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RESOURCE USE EFFICIENCY OF GROUNDNUT FARMERS IN BEKWARA LOCAL GOVERNMENT AREA, CROSS RIVER STATE, NIGERIA

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ABSTRACT

The study assessed the resource use efficiency of groundnut farmers in Bekwara Local Government Area of Cross River State, Nigeria**.** The specific objectives were to; describe the socio-economic characteristics of groundnut farmers, determine the cost and returns of groundnut production, determine the technical efficiency of groundnut farmers, identify the socio-economic factors influencing technical efficiency of groundnut production. A multi-stage sampling technique was used to select groundnut farmers in the area. Data were obtained using a set of structured questionnaire. Descriptive, gross margin analysis and stochastic frontier were used for data analyses. Result from the study showed that majority **(**51.02%) of the respondents fall within age ranged of 31 – 40 years, with a mean age of 34 years. Females dominated groundnut production, 67.4% were married, 89.9% had family sizes of 1-10 persons per households, 94.9% had one form of education or the other. The result further shows that majority (79.60%) had 6 – 11 years of farming experience, 58% had farm sizes of between 1 – 1.5 hectares. The gross margin analysis shows that groundnut production was a profitable business with a gross margin and net farm income of ₦338, 019.249 and ₦330, 407.51 respectively. The result also revealed that quantity of seed used and farm size had positive and significant relationship with groundnut production. The mean technical efficiency was 0.97 with minimum and maximum efficiencies of 0.85 and 0.99. The inefficiency model showed that educational level, membership to co-operative, access to credit and the amount received were the significant variables that increased the technical efficiency of the respondents. It is recommended that policies by the government and non-governmental agencies should be geared towards encouraging farmers' education on farm management practices so that they would be able to allocate production resources more efficiently especially agrochemicals for optimum yield.

KEYWORD: Groundnut farmers, Resource efficiency, technical efficiency, inefficiency

INTRODUCTION

Agricultural sector occupies a significant place in nearly all economies worldwide (Reddy, Ram, Sastry and Devo, 2004). In spite of the re-basing of Nigeria's GDP agriculture still plays a dominant role in the nation's economy providing employment for more than 65 million of her citizens in 2013 alone (FMARD, 2013). Groundnut (Arachis hypogea linaus) is one of the most popular crops in the crops sub-sector in Nigeria.. Nigeria reached her peak in groundnut production of 1.6 million metric tonnes in 1973 but production declined by half in less than a decade due to the combined effects of two important events (Ntare, Waligar, Ramouch, Masters and Ndejunga, 2005). Groundnut seeds, which are known as Kernals, contain 40 – 50% fats, 20 - 50% protein and 10 – 20% carbohydrates (Girei et al., 2013).According to Shehu et al.(2010) and Shamsudeen et al. (2011) efficiency is concerned with the relative performance of the processes used in transferring given inputs into outputs. Technical efficiency means that natural resources are transformed into goods and services without waste. The maximum amount of physical production is obtained from the given resource inputs. In essence, production is achieved at the lowest possible opportunity cost. Technical efficiency is a prerequisite for allocative or economic efficiency. Economic efficiency is achieved if the highest possible level of satisfaction is obtained from given resources used (Azeez et al., 2013). Technical efficiency is one component of overall economic efficiency. However, in order to be economically efficient, a firm must first be technically efficient. Profit maximization requires a firm to produce the maximum output given the level of inputs employed (that is, be technically efficient), use the right mix of inputs in light of the relative price of each input (that is, be input allocative efficient) and produce the right mix of outputs given the set of prices (that is, be output allocative efficient) (Kumbhaker and Lovell, 2000). It has been observed by Adinya et al.(2010) that groundnut farmers in Bekwarra Local Government Area of Cross River State fail to exploit fully the potential of resources and make production errors which results to decline in production and low

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profit. Successive governments had embarked on agricultural programmes aimed at boosting crop production in Nigeria. These programmes include River Basin Development Authority, Land Use Decree, World Bank Assisted Agricultural Development Programme, National Fadama Development Project, Root and Tuber Expansion Programme and the Special Programme on Food Security (Panwal et al, 2006). However, none of these programmes has been able to adequately solve the food problems. According to Oredipe and Akinwumi, (2002) these programmes 90 percent of groundnut requirement by companies involved in processing (RMRDC, 2014). The low yield realized by groundnut farmers in the area is an indication that resources needed in the production of crops are not at optimal levels (Adinya et al, 2008). The decline has been attributed to the inability of farmers to efficiently utilize their available resources. However, the desired objectives of being efficient in resources use have not been achieved and productivity of groundnut has remained low. Studies have shown that the socio-economic variables influences farmers technical and resource use efficiency (Otitoju and Arene, 2010; Gerei et al.(2013);Taphe et al.(2015); Taru et al.(2008)). Therefore, there is need to reverse the forgoing scenario with a view to improving the productivity and efficiency of resources used among groundnut farmers through the investigation of their production. The study will therefore consider the following objectives: describe the socio-economic characteristics of groundnut farmers in the area; determine the cost and returns of groundnut production; determine the technical efficiency of groundnut farmers and identify the socio-economic factors influencing technical efficiency of groundnut production in the area

Some theoretical issues

This study hinges on the theory of production and production efficiency. The production theory provides the analytical framework for most empirical research on productivity and efficiency (Adams, 2006). Production is the process of transforming inputs such as capital, labor, and land into goods and services called output. These resources can be organized into a farm-firm or producing unit whose ultimate objectives could be profit maximization, output maximization, cost minimization or utility maximization or a combination of the four (Ezeaku et al., 2013). In this production process, the farm-firm or entrepreneur may be concerned with efficiency in the use of inputs to achieve a goal (Oniah, 2005). The theory of production in economics is concerned with optimization, and optimization implies efficiency (Udoh, 2012). To achieve economic optimum output and thus profitability, resources have to be optimally and efficiently utilized. Decision- makers are presumed to be concerned with the maximization of some measure of achievement such as profit or efficiency (Oluwatayo et al., 2008). According to Adams (2006), production is interwoven with efficiency because the productivity of any resource which is efficiently or inefficiently used, serves as the criteria for economic measures. A production unit is said to be technically inefficient if too little outputs is being produced from a given bundle of inputs. Efficiency is measured either in terms of technical optimum or economic optimum. The technical efficiency is measured using output (Y) to input (X) ratio, that is, Efficiency, E = Y/X. It is efficient where the ratio is highest. In production process, the producer is interested in one of two things to measure efficiency. These are either he chooses to maximize production, that is, using technical efficiency criterion or may decide to maximize profit, that is, using economic efficiency criterion (Ekanem & Iyoha, 1999). According to Nmadu and Marcus (2013), the farm-specific technical efficiency is defined in terms of observed output ($Y_{i)}$ to the corresponding frontier output (Yi*) using the available technology derived from the result of equation 1.

$$TE_1 = \frac{Y_i}{Y_i^*} = \frac{F(X_i\beta)\exp(V_i - U_i)}{F(X_i\beta)\exp(V_i)} = \exp(-U_i) \quad \text{..... (1)}$$

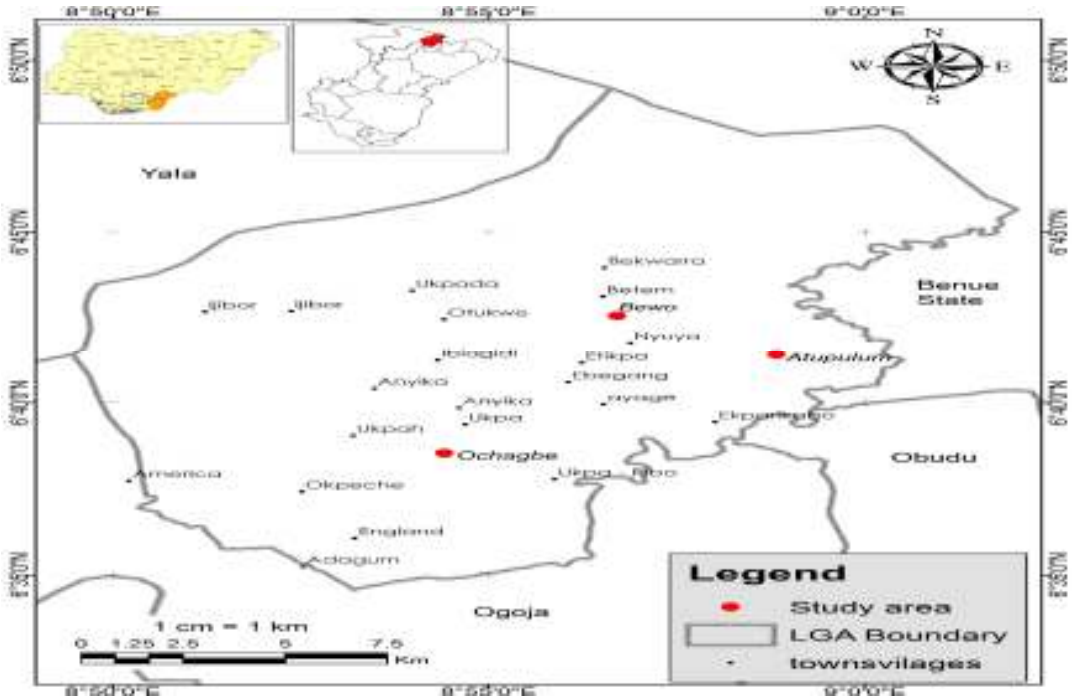
Where:
TE = Technical efficiency of ith firm
Y_i = Observed output from ith firm
Y_i* = Frontier output
This is such that 0≤TE ≤1 (Farell, 1957)
Maximum efficiency has a value of 1.0, lower value represents less than maximum efficiency in production. According to Idiong (2006), the difference between Yi and Yi* is embedded in U_i when U = 0, then production is in the frontier (i.e. Y = Y*) and the firm is technically efficient. However, if V_i > 0, the firm is inefficient since production will be below the frontier.

Methodology

The study was carried out in Bekwarra Local Government Area of Cross River State, Nigeria. It is located between latitude $6^0$40 N and longitude $8^0$43 E and bounded in the south by Ogoja, in the East by Yala, in the West by Obudu and in the North by Benue State (Menakaya and Floyd, 1998). The local government area is one of the eighteen (18) local government areas that make up Cross River State. It has approximately 304.30 square kilometers of land with population of about 88,965 people (NPC, 2006). There are two distinct climate seasons in the area, rainy season from March to October and dry season

from November to February. The annual rainfall varies from 2,942 mm to 3,424 mm, while the average temperature is about 28 ^{o}C (Adinya et al., 2010). The main economic activities of the people are farming, trading and hunting and the entire population of the area depends largely on natural fresh water sources for all its water related activities, as pipe borne water is not available. Crops grown in the locality include groundnut, rice, maize, yam, cassava, pineapple, plantain and banana.

Multi-stage sampling technique was adopted in selecting the respondents (groundnut farmers) for the study. Bekwara local government area was purposively selected from the five local government areas that make up the Northern Agricultural zone of Cross River State. This was because they were the major producer of groundnut in the zone. **Stage 1 involved the** purposive selection of three (3) farming communities out of the ten (10) farming communities in Bekwarra based on high intensity of groundnut farming activity, rich vegetation and high demographic condition in the areas. In **stage 2,** one (1) village was purposively selected from each of the farming communities (3 villages were taken from 3 farming communities i.e Bewo, Ochagbe and Atupulum)(**Fig.1**) **Stage 3** involved a random selection of 98 groundnut farmers from the list of major groundnut farmers in the three (3) villages**.** Primary data used for the study was obtained using a well structured questionnaire. The study used the 2017 farming season. Descriptive statistics, budgetary technique and stochastic frontier production function analysis were used to analyze the data.



Source: GIS Laboratory University of Calabar, Calabar (2017)

FIG.1: Map of Bekwarra Local Government Area showing study areas (communities), Cross River State

Model specification

The model for the study was stated in the double log form. The implicit production function is given as:

$Y = f(X1, X2, X_3, X_4, X_5, X_6, U)$…….. ……..(2)

$Y = b_0 + b_1 \log X_1 + b_2 \log X_2 + b_3 \log X_3 + b_4 \log X_4 + b_5 \log X_5 + b_1 \log X_6 + U$

Where Y = Groundnut output (in kg of shelled nuts)

X_1 = Quantity of seed used for planting (in kg)

X_2 = Farm size (Ha)

X_3 = Family labour (in man-days)

X_4 = Hired labour (in man-days)

X_5 = Quantity of fertilizer used (in kg/per ha)

X_6 = Quantity of Agrochemical used (in litres/per ha)

U = Error term

b_1-b_6= unknown parameters to be estimated.(Gerei et al.2013; Umoh, 2006; Taphe et al. ,2015)

Farm budgetary technique

The budgetary technique involves costs and returns analysis. It was used to determine the profitability of groundnut farmers in the area. Gross margin was adopted to analyze the cost and returns of groundnut production. The gross margin according to Gerei et al.,2013; Umoh, 2006; Taphe et al., 2015 is expressed as:

GM = TR – TVC ……(3)

Where GM = Gross Margin of groundnut farmers in N

TR = Total revenue of groundnut farmers
TVC = Total Variable Cost
NFI = GM – TFC ……(4)
Where NFI = Net Farm Income
TFC = Total Fixed Cost

Stochastic frontier production function

The stochastic frontier production model was used to analyze the technical efficiency of groundnut farmers. The Stochastic Frontier Production Function was independently proposed by Aigneret, Lovell and Schmidt (1977) and Meeusen and Van den Broeck (1977) in Amaza (1999). The Frontier Production differs from production function in that its disturbance term has two components one to account for the technical inefficiency and the other to permit random events due to measurement errors (Tran et al., 1993).
It is expressed as
$Yi = f [X_1:\beta]\exp (Vi - U_i)$ I = 1, 2, 3,…N… ……(5)
Where
Yi = Quantity of groundnut output of the i^{th} farmer in ₦
X_1 = Vector of input quantities of the i^{th} farmer in ₦
β= Vectors of parameters
V_i = Assumed to account for random factors such as risks, weather and measurement error.
U_i = Are due to technical inefficiency
The empirical Stochastic Frontier Production model that will analyze the technical efficiency in this study is expressed as
$\text{Log } Y_i = \beta_0 + \beta_1 \text{Log} X_1 + \beta_2 \text{Log} X_2 + \beta_3 \text{Log} X_3 + \beta_4 \text{Log} X_4 + \beta_5 \text{Log} X_5 + \beta_6 \text{Log} X_6 V_i - U_i$ ….. (6)
Where Y_i = Output (kg of groundnut of i^{th} farmer)
X_1 = Quantity of seed used for planting (in kg/ha)
X_2 = Farm size (in hectares)
X_3 = labour (in man-days)
X_4 = Quantity of fertilizer used (in kg/ha)
X_5 = Quantity of Agrochemical used (in litres)
V_i = Random noise
U_i = Inefficiency effect which are non-negative, half normal distribution.
The inefficiency model is defined as
$U_i = \delta_0 + \delta_1 D_1 + \delta_2 D_2 + \delta_3 D_3 + \delta_4 D_4 + \delta_5 D_5 + \delta_6 D_6$ …….. (7)
where:
U_i= Technical inefficiency effect of the i^{th} farmer
D_1 = Farming experience (in years)
D_2 = Gender of the respondent
D_3 = Family size (no. of persons per farmers household)
D_4= Age of respondents (in years)
D_5 = Educational level (in years)
D_6= member of co-operative (in years)
D_7= Access to credit (in years)
D_8= Amount of credit received (in years)
D_9 = Number of contact by extension in agent (in No.)
$\delta_1 – \delta_9$= Are parameters to be estimated.
The Maximum Likelihood Estimate (MLE) for all parameters of the Stochastic Frontier Production Function and the inefficiency model stated above and the technical efficiency was obtained through the use of programme Frontier 4.1 software.

Results and discussion

Socio- economic characteristic of groundnut farmers

The socio-economic characteristics of groundnut farmers are presented in Table 1. The table indicates that female farmers constitute the majority (64.29%) of the groundnut farmers, while only few (35.71%) of them were male. This implies that there are more female farmers than male farmers engaged in groundnut farming in the study area. This result is consistent with that of Taphee (2015). The high proportion of female farmers can be attributed to the fact that picking and drying of groundnut requires much time and labour force which can be endured by female farmers. Majority (51.02%) of the respondents were within the age ranges of 31-40 years, with a mean age of 34 years. This indicates that the respondents are relatively young and physically active. This is in line with Otitoju and Arene (2010) and Umaru et al.(2017). The result revealed that most (67.4%) of the groundnut farmers were married and had a household size of 1 – 10 persons, with an average household size of 5 persons per household. The result is in line with that of Madaki et al.(2016). About 94.9%

of the groundnut farmers had one form of formal education or the other. The result is in line with that of Renato and Evan (2004) and Madaki et al. (2016) who found out that, education was a significant factor which had positive impact on farmer's productivity and efficiency. Majority of the respondents (79.60%) have 6-11 years of farming experience. The average farming experience was 8 years. This implies that farmers in the study area have acquired enough experience in groundnut production; therefore, adoption of new innovations will pose no problem. The result is in line with the study of Rahman and Umar (2009), who found out that farmers with many years of experience in farming, are more willing to change towards adopting current recommended techniques. Furthermore, majority of the respondents (59.18%) had small farm sizes ranging from 1-1.5 hectares. This agrees with the findings of Ibrahim (2004), who stated that small-scale farmers are those that cultivated farm land not more than 2hectares. Girei, Dauna and Dire (2013) reported that groundnut farming was mainly on small scale and subsistence at Adamawa State. The result showed that majority (83.67 %) of the respondents had no contact with extension agent, 60 % had no access to credit facilities, while majority (54.23 %) of the respondents had personal saving as their source of finance.

Table1: Socio-economic characteristics of groundnut farmers (N=98)

	Variable	Frequency	Percentage	Mean
Sex	Male	35	35.71	
	Female	63	64.29	
	Total	98	100	
Age	<20	9	9.17	
	21-30	11	11.24	
	31-40	50	51.02	34
	41-50	20	20.41	
	>50	8	8.16	
	Total	98	100	
Marital status	Single	26	26.5	
	Married	66	67.4	
	Widowed	6	6.2	
	Total	98	100	
Household size	1-10	88	89.9	5
	11-20	10	10.2	
	>20	-	-	
	Total	98	100	
Source of labour	Family	54	55.10	
	Hired	29	29.60	
	Both	15	15.30	
	Total	98	100	
Education level	No formal edu.	5	5.10	
	Primary	15	15.31	
	Secondary	64	65.5	
	Higher institution	14	14.09	
	Total	98	100	
Farming experience	1-5years	20	20.40	
	6-11years	78	79.60	8
	>11years	-	-	
	Total	98	100	
Farm size	<1 ha	11	11.23	
	1-1.5ha	58	59.18	
	≥2ha	29	29.59	
	Total	98	100	
Contact with extension agent	Yes	16	16.33	
	No	82	83.67	
	Total	98	100	
Access to credit	Yes	39	40	

	No	59	60
	Total	98	100
Source of finance	Personal savings	53	54.23
	Money lenders	22	22.55
	Farmer assoc.	15	15.60
	Relatives/friends	8	7.62
	Total	**98**	**100**

Source: Field Survey, 2017.

Cost and return associated with groundnut production

The estimated cost and return of groundnut production are presented in Table 2. The result shows that, the variable cost constituted the greater proportion of the total cost of production which was estimated at 95.90 %, specifically other operating capital (labour input) covered 52.74% of the total cost which was the highest. The result is consistent with that of Madaki, et al. (2016) and Taphee (2015). The total variable cost was ₦179, 077.69, while the total fixed cost was ₦7, 611.739. The total revenue obtained was ₦517, 096.939, while the gross margin and net farm income was ₦338, 019.249 and ₦330, 407.51 respectively. The results further showed that the return per naira invested was ₦1.76 per hectare. This implied that in every naira invested the farmer realized a return of ₦1.76. Hence groundnut production is a profitable business in the study area. The benefit cost ratio was 2.76. This shows that output earning per ₦1 expenditure on labour was ₦2.76 showing that labour was well managed. The Profitability Index (PI) was 0.98 which means that for every naira earned as revenue, 98 kobo was returned to the groundnut farmers as net income. These measures of performance also indicate that groundnut production in the study area is viable and profitable. The result obtained is consistent with study by Adinya et al. (2010), Gerei et al.(2013), Ani et al. (2013). They all concluded that groundnut production was profitable venture.

Table 2: Cost and returns of groundnut production per hectare

Item	Cost(₦)	% Total cost
Operating expenses		
Seedling	17,183.67	9.20
Fertilizer	7,609.94	4.06
Agrochemical	10,839.29	5.82
Labour	45,000	24.10
Other operating capital	98,444.79	52.74
Total operating expenses(TVC)	**179,077.69**	95.90
Total Fixed Cost (TFC)	**7,611.739**	4.08
Total Cost (TC)	**186,689.429**	
Revenue		
Quantity of groundnut(kg)	24.051	
Unit price	21,500	
Total Revenue (TR)	517,096.939	
Gross Margin (GM)	338, 019.249	
Net Farm Income (NFI)	330, 407.51	
Benefit Cost Ratio (BCR)	2.76	
Rate of return per naira	1.76	
Profitability index	0.98	
Profit margin	0.64	
Operating expenses	0.34	

Source: Field Survey, 2017.

Stochastic frontier Production function

The maximum-likelihood estimates of the parameters of the stochastic frontier production for groundnut farmers and their corresponding levels of statistical significance are shown in Table 3. The maximum likelihood estimation (MLE) of the frontier function revealed that σ^2 and γ are significant at 1 percent level. The significant value of the sigma square (σ^2) indicates a good fit and correctness of the specified distribution assumption of the composite error term and also shows the presence of inefficiency effects and random error in groundnut production in the study area. The result revealed that all the estimated coefficients of the variables of the production function were positive except agrochemical. The positive coefficient of quantity of seed(X_1), farm size(X_2), labour (X_3) and quantity of fertilizer(X_4) were in line with a priori expectation and this implies that groundnut output increases with increase in these variables. Quantity of seed and farm size were the only variables that had a significant effect on groundnut output. The coefficients of both variables were statistically significant at 1% level of significance respectively. This implies that, increases in the level of use of these inputs will significantly increased output of groundnut in the study area. The result obtained is in line with that of Amaza et al. (2006) and Umaru et al. (2017). They obtained a positive relationship between quantity of seed and farm size. The coefficient of farm size was estimated at 0.112 and statistically significant at 1% level, implying that a 1% increase in the hectares of land put into

groundnut production will bring about increase in output by 0.11%. This is attributed to the relative importance of land in crop production and corroborates the findings of Wakili (2012).

Table 3: Maximum Likelihood Estimates of the Parameters of the Stochastic Frontier Production Function

Variables	Parameter	Coefficient	Std. error	t-ratio
Production Factors				
Constant	b_0	5.715	0.167	34.25***
Quantity of seed (X1)	b_1	0.398	0.0328	12.09***
Farm size (X2)	b_2	0.112	0.0498	2.249***
Labour (X3)	b_3	0.0248	0.0177	1.401
Quantity of fertilizer (X4)	b_4	0.0819	0.0121	0.673
Quantity of Agrochemical (X5)	b_5	-0.0200	0.0151	-1.55
Inefficiency effects				
Constant	δ_0	2.00	1.147	1.746*
Farming experience (Z1)	δ_1	-2.17	1.979	-1.09
Gender (Z2)	δ_2	2.07	1.933	1.072
Family size (Z3)	δ_3	-0.104	0.061	-1.696
Age(Z4)	δ_4	0.0576	0.061	0.943
Marital status (Z5)	δ_5	-0.356	0.240	-1.48
Educational level (Z6)	δ_6	-0.0334	-0.00223	-14.97***
Member of co-operative (Z7)	δ_7	-0.0837	-0.0526	-15.94***
Access to credit (Z8)	δ_8	-0.0937	-0.0060	-15.45***
Amount of credit receive (Z9)	δ_9	-0.125	-0.0769	-16.187***
Extension service (Z10)	δ_{10}	-0.0488	0.0318	-1.53
Diagnostic statistics				
Sigma squared	(δ^2)	0.5223	0.1381	3.78***
Gamma	(γ)	0.7980	0.1951	4.09***
LR test		11.77		
Likelihood function	(ʎ)	144.39		
Sample size	N	98		

*** (P <0.01) ** (P<0.05) * (P<0.10).all explanatory variables were expressed in natural log form. A negative sign of the parameter in the inefficiency function implies that the associated variable has a positive effect on technical efficiency level while a positive sign indicates otherwise.

The return to scale (RTS) analysis which serves as a measure of total resource productivity is given in Table 4. The result indicates that groundnut production was in the Stage II (RTS = 0.597) of the production surface where production increases at decreasing rate. Stage II is the stage of decreasing positive return to scale. This result was in line with that of Ogunniyi et al.(2012). The estimate of their RTS was 0.583. Hence, it is advisable, according to Ogundari and Ojo (2007) that production units should maintain current levels of input utilization, as this will bring about maximum output from a given level of output, ceteris paribus.

Table 4: Elasticities and return to scale (RTS) analyzes of production functions

Variable	Elasticities
Quantity of seed (X1)	0.398
Farm size (X2)	0.112
Labour (X3)	0.0248
Quantity of fertilizer (X4)	0.0819
Quantity of Agrochemical (X5	-0.0200
Return to scale (RTS)	0.597

Source: Computed from Field Survey, 2017.

Efficiency analysis for groundnut production

The result in Table 5 shows the distribution of farmers according to technical efficiency. The technical efficiency is less than 1.0 indicating that all the farmers were producing below the maximum efficiency frontier. A range of technical efficiencies is observed across the sampled groundnut farmers and the spread is large. The most efficient (maximum efficiency) had technical efficiency of 0.99 (or 99 %), while the least efficient farmer had a technical efficiency of 0.85 (or 85%). The mean technical efficiency is 0.97 (or 97%). This implies that, on the average, the farmers were 97 % technically efficient; hence their observed output was about 3% (efficiency differential) less than the maximum frontier output. The small variation in

technical efficiency estimates is an indication that most of the farmers were using their resources efficiently.

Table 5: Distribution of farm-specific technical efficiency scores in groundnut farming

Efficiency scores	Frequency	Percent
< 0.85	-	-
0.85 - 0.90	4	4.1
0.91 - 0.95	8	8.2
0.96 - 1.00	86	87.8
Sample size	98	100
Mean efficiency	0.97	
SD	0.024	
Minimum efficiency	0.85	
Maximum efficiency	0.99	

Source: Computed from Field Survey, 2017.

Determinants of technical efficiency

The parameter estimates from the inefficiency model included in the stochastic production frontier estimation (Table 3), was used to determine the factors affecting farmers technical efficiency. For technical inefficiency model, the coefficients of educational level, membership of co-operative, access to credit and amount of credit received were negative and significantly related to technical inefficiency at 1% level of significance. This result implies that an increase in these variables will decrease the technical inefficiency but increase the technical efficiency. Ogunniyi et al. (2012) obtained a negative relationship between educational level and technical inefficiency in their study. Bathon and Maurice (2015) also obtained a negative relationship between access to credit, educational level and technical inefficiency.

Household size was negatively related to technical inefficiencies. This implies that household size has a positive effect on technical efficiency. Dimelu et al. (2009), posits that large household size serves a ready source of labour for most farm operations. The coefficient of farming experience was negative, implying that technical efficiency among farmers increases with more years of experience in farming and vice versa. This corroborates the finding of Fassasi (2007) who reported that increase in farming experience reduces technical inefficiency. Similarly, the estimate for marital status and extension was negative but not significantly related to technical inefficiency. This implies that an increase in these variables may increase the technical efficiency of the farmers. The coefficient of age was positively related with technical inefficiency. The positive relationship between age and technical inefficiency was not significant. This means that technical efficiency will reduce as age increases. The result is not in line with that of Biye (2016), Otitoju and Arene (2010), Adeyemo et al. (2010) and Ebong et al. (2009) who observed that age and years of farming experience improved efficiency as a result of "practice makes perfect".

Conclusion

The study revealed that groundnut farming is dominated by female farmers cultivating between 1-1.5 ha and were mostly literate. The farmers were themselves efficient in groundnut production in lieu of their vast experience and literacy level. The return per naira invested was ₦1.76 which implied that for every naira invested, the farmer realized a return of ₦1.76. Hence, groundnut production is a profitable business in the study area. It can be concluded that farmers should be encouraged to expand their farm size and also form cooperative associations so that they can interact with each other on problems of mutual interest, benefit incentives put forward through government programs and non-governmental organizations.

Policy Recommendations

Based on the findings of this study, the following policy recommendations are offered:

I. Policies by the government and non-governmental agencies should be geared towards encouraging farmers' education on farm management practices so that they would be able to allocate production resources more efficiently especially agrochemicals for optimum yield.

II. Government is also advised to reinstate its subsidy policy on inputs especially fertilizers, hybrid seeds and other agrochemicals through the use of national identity card project to reach all the targeted farmers in order to control the deep rooted corruption in the disbursement of the subsidized inputs rather than removing it.

III. Extension activities should be increased in the study area and they should focus on improved techniques of groundnut production and encourage farmers to use available resources efficiently and effectively.

IV. Since production of groundnut is profitable in the area, it means if government and non-governmental agencies will encourage farmers, it will go a long way to help them produce more and generate more incomes for their wellbeing.

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