labour productivity and lowering the transportation cost for inputs and outputs.

Determinants of Productivity and Technical Efficiency of Food Crop Farmers

Data in Table 3shows that the coefficient of farm size is positive and significant at 0.5 (5%). This implies that it has efficiency increasing effect. Hired labour and cost of intermediate materials such as seed, agro-chemical etc. are positive and significant effect on efficiency at 0.5, (5%) respectively, signifying that having access to these variables will increase efficiency. The coefficient of farm size is negative and also significant at 10%. This implies that decrease in farm size of land decrease technical efficiency. The coefficient in fragmentation index is positive and also have significant on the inefficiency of farmland, increase in this indicate decrease in fragmentation of farmland by 1%, decrease technical inefficiency by 0.004. This is contrary to Tan (2005) that land fragmentation creates efficiency. The coefficient of distance of farm from residence is positive and significant as 10% and also coefficient of farming experience and total credit obtained from formal sources are negative and significant effect on inefficiency, signifying that increase in farming experience reduces efficiency and increase in total credit obtained from formal sources reduces efficiency. Reduction in technical efficiency with increase in year of farming experience is contrary to *apriori* expectation. However, this could be due to over reliance on the acquired experience at the expense of new innovations. This finding is in consonance with that of Ogundari and Ojo (2007). Gender of household head is positive and significant at 1%, while education of household head is positive but with no significant effect on production, Age of respondent is positively significant at 5%. Cost of intermediate materials is positive and significant at 10%. The coefficient of farm size is positively significant at 0.5 (5%). This implies that it has efficiency increasing effect. Hired labour and family labour which both positive and statistically significant at 10 percent respectively,

Table 3: Maximum Likelihood Estimate (MLE) of Stochastic Production Frontier

Natural log factors	OLS Coefficient	MLE Coefficient
Constant	3.825*	4.842**
	(5.066)	(17.53)
Farm Size	0.983**	9.535**
	(29.316)	(61.45)
Hired labor	9.187*	0.357**
	(1.574)	(17.197)
Family labour	0.359*	-9.837*
	(3.211)	(2.639)
Cost of intermediate materials	8.753*	0.165**
	(2.717)	(15.148)
Inefficiency model constant		3.565*
		(3.11)
Farm experience		-1815*
		(-3.634)
Extent of farm fragmentation		1.976***
		(2.254)
Distance of farm from home		-3.697**
		(1.394)
Farming experience of house hold head		-1.475***
		(2.164)
Total credit obtained		-7.052**
		(-1.95)
Gender of household head		3.588
		(27.623)
Age of respondents		7.558**
Log likelihood	0.1631	67.226
Sigma Square		0.545
		(3.518)
Gamma		0.999
		(94.37)

Figures in parenthesis are the t values of estimate.
*** = significant at 1%, ** = Significant at 5%, * = Significant at 10%
Source: Field Survey, 2019

The finding and data in Table 4 revealed that predicted technical efficiencies range between 0.10 (10%) and 0.90 (90%) while the mean technical efficiency of the entire sample was estimated at (0.84%). Table 4.1.24 shows that 17.64% of the sampled farmers are within the mean value, while 60% of the sampled farmers are below and 70% of the sampled farmers are above, indicating that majority (70%) of the farmers are close to the production frontier. The mean of technical efficiency (84%) signifies that there exit 16% potential for farmers to increase their production through the existing level of resources and technology by operating full technical efficiency level, farmers can increase their production by an average of 16% with the available farm resources and technology.

Table 4: Technical Efficiency Levels of the Sampled Farming Household

Decile range	Frequency	Percentage
0.10-0.19	1	0.89
0.20-0.79	-	-
0.30-0.39	-	-
0.40-0.49	5	4.46
0.50-0.59	2	1.79
0.60-0.69	4	3.57
0.70-0.79	23	20.54
0.80-0.89	22	19.64
0.90-0.99	55	49.11
Total	112	100

Mean Technical Efficiency = 0.84, Minimum = 0.10 (10%), Maximum = 0.90 (90%)

Source: Field Survey, 2019

CONCLUSION AND RECOMMENDATIONS

Base on the findings of this research work, the following conclusions could be drawn: majority of farmers are male, farmers have access to land through inheritance, and also most of farmers could not access loans from financial intuitions. This could be due to strict conditions for granting of loan adopted by these financial institutions. The findings also revealed that farmers face difficulties in accessing land and thus they farm on available scattered farm land which will not encourage commercial farming and practice of mechanized farming. Farmers still considered the use of hired labour as option. Farmers use less of family labour, could be because children will be at school during active farming hours. Based on the findings, it is therefore recommended that:

(i) Government should make policies that will make access to land more easier to farmers, so that they can cultivate on large parcel of land other than the ones inherited.

(ii) Government should create and execute good agricultural policies that will encourage young graduate to go into farming.

(iii) Government should encourage mechanized farming.

(iv) Policies that will make loan more accessible to farmers should be introduced.

(v) Land consolidation should be encouraged among farmers.

(vi) Youth should be encouraged to go in to farming. Instead of looking for white collar jobs in the cities.

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