Land Tenure Systems and Agricultural Productivity in Nigeria: a Case of Rice Production

Saheed Olakunle SANUSI (sanusisaheed@yahoo.com)
Federal University Gashua https://orcid.org/0000-0002-0531-643X
Musa Janga Madaki
Federal University Gashua
Hyelni Seth David
Federal University Gashua
Sharon Ocheinehi Adole
University of Abuja

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By

Sanusi, Saheed Olakunle[1*]

[1]Department of Agricultural Economics and Extension,

Faculty of Agriculture, Federal University Gashua.

P.M.B 1005, Gashua. Yobe State, Nigeria.

**Corresponding Author Email: sanusisaheed@yahoo.com, Tel: +2348062965260*

Madaki, Musa Janga[1]

[1]Department of Agricultural Economics and Extension,

Faculty of Agriculture, Federal University Gashua.

P.M.B 1005, Gashua. Yobe State, Nigeria.

Email: musamjanga@yahoo.com

David, Hyelni Seth[1]

[1]Department of Agricultural Economics and Extension,

Faculty of Agriculture, Federal University Gashua.

P.M.B 1005, Gashua. Yobe State, Nigeria.

Email: dhyelni@gmail.com

Adole, Sharon Ocheinehi[2]

[2]Department of Agricultural Economics,

Faculty of Agriculture, University of Abuja.

P.M.B 117 Gwagwalada-Abuja, Federal Capital Territory, Abuja, Nigeria.

Email: danorash2000@yahoo.com

Abstract

This study examined land tenure systems and rice productivity in Nigeria. Primary data were used for the study. Data were collected with the aid of a well-structured questionnaire. A four-stage sampling technique was used to select a total sample size of three hundred and forty-nine (349) rice farmers based on the number of questionnaires correctly filled and returned from the selected sampled size. Data were analyzed using descriptive statistics, total factor productivity, and Stochastic production frontier model. The study revealed that large portion of the land (over 94%) used for rice production were acquired through inheritance mode of land acquisition and communal type of land tenure system widely practiced. The result of total factor productivity indicated that 62.18% of the rice farmers were at sub-optimal productivity level. The results of the stochastic production frontier function revealed that seed ($P< 0.10$), and fertilizer application ($P<0.01$) were the significant factors influencing technical efficiency of rice production in the study area. Based on the findings, the study recommend that current land use act and policy should be amended to prevent concurrent grabbing of agricultural land for non-agricultural purposes in order to enhance availability and accessibility of land for agriculture.

Keywords: Land tenure, Agriculture, productivity, rice, Nigeria

Introduction

Land is one of the vital assets throughout the world either in urban centers or rural environments' where lives and survival is based and build on the cultivation of land [1]. According to [2] smallholder farmers play key roles in achieving food security but unfortunately, they face limited access to land resources due to different socio-economic and land tenure factors. Land tenure is essentially, the methods by which individuals or groups acquire, hold, transfer or transmit property rights in land [3]. The term tenure means the sum of rights an individual, household or community may have with respect to land or water or other resources for that matter. It is a mix or number of entitlements (rights and duties) concerning the use of land resources. It covers the rules under which those rights and duties are exercised and the time horizon or guarantee of continued claim to such entitlements. In simple terms, land tenure systems determine who can use what resources for how long and under what conditions. Land remains a limited resource and its distribution as well as tenure structures are key issues in nation's agricultural developmental strategy. The development of the rice sub-sectors in Nigeria revolves, largely around the ownership and use of land resources, and type of labour [4]. Land is the main factor for agricultural production and rural livelihoods, it is one of the principal challenges of implementing agricultural programs for improved productivity and resource utilization. Consequently, access to, and security of land rights are major concerns for policies and strategies aimed at increasing rice production. Land is therefore, a very strategic socio-economic asset, particularly in poor societies where agricultural output are measured by control of, and access to land.

Land tenure systems affect agricultural productivity by influencing the efficient use of inputs and adoption of modern technology. [5] opined that land tenure system has generally been broadly described as rigid, creating obstacles in the way of agricultural development. Land as a factor of production and as a natural resource is critical in agricultural production. Its importance is expressed in terms of availability, accessibility, quantity and quality. In Nigerian agriculture, the accessibility and quality factors stand out as major determinants of productivity. The accessibility of most agricultural lands especially in the North-Central part of the country depends largely on land tenure system and the extent of competition by non-agricultural land uses [6]. Farm size and productivity is one of the oldest issues in the academic arena for analyzing the agrarian structure.

Rice (*Oryza sativa*) is an important traditional basic commodity contributing a significant proportion of the food requirements of Nigerians and it is cultivated in almost all the agro-ecological zone in Nigeria [7]. In recent years, rice production had been on the increase but not sufficient to meet the demand of growing population According to [8] rainfed lowland and upland rice production have the potential to meet national demand. However, their average rice yield of 1.8tons/ha fall short of the expected national average potential yield of 5.0tons/ha and 3.0tons/ha respectively [9]. The current average increase in yield of about 2.5-3.2 tons/ha for lowland rice is a tremendous growth but still below the optimal level of production. Hence, there is a gap in the optimum capacity of rice farmers in realizing the expected output. The research is therefore set to ascertain the validity of this claim.

An efficient system of land tenure and land right contributes to the general economic development by assisting agriculture in contributing to industrial development through the production of food, capital, raw materials, labour, foreign exchange and expanded market. Consequently, the system of land tenure in any place to a large extent determines the pattern of agriculture that prevails in that society. It has potential to determine the allocation of resources, systems of conserving land and the general productivity of the farm. [5] reported that land right system determines the type of farming systems, decisions regarding investment of factors of production such as capital, labour and management as well as the productivity of such farming systems. Even though land tenure is believed to strongly impact upon agricultural production in rural areas of Nigeria, relatively little is known about the types and mode of land acquisition, how and the extent of the impact and in what specific areas of agricultural activities the impact is evident particularly in Federal Capital Territory, Nigeria. The gap that existed on the dual mix of land tenure system and the effect on rice productivity in the Federal Capital Territory necessitated the need for research of this nature to fill the identified vacuum. Furthermore, much of the little that is known about the effect of land tenure on agricultural production in Northern Nigeria is merely speculative and not sufficiently substantiated or clarified by empirical evidence. Hence, the need for a study such as this in Federal Capital Territory, Nigeria.

From time immemorial till the present period, there has been a great concern that the process of land tenure system and land ownership practices for agricultural purpose and other uses in Sub-Sahara Africa subdued productivity, resource-use and-investments in agriculture [10]. The concern that land tenure disrupts free ownership and control of land resources are rarely backed with empirical evidence. Quantitative evidence to support the argument that there exits inverse relationship between land tenure practices and productivity are scanty and weak [11-12]. To some extent the weak evidence reflects the fact that either it is because it is difficult to measure the effect of land tenure on productivity or there is not enough empirical research that have been carried out in this area of human endaevour. Hence the need for research to be conducted on this subject area to fill the identified gap in literature. Therefore, the broad objective of the study was to examine the land tenure system and productivity of rice farmers in Federal Capital Territory, Nigeria. The specific objectives were to: -

(i) identify the types of land tenure system and mode of land acquisitions by rice farmers,

(ii) determine the productivity index of rice farmers, and

(iii) examine the factors influencing technical efficiency of rice production

2.0 Theoretical Framework

2.1 Land Tenure and Agricultural Productivity

Nigeria has about 84 million hectares of arable land that spreads across all the ecological zones and only about 5 million hectares is suitable for rice cultivation [13]. [14] suggested that a much smaller area is available for cultivation leaving little room for agricultural expansion as a result of which great difficulties are going to be faced in producing enough food to sustain future populations, and the impact of tenure on land use and productivity is critical. The customary principle of communal land tenure is seen as setting limits on strategies that could be used to promote agricultural production or as warping the effects of the various strategies in use [15]. It is argued that this principle encourages fragmentation of holdings and land immobility which prevents progressive farmers from consolidating fragmented parcels or expanding their holding. The argument advanced by the critics of customary tenure emphasized the utility of private over communal (public) land-ownership, and the starting assumption appears to be that only private tenure can quickly adjust to the rigid social and economic change brought about by modernizing agriculture.

[16] stressed that the dominant source of output growth in Chinese agriculture during 1978-1984 was the change from collective - team large farms to individual household-based farming (despite the often-small size of household plots). Private plots usually are highly productive and account for significant national agricultural output; Individualized tenure facilitates the establishment of commercial agriculture; Communal tenure system under customary arrangement breeds uncertainty and insecurity of tenure [15].

[17] ownership insecurity causes low farm productivity due to a lack of investment incentives and limited access to credit; Tenant farmers have generally been found to be neglected in the allocation of credits and are subjected to insecurity as an additional source of risk to farmers. Therefore, its impact on productivity depends on the ability of farmers to bear additional risk. Corroborating this view, [15] stated that the right an individual exercise over his portion of communal land usually terminates at the end of the cropping season.

3.0 METHODOLOGY

3.1 The Study Area

The study was conducted in the Federal Capital Territory (FCT). The FCT was purposively chosen because it is a major rice belt and hub in the North Central part of Nigeria. FCT was created in 1976, while the city was built throughout the 1980s. It officially became Nigeria's capital on December 12, 1991, replacing the role of the previous capital, Lagos. FCT is located at the heart of Nigeria, approximately between latitudes 8^0 25'N and 9^0 20'N and longitude $6^0$39' and 7^0 45' East of the Greenwich meridian [18] . It lies just above the hot humid lowlands of the Niger - Benue trough and it is bounded on the north by Kaduna State, on the west by Niger State, on the east and southeast by Plateau State and on the southwest by Kogi state. It covers a land mass of about 8,000 sq. km, out of which 274 000 hectares are available for, agricultural activities, 270 000 hectares under forest reserves, and 250 000 hectares earmarked for the Federal Capital Cities developments, and the remaining 6 000 hectares account for rocks, hills and rivers [19]. The vegetation of the FCT is normally classified as park savannah, with scattered trees, pockets of guinea, woodland and derived savannah. The FCT has two main seasons, rainy (April to October) and dry (November to March). Average annual temperature varies between 20ºC (68ºF) and 33ºC (91.5oF) with a relative humidity, in the dry season, of between 20 and 30 per cent. Average annual rainfall range is in the order of 1,100mm to 1,600mm, with an annual average of 82 rainy days [20-21]. [22] put FCT at 3,564,126 people. The FCT is divided into six area councils namely, Abaji, Abuja Municipal, Bwari, Gwagwalada, Kuje, and Kwali (Fig. 1).

Figure 1: Map of the Federal Capital Territory Showing the Study Area

Source: [19]

3.2 Sampling Techniques and Sample Size

Federal Capital Territory was purposively selected because of the presence of rice farmers in the villages. Multi-stage sampling method was used for selecting the respondents. In the first stage, four (4) Area Councils were randomly selected using raffle-draw ballot-box method. In the second stage, four (4) wards were randomly selected each in Abaji, Bwari, Gwagwalada, and Kwali Area Councils respectively using raffle-draw ballot-box method. In the third stage, two (2) villages were randomly selected using raffle-draw ballot-box method from each of the 16 sampled wards making total of 32 villages. Fourth and the final stage, from equation (3.1) a proportionate – random sampling was used to select a total sample size of three hundred and forty-nine (349) smallholder rice farmers from the total sample frame of 2723 rice farmers (FCT, ADP 2018). However, two hundred and fifty (250) questionnaires were correctly filled and returned. The study used [23] for estimating sample size:

$$\mathrm{n} = \frac{N}{1 + N(e^2)} = 349 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots. (3.1)$$

Where,

n = Sample Size (Units)

N= Sample Frame/Population size (Units)

e = Level of Precision (5%)

3.3 Method of Data Collection

Primary data were used for this study. Primary data were collected from rice farmers in the study area. Trained enumerators from Agricultural Development Project (ADP) were employed for data collection using well-structured questionnaire. The questionnaires were sectioned appropriately to cover all the specific objectives stated such as types of land tenure systems, mode of land acquisitions by rice farmers, and production inputs used by the farmers.

3.4 Method of Data Analysis

Descriptive statistics involve the use of mean, frequency and percentages. It was used to identify the land tenure system, and mode of land acquisitions as stated in specific objective one (i),

To achieve specific objective two (ii), that is, determine the productivity index of rice farmers; TFP model following [24] was used. The TFP approach adopted is given as: -

$$TFP = \frac{Y}{TVC} \dots\dots\dots\dots\dots\dots\dots\dots\dots (3.2)$$

$$TFP = \frac{Y}{\sum P_i X_i} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (3.3)$$

Where,

Y = Output (Kg),

TVC = Total Variable Cost (₦),

P_i = Unit Price of ith Variable Input (₦), and

X_i = Quantity of ith Variable Input (Kg).

Total fixed cost is constant as it is fixed.

From Cost Theory:

$$AVC = \frac{TVC}{Y} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (3.3)$$

Where, AVC = Average Variable Cost in naira (₦)

Therefore, the transpose of AVC will be TFP

$$TFP = \frac{Y}{TVC} = \frac{1}{AVC} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (3.3)$$

As such, TFP is the inverse of the AVC. The partial productivity estimate is the marginal products (MP) given as

$$MP = \frac{\Delta TFP}{\Delta X} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..(3.3)$$

Note: At the time of undertaken this study, 1 dollar ($1) = 500 hundred naira (₦500)

The Stochastic Production Frontier Model following [25] Rahji (2005) is stated thus:

$$Q_i = f(X_i\beta) + \varepsilon_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.(3.4)$$

Where,

Q_i= Output of ${}_i$th farmer (Kg),

Xi = Vector of actual quantity used,

β = Vector of Parameter to be estimated,

ε_i = Composite error term denoted by Rahji (2005).

$\varepsilon_i = V_i - U_i$

V_i = Decomposed error term measuring technical efficiency of the farmer, and

U_i= The inefficiency component of the error term.

Stochastic production frontier Model is stated explicitly as: -

$$L_nQ = \beta_0 + \beta_1 L_nX_1 + \beta_2 L_nX_2 + \beta_3 L_nX_3 + \beta_4 L_nX_4 + \beta_5 L_nX_5 + V_i - U_i \ldots\ldots\ldots\ldots\ldots.(3.5)$$

Where: -

Q = Output {Total quantity of rice harvested in (kg),

X_1 = Farm Size (Ha),

X_2 = Labour Input (Mandays),

X_3 = Fertilizer Input (Kg),

X_4 = Agrochemical Input (litres), and

X_5 = Seed Input (Kg),

V_i = Decomposed error term measuring technical efficiency of the farmer, and

U_i= The inefficiency component of the error term.

The Inefficiency Component of the Stochastic Production Frontier Model is stated thus: -

$$U_i = \propto_0 + \propto_1 Z_1 + \propto_2 Z_2 + \propto_3 Z_3 + \propto_4 Z_4 + \propto_5 Z_5 + \propto_6 Z_6 + \propto_7 Z_7 + \propto_8 Z_8 + \propto_9 Z_9 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3.6)$$

Where,

U_i = Inefficiency Component,

Z_1 = Contact with Extension Agent (Number of contact/month),

Z_2 = Access to Credit (Naira),

Z_3 = Sex of the farmers (1, Male; 0, Otherwise),

Z_4 = Educational Level of Farmers (Number of years in School)

Z_5= Farming Experience (Years),

Z_6 = Member of Cooperative Society (1, Member; 0, Otherwise).

Z_7 = Land Tenure System (1, Individual; 2, Communal; 3, Government),

Z_8 = Mode of Land Acquisition (1, Inheritance; 2, Lease; 3, Purchase), and

Z_9 = Labour Utilized (1, Hired; 2, Family; 3, Communal)

α_0= Constant Term

$\alpha_1 - \alpha_6$ = Regression Coefficients

The Stochastic production frontier model was used to achieve specific objective three (iii), which is, evaluate the factors influencing technical efficiency of rice production.

4.0 RESULTS AND DISCUSSION

4.1 Mode of Land Acquisitions by Rice Farmers and Types of Land Tenure Systems

4.1.1 Mode of Land Acquisitions by Rice Farmers

The modes of land acquisition are presented in Table 1 and Figure 2. Inheritance is the highest mode of farm land acquisition as indicated by 94.56% response. Inheritance refers to the customary transfer of land to children on the death of the landholder. Inheritance ranks first and it is followed by purchase (3.44%). The title acquired under inheritance is permanent and heritable. The holder of such title exercises full management rights over his/her holdings. The finding is in line with [26] that concluded that inheritance is the principal mode of land acquisition in Northern part of Nigeria. However, the finding differs with [27] who reported that purchase was the major means of acquiring land in South Eastern Nigeria. Farmers that own land tend to have an edge over farmers renting lands.

Table 1: Mode of Land Acquisition by Rice Farmers in the Study Area

Mode of Land Acquisition	Frequency	Percentage
Inheritance	330	94.56
Lease	7	2.10
Purchase	12	3.44
Total	**349**	**100**

Source: Field Survey (2020)

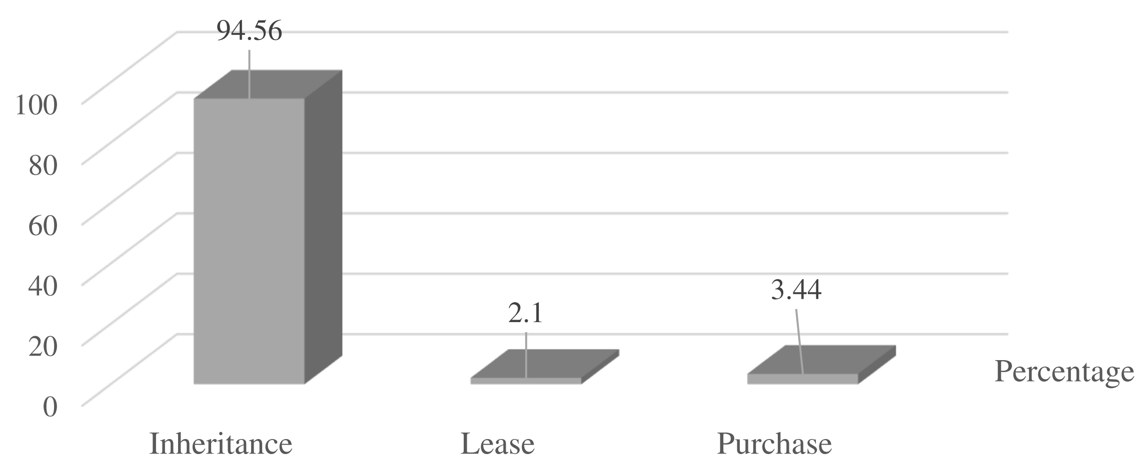

Figure 2: Bar Chart Showing Mode of Land Acquisiton by Rice Farmers

4.1.2 Types of Land Tenure System

The land tenure systems are presented in Table 2 and Figure 3. From the results, greater percentage (97.71%) of the sampled rice farmers rely on communal arrangement for the land they use for cultivation. However, 2% of sampled rice farmers had their individual farm land, while 0.29% of the farm land was owned by the government. This implies that the farmers had restrictions and could not engage in farm practices suitable to them especially cultivating permanent crops. This finding agrees with the findings of [28].

Table 2: Types of Land Tenure Systems in the Study Area

Land Tenure Systems	Frequency	Percentage
Communal	341	97.71
Individual	7	2.00
Government	1	0.29
Total	**349**	**100**

Source: Field Survey (2020)

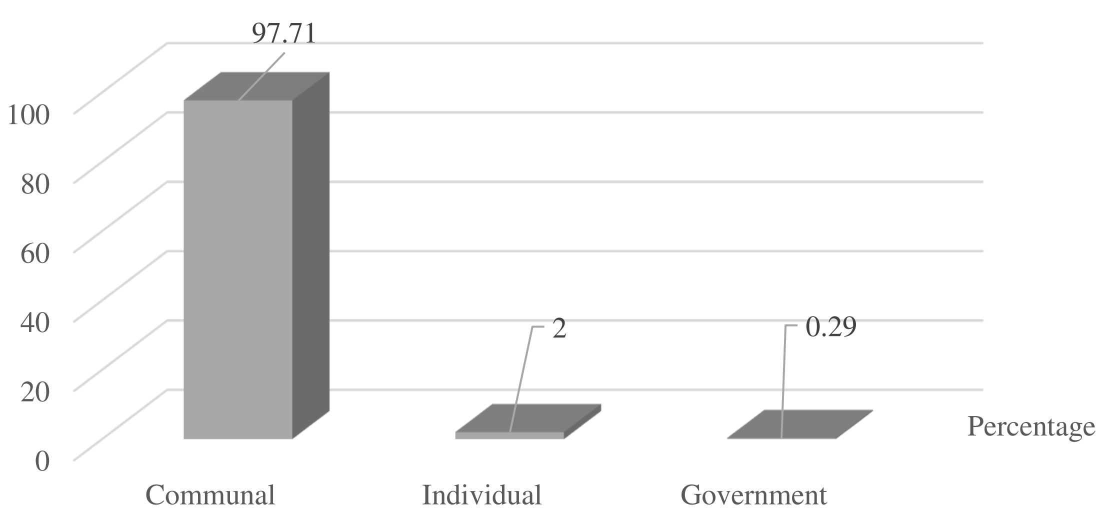

Figure 3: Bar Chart Showing Types of Land Tenure Systems

4.2 Total Factor Productivity of Rice Production in the Study Area

The result of the total factor productivity in Table 3 shows that most (62.18%) of the smallholder rice farmers had TFP index less than one which means that the productivity is sub-optimal. Also, 19.2% of the respondents had TFP index greater than 1.10 which is in the super-optimal range, while 18.62% had TFP index within the optimal range of 1.00 and 1.09. This implies that most of the respondents performed less than the optimal level, meaning that there are low utilizations of production factors among the smallholder rice farmers. The result agreed with [29]. However, the finding contradicts that of [30] Ebe, Obike, Ug who posited that the average total factors were at optimal level among arable crop farmers. Figure 4 below represent a graph of total factor productivity. From the figure the total factor productivity was left skewed, which implies that most of the farmers were sub-optimal in productivity.

Table 3: Total Factor Productivity (TFP) Index of Smallholder Rice Farmers in the Study Area

TFP Index	**Frequency**	**Percentage**
Sub-Optimal (< 1.00)	217	62.18
Optimal (1.00–1.09)	65	18.62
Super-Optimal (≥ 1.10)	67	19.2
Total	**349**	**100**
Mean	0.52	
Minimum	0.001	
Maximum	5.17	
Standard Deviation	0.91	

Source: Field Survey (2020)

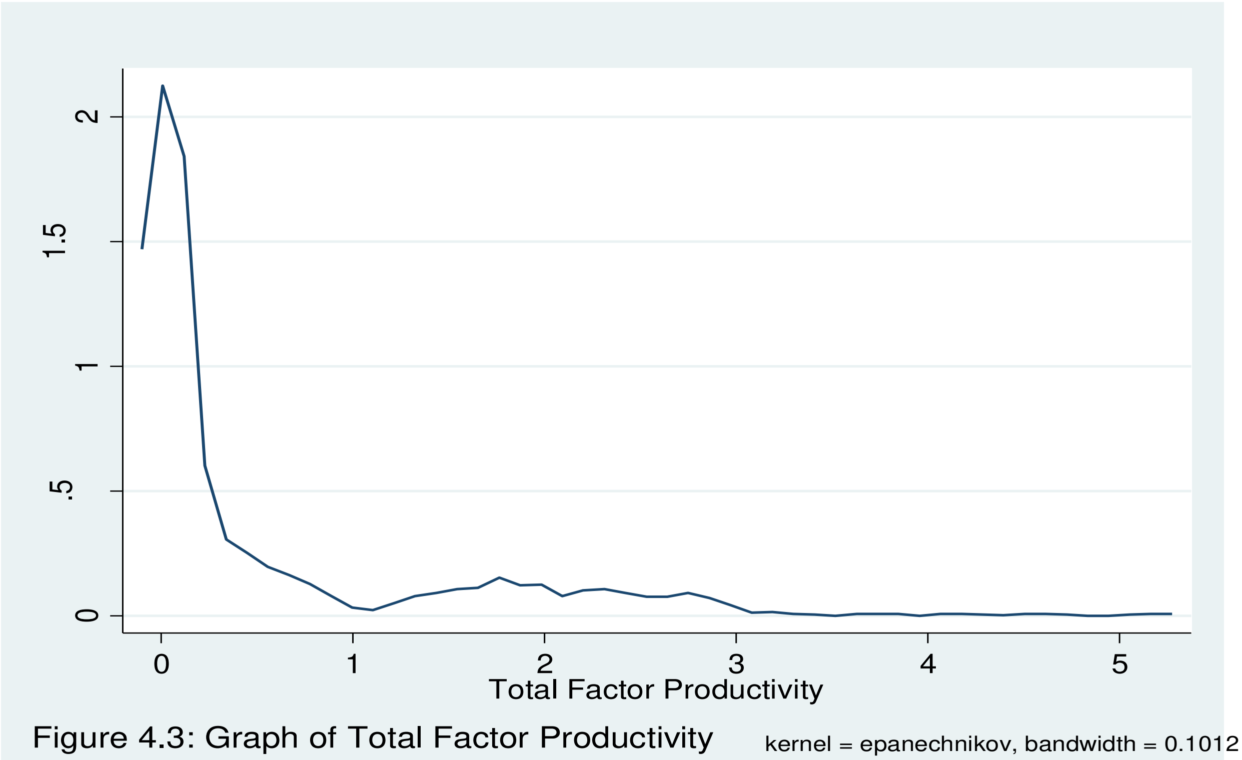

Figure 4.3: Graph of Total Factor Productivity

4.3 Factors Influencing Technical Efficiency of Rice Production in the Study Area

The result for the stochastic production frontier function for rice farmers showing the maximum likelihood estimates and inefficiency components are presented in Table 4. The study revealed that the Log-Likelihood value was -687.0619. The Log-Likelihood function implies that inefficiency exist in the data set. The estimated Chi square value of 57.90 was significant at 1% probability level. The Lambda value was 1.005, while the mean technical efficiency was 0.75. The Gamma value for the production function was 50.12%. This result is consistent with theory that postulated that gamma (γ) value should be greater than zero which means statistically different from zero [31]. The implication of the result is that 50.12% of the variations in the yield of the rice farmers are due to the farmer inefficiency rather than random variability. Therefore, since the factors are within the control of the farmers, reducing the effect of the gamma(γ) will greatly enhance the technical efficiency of the farmers and thereby improve potential yields of rice production. Hence, the values represent the total output made on the frontier production function attributed to technical efficiency [25]. The average technical efficiency of 0.75 implies that rice farmers are able to obtain 75% of the output from the mixtures of inputs used.

The estimated coefficient of seed was positive and statistically significant at 10% level of probability. The estimated coefficient of seed is 0.31861. The implication of the positive coefficient was that seeds input contributed significantly to the technical efficiency of rice production. This implies that a unit increase in seed by one percent, increases the output of rice by 31.86%. This is in line with [32-33] that poised that there is a positive relationship between seeds and farmers efficiency in the production process. Seed is very important in production as it determines to a large extent the kind of output obtained. Hence, farmers need to be mindful of the quality, seed rate and variety of seed used in order to obtain increased output. Output will be low in the absence of good quality and improved seeds even if other inputs are in abundance [32].

Similarly, fertilizer is negative and statistically significant at 1% level of probability. The negative sign implies that the factors had an indirect effect on rice production. The implication of the coefficient of fertilizer which was -0.2809 is that if the fertilizer increases by one percent, it could decrease output by 28.09%. Fertilizer is a major input for improving the performance of output per hectare of cultivated crops. Farmers in this instance had excessively apply fertilizer on their rice farms. The result is in consonance with the research findings of [34-36].

For the inefficiency effect components presented in Table 4, the result indicated that farming experience ($P<0.10$), sex ($P<0.05$) and labour utilization ($P<0.10$) were negative and statistically significant. The signs of the coefficients of these variables have an important policy implications as positive sign implies negative effect on technical efficiency and vice versa. Therefore, the implication of sex being negative and statistically significant at 5% level of probability implies that as sex disparity increases, technical inefficiency declines thereby increasing the efficiency in production. That is, male farmers had the likelihood of lowering technical inefficiency. The result is in line with the findings of [37] that asserted that male farmers were more technically efficient than their female counterpart cultivating same crop. Also, farm experience is negative and significant at 10% level of probability which indicates that as farm experience increases, technical inefficiency decreases. Hence, experience in farming activities enhance better performance, improve knowledge and ability to make good farm decisions that will lead to efficiency and profitable enterprise. This finding is supported by [38-40] that concluded that farmers with more experience would be more efficient. Labour utilization on the other hand is negative and statistically significant at 10% probability level. Labour is significant probably because virtually all farming activities are carried out using human labour among small scale farming households in developing countries like Nigeria where mechanization is rarely deployed [31]. The coefficient of labour utilization was -0.35116. The result of the coefficient implies that a unit increase in labour utilization will likely lead to 35.11% decrease of technical inefficiencies in rice production in the study area. The results are in line with several studies that confirmed the importance of labour in farming activities. Such studies are [41-44].

The estimated coefficient of land acquisition is 0.2054 and it was statistically significant at 1% probability level. The result implies that a unit increase in land acquisition by one unit will decrease the technical inefficiency of the farmers output by 20.54%. The findings conform with the results of [45] in the analysis of rice production in Enugu State, Nigeria. Figure 4.5 shows the distribution of technical inefficiency of farmers. From the graph most of the farmers were between technical inefficiency units of 0.752 to 0.756.

Table 4: Maximum Likelihood Estimates of Stochastic Production Frontier Function for the Rice Farmers

Variables	Coefficient	Std. Err,	t-ratio
Farm Size	0.158527	0.235292	0.67
Labour Input	-0.52558	0.322612	-1.63
Fertilizer	-0.28094***	0.065376	-4.3
Agrochemicals	0.192247	0.17347	1.11
Seed Input	0.3186*	0.167276	1.9
Constant	-0.37915	3.793474	-0.1
	Inefficiency Component		
Extension Contacts	-0.74766	0.918657	-0.81
Access to Credit	-0.44847	1.711237	-0.26
Sex	-2.75452**	1.2339	-2.23
Level of Education	-0.52105	0.367236	-1.42
Farming Experience	-0.07036*	0.043318	-1.66
Land Tenure System	0.730972	2.39928	0.72
Mode of Land Acquisition	-0.205416***	0.350196	-3.44
Labour Utilized	-0.35116*	0.213176	-1.65
Member of Cooperative Society	1.03889	1.54550	0.67
Constant	1.870889	1.653285	1.13
Chi-Square	**57.90*** **		
Lambda	**1.005**		
Mean Technical Efficiency	**0.75**		
Log Likelihood	**-687.0619**		
Total Number of Observations	**349**		
Gamma	**50.12%**		

Source: Computed Field Data (2020)

5. Conclusion

The study investigated land tenure system and its effects on rice productivity in Nigeria. The study revealed that communal and inheritance are the established forms of land tenure and mode of land acquisition respectively in the study area. These identified means of land control constitute constraints and negatively influence the productivity of the rice farmers particularly has it reduces their ability to possess full ownership and control in the used of the farm land. The stochastic production frontier function for rice farmers shows that fertilizer (P<0.01), seed input (P<0.10), land acquisition (P<0.01), and labour utilized (P<0.01) were statistically significant. Therefore, the study concluded that land tenure and acquisition play a significant role in the determination of agricultural productivity.

6. Recommendations

Based on the results of analysis from this study, the following recommendations are made:

(i). Land use act and policy that is currently in use should be amended. This is necessary to enhance availability and accessibility of land to individuals, groups and institutions for rice production and agricultural purposes. The amendment is also important in order to mitigate the preponderance of inheritance mode of land acquisition and communal tenure system.

(ii). Farmers should train on appropriate utilization of production factors such as fertilizer, seeds, land and agrochemicals so as to increase their technical efficiency and output.

Declarations

Availability of data and materials: Data used for the research was gathered through structured questionnaire administered. The questionnaire is attached herewith as appendix I. Also, the data gathered were analyzed appropriately and the result is presented as appendix II.

APPENDIX I
QUESTIONNAIRE

LAND TENURE SYSTEM AND AGRICULTURAL PRODUCTIVITY IN NIGERIA: A CASE OF RICE PRODUCTION

Dear Respondent,

This questionnaire and information gathered will be used for research purposes on the research subject titled above. Please, kindly respond or tick (√) where necessary. All information will be treated with utmost confidentiality and will strictly be used for the purpose of research only. Thanks for your cooperation.

Instruction: Kindly tick (√) or fill in the blank spaces as appropriate

SECTION A
Back ground Information of the Farmer

Questionnaire No…... Village/Ward……………………… L.G.A……………………

SECTION B
Socio-Economic Characteristics of the Farmer

1) What is your gender? (a) Male { } (b) Female { }

2) How many are you in your house (household size)?..............................Units
3) Total number of persons below 18years old ……………Units
4) Total number of persons above 65 years old……………Units
5) Marital status? Married { } Single { } Divorced { } Widow { }
6) Age (years) ?...
7) What is the highest level of education of the household head?
(0) Non- Formal Education { } (1) Primary Education { } (2) Secondary Education { }
(3) Tertiary Education { }
8) Do you belong to any Cooperative Organization? Yes { } No { }
9) How long have you been into Rice farming? …………………………….. (years)
10) What is your annual income from Rice farming? ………… (Naira).
11) What is your annual income from other activities apart from Rice farming?....... (Naira)
12) What are the types of land tenure systems practiced in your community?
(a) Individual { } (b) Communal { } (c) Government { }
13) Did you have access to Credit facilities? Yes { } No { }
14) Do you have access to Extension Services Yea { } No { }
15) How many rice farm plots do you have? .... Please indicate the size in the Table below.

Plot size (m^2)	**Acre(m^2)**	**Hectare (Ha)**

23. How did you acquire your land? (Please Tick below)
(a) Inheritance…{ } (b) Lease …{ } (c) communal…{ } (d)Purchased… { }

24. What does it cost to rent one Hectare of land per season in your village? .... Naira
25. What is the quantity of seed you used?

Quantity of Seed (kg)	Unit Price (kg)	Total Quantity (kg)	Total Cost (**₦**)
Total			

26. What is the total quantity and type of fertilizer you used?

Fertilizer Type (S)	Quantity (kg)	Unit Price (**₦**) **50kg**	Total cost (**₦**)
Total			

27. What is the total quantity and type of agrochemical used?

S/n	**Agrochemical Type**	**Quantity(Litres)**	**Unit price(₦)/Litre**	**Total Cost(₦)**
1				
2				

3				
Total				

28. What type of labour do you use for farming operation?
(a) Family Labour ( ) (b) Hired Labour ( ) (C) Both Family and Hired Labour ( ) (d)Communal( )
29. Complete the following Table for Hired Labour.

S/N	Farming Activities	Women	Men	Children	Total no of People	No of Hours	No of Mandays	Unit cost (₦)/ Mandays	Total cost (₦)
1	Land preparation								
2	Planting								
3	Fertilizer Application								
4	Manure Application								
5	Chemical Application								
6	First Weeding								
7	Second weeding								
8	Harvesting								
9	Threshing/ Bagging								
10	Storage								
total									

30. Complete the following Table for Family Labour:

S/N	Farming Activities	Woman	Men	Children	Total No of People	Total No of Hours	No of Mandays	Unit cost(₦)	Total Cost(₦)
1	Land Preparation								
2	Planting								
3	Fertilizer Application								
4	Manure Application								
5	Chemical Application								
6	First Weeding								
7	Second weeding								
8	Harvesting								
9	Threshing/ Begging								
10	Storage								
Total									

31. Complete the following Table for Communal Labour:

S/N	Farming Activities	Woman	Men	Children	Total No of People	Total No of Hours	No of Mandays	Unit cost(₦)	Total Cost(₦)
1	Land Preparation								
2	Planting								
3	Fertilizer Application								
4	Manure Application								
5	Chemical Application								
6	First Weeding								
7	Second weeding								
8	Harvesting								
9	Threshing/ Begging								
10	Storage								
Total									

32. How much do you pay to transport output to the market per bag? ………………

33. Rice Output

	Number of Bags Produced (Kg)	Total Quantity Sold	Price/Units	Total Revenue (₦)
50Kg Bags				
100KgBags				

34. Home consumed quantity (**in bags**) of rice? (a) 25kg bag ----- (b) 50kg bag----(c)100kg bag--

35. What are the constraint faced during the production of rice?

Ranking according to severity 1=Strongly Disagree, 2=Disagree, 3= Agree, 4 =Strongly Agree.

S/N	Constraints	Strongly agree (4)	Agree (3)	Disagree (2)	Strongly disagree (1)
1	Herdsmen's and farmer clashes				
2	Inadequate funds				
3	Bureaucracy in accessing credits				
4	Inadequate fertilizer				
5	Pest and diseases				
6	Poor access to extension agent				
7	Distance to the Market				
8	High cost of labour				
9	High cost of maintenance				
	Other Constraints				
10					
11					
12					

36. Suggest Solutions to the Problem Stated

i) ………………………………………………………………………………………

ii) ………………………………………………………………………………………

iii) ………………………………………………………………………………………

iv) ………………………………………………………………………………………

37. Total Loading/ Offloading Cost (₦) ………………………………………………………

38. Total Fees and Commission Paid (₦)……………………………………………………………

SECTION C

39. Production Assets

S/N	Production Assets	Quantity	Years Purchase	Unit Cost (₦)	Estimated Value
1	Plough				
2	Harrow				
3	Tractors				
4	Water Pump				
5	Sprayers				
6	Hoe				
7	Cutlass				
8	Others Specify				

Thank you for your attention.

APPENDIX II
RESULTS

```
  ___  ____  ____  ____  ____ (R)
 /__    /   ____/   /   ____/
___/   /   /___/   /   /___/   14.1   Copyright 1985-2015 StataCorp LP
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                                      979-696-4601 (fax)

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Notes:
      1.  Unicode is supported; see help unicode_advice.
      2.  Maximum number of variables is set to 5000; see help set_maxvar.
running c:\ado\personal\profile.do ...

   Average interitem covariance:     .0397513
Number of items in the scale:           9
```

Scale reliability coefficient: 0.6077

Determinant of the correlation matrix
Det = 0.076
Bartlett test of sphericity
Chi-square = 864.234
Degrees of freedom = 36
p-value = 0.000
H0: variables are not intercorrelated
Kaiser-Meyer-Olkin Measure of Sampling Adequacy
KMO = 0.605

Principal components/correlation Number of obs = 341
Number of comp. = 9
Trace = 9
Rotation: (unrotated = principal) Rho = 1.0000

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	2.45521	.264601	0.2728	0.2728
Comp2	2.19061	1.08049	0.2434	0.5162
Comp3	1.11012	.181429	0.1233	0.6395
Comp4	.928693	.119789	0.1032	0.7427
Comp5	.808904	.317603	0.0899	0.8326
Comp6	.491301	.0457942	0.0546	0.8872
Comp7	.445507	.103818	0.0495	0.9367
Comp8	.341688	.113723	0.0380	0.9747
Comp9	.227965	.	0.0253	1.0000

Principal components (eigenvectors)

Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Comp6	Comp7	Comp8	Comp9	Unexplained
ii	-0.2033	0.4707	0.2791	-0.3918	0.0769	-0.2882	0.4202	-0.2123	-0.4417	0
iii	-0.1110	0.5411	-0.1152	0.0912	0.2419	-0.4772	-0.4420	0.3745	0.2271	0
iv	0.2989	0.2831	0.4485	-0.4255	0.1180	0.5556	-0.3093	0.1033	0.1392	0
v	0.4728	0.2570	-0.1514	0.1093	-0.0331	0.0553	0.6605	0.4152	0.2506	0
vi	0.2480	0.0227	0.6082	0.3910	-0.5529	-0.2695	-0.1201	0.0812	-0.1261	0
vii	0.2466	0.4038	-0.1987	0.5525	0.2150	0.3016	-0.1127	-0.3539	-0.3953	0
viii	-0.4683	0.2857	0.1914	0.2603	-0.1348	0.2006	0.1932	-0.3555	0.6104	0
x	-0.5261	-0.0299	0.1658	0.2547	0.0887	0.3671	0.1016	0.6067	-0.3300	0
xi	0.1229	-0.3055	0.4596	0.2332	0.7366	-0.1975	0.1464	-0.0727	0.1327	0

___ ____ ____ ____ ____ (R)

Variable	Obs	Mean	Std. Dev.	Min	Max
gender	349	.8452722	.3621642	0	1
hhs	349	12.24355	11.41464	1	50
ms	349	.8825215	.3797435	0	2
age	349	43.53295	12.50918	0	68
hle	349	1.544413	1.109729	0	3
co	349	.8366762	.3701916	0	1
ai	349	554447	259458.8	26000	1000000
lts	349	.9856734	.1772099	0	3
cf	349	.0630372	.2433789	0	1
exts	349	.6361032	.4818102	0	1
fs	349	1.749284	.7786525	.2	8.5
laq	349	1.123209	.5614585	1	4
lt	349	2.297994	1.021336	1	4

GENDER	Freq.	Percent	Cum.
0	54	15.47	15.47
1	295	84.53	100.00
Total	349	100.00	

MS	Freq.	Percent	Cum.
0	48	13.75	13.75
1	294	84.24	97.99
2	7	2.01	100.00
Total	349	100.00	

CO	Freq.	Percent	Cum.
0	57	16.33	16.33
1	292	83.67	100.00
Total	349	100.00	

CF	Freq.	Percent	Cum.
0	327	93.70	93.70
1	22	6.30	100.00
Total	349	100.00	

EXT S	Freq.	Percent	Cum.
0	127	36.39	36.39
1	222	63.61	100.00
Total	349	100.00	

LAQ	Freq.	Percent	Cum.
1	330	94.56	94.56
2	7	2.01	96.56
4	12	3.44	100.00
Total	349	100.00	

-> tabulation of lt

LT	Freq.	Percent	Cum.
1	78	22.35	22.35
2	156	44.70	67.05
3	48	13.75	80.80
4	67	19.20	100.00
Total	349	100.00	

LTS	Freq.	Percent	Cum.
0	7	2.01	2.01
1	341	97.71	99.71
3	1	0.29	100.00
Total	349	100.00	

HLE	Freq.	Percent	Cum.
0	88	25.21	25.21
1	66	18.91	44.13
2	112	32.09	76.22
3	83	23.78	100.00
Total	349	100.00	

agecat	Freq.	Percent	Cum.
0	74	21.20	21.20
1	94	26.93	48.14
2	67	19.20	67.34

3	114	32.66	100.00
Total	349	100.00	

yearscat	Freq.	Percent	Cum.
0	38	10.89	10.89
1	155	44.41	55.30
2	86	24.64	79.94
3	39	11.17	91.12
4	31	8.88	100.00
Total	349	100.00	

HHScat	Freq.	Percent	Cum.
0	93	26.65	26.65
1	139	39.83	66.48
2	46	13.18	79.66
3	71	20.34	100.00
Total	349	100.00	

Fzcat	Freq.	Percent	Cum.
0	16	4.58	4.58
1	86	24.64	29.23
2	38	10.89	40.11
4	206	59.03	99.14
5	3	0.86	100.00
Total	349	100.00	

Variable	Obs	Mean	Std. Dev.	Min	Max
nyf	349	21.9255	11.07525	1	50

aicat	Freq.	Percent	Cum.
0	86	24.64	24.64
1	193	55.30	79.94
2	70	20.06	100.00
Total	349	100.00	

```
. sum tfp2

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
        tfp2 |       349     .516361    .9078899          0       5.17

     tfpcat |      Freq.     Percent        Cum.
------------+-----------------------------------
          0 |        217       62.18       62.18
          1 |         65       18.62       80.80
          2 |         67       19.20      100.00
------------+-----------------------------------
      Total |        349      100.00

Iteration 0:   log likelihood = -221.20777
Iteration 1:   log likelihood = -188.91417
Iteration 2:   log likelihood = -188.20157
Iteration 3:   log likelihood = -188.20074
Iteration 4:   log likelihood = -188.20074

Probit regression                               Number of obs     =        349
                                                LR chi2(11)       =      66.01
                                                Prob > chi2       =     0.0000
Log likelihood = -188.20074                     Pseudo R2         =     0.1492

------------------------------------------------------------------------------
         rue |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
labourmandays |  -.0067473   .0135721    -0.50   0.619    -.0333481    .0198535
         nyf |   .0200982   .0087644     2.29   0.022     .0029204    .0372761
          fs |   .1557524   .1063082     1.47   0.143    -.0526079    .3641127
fertilizerqtt |  -.1529726   .0336044    -4.55   0.000     -.218836   -.0871092
 agrochemqty |  -.0164142   .0077782    -2.11   0.035    -.0316592   -.0011691
          co |  -.4131022   .2110933    -1.96   0.050    -.8268374    .0006331
         hle |   .1887574   .0803099     2.35   0.019     .0313529    .3461619
          cf |   .2606337   .3048875     0.85   0.393    -.3369349    .8582022
         lts |   .2038362   .5097497     0.40   0.689    -.7952549    1.202927
         laq |   .3277221   .1369857     2.39   0.017     .0592351    .5962091
          lt |  -.1629695   .0822537    -1.98   0.048    -.3241839   -.0017552
       _cons |  -.2590502    .607053    -0.43   0.670    -1.448852    .9307519
------------------------------------------------------------------------------

Average marginal effects                        Number of obs     =        349
Model VCE    : OIM

Expression   : Pr(rue), predict()
dy/dx w.r.t. : labourmandays nyf fs fertilizerqtt agrochemqty co hle cf lts laq lt
```

```
------------------------------------------------------------------------------
             |            Delta-method
             |      dy/dx   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
labourmandays |  -.0020725   .0041662    -0.50   0.619    -.010238    .0060931
         nyf |   .0061733   .0026462     2.33   0.020     .0009868    .0113598
          fs |   .0478406   .0323765     1.48   0.140    -.0156161    .1112974
fertilizerqtt |  -.0469868   .0095844    -4.90   0.000    -.0657719   -.0282017
 agrochemqty |  -.0050418   .0023524    -2.14   0.032    -.0096525   -.000431
          co |  -.1268878   .0637643    -1.99   0.047    -.2518635   -.0019121
         hle |   .0579784   .0241241     2.40   0.016     .010696    .1052608
          cf |   .0800558   .0932892     0.86   0.391    -.1027877    .2628993
         lts |     .06261   .1564218     0.40   0.689    -.243971     .369191
         laq |   .1006626   .0409939     2.46   0.014     .020316    .1810092
          lt |  -.0500574   .0248526    -2.01   0.044    -.0987676   -.0013473
------------------------------------------------------------------------------

Iteration 0:   log likelihood = -693.56591  (not concave)
Iteration 1:   log likelihood = -691.11652
Iteration 2:   log likelihood = -688.23069
Iteration 3:   log likelihood = -687.17958
Iteration 4:   log likelihood = -687.08956
Iteration 5:   log likelihood = -687.06877
Iteration 6:   log likelihood = -687.06418
Iteration 7:   log likelihood = -687.06302
Iteration 8:   log likelihood = -687.06245
Iteration 9:   log likelihood = -687.06217
Iteration 10:  log likelihood = -687.06203
Iteration 11:  log likelihood = -687.06196
Iteration 12:  log likelihood = -687.06193
Iteration 13:  log likelihood = -687.06191
Iteration 14:  log likelihood =  -687.0619

Stoc. frontier normal/half-normal model        Number of obs     =        349
                                   Wald chi2(8)      =      57.90
Log likelihood = -687.0619                          Prob > chi2       =     0.0000

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      tP>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
y            |
          fz |   .1585267   .2352921     0.67   0.500    -.3026374    .6196907
labour |  -.5255849   .3226124    -1.63   0.103    -1.157894    .1067238
 fertilqt |  -.2809404   .0653758    -4.30   0.000    -.4090747   -.1528062
 agroch |   .1922465   .1734696     1.11   0.268    -.1477477    .5322407
    seed |   .3186002   .1672761     1.90   0.057    -.0092549    .6464553
      _cons |  -.3791465   3.793474    -0.10   0.920    -7.814219    7.055926
```

```
--------------+----------------------------------------------------------------
lnsig2v      |
      _cons |   1.085234   .0771119    14.07   0.000     .9340979    1.236371
--------------+----------------------------------------------------------------
lnsig2u      |
       exts |  -.7476562   .9186568    -0.81   0.416     -2.54819    1.052878
         cf |  -.4484746   1.711237    -0.26   0.793    -3.802438    2.905488
       gend|  -2.754523     1.2339    -2.23   0.026    -5.172922    -.336123
        hle |  -.5210475   .3672358    -1.42   0.156    -1.240817    .1987215
        nyf |  -.0703632   .0433175    -1.66   0.104    -.1552639    .0145376
         co |    1.03889   1.545507     0.67   0.501    -1.990247    4.068028
        lts |   0.730972    0.39928     0.72   0.471     -2.97153    6.433475
        laq |  -0.205416   .1501958    -3.44   0.001     .5190444    1.891787
         lt |  -.3511554   .2131762    -1.65   0.100    -.7689731    .0666623
      _cons |   1.870889   1.653285     1.13   0.258    -1.369491    5.111269
--------------+----------------------------------------------------------------
    sigma_v |   1.720504   .0663356                       1.59528    1.855558
-------------------------------------------------------------------------------

.Iteration 0:   log likelihood = -685.93471
Iteration 1:   log likelihood = -685.93457
Iteration 2:   log likelihood = -685.93373
Iteration 3:   log likelihood = -685.93363
Iteration 4:   log likelihood = -685.93348
Iteration 5:   log likelihood = -685.93345
Iteration 6:   log likelihood = -685.93339
Iteration 7:   log likelihood = -685.93338
Iteration 8:   log likelihood = -685.93338
Iteration 9:   log likelihood = -685.93337
Iteration 10:  log likelihood = -685.93337

Stoc. frontier normal/half-normal model        Number of obs     =       349
                                               Wald chi2(8)      =     83.62
Log likelihood = -685.93337                    Prob > chi2       =    0.0000

-------------------------------------------------------------------------------
          y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
--------------+----------------------------------------------------------------
         fz |   .2079927   .2301585     0.90   0.366    -.2431095     .659095
   labourm|  -.3205547   .3191075    -1.00   0.315    -.9459939    .3048846
  fertilqty|  -.3265247    .055016    -5.94   0.000    -.4343541   -.2186952
   agroche|   .2144232   .1691221     1.27   0.205      -.11705    .5458964
      seedq |   .3918486   .1664039     2.35   0.019     .0657029    .7179943
      _cons |  -3.408017   3.727692    -0.91   0.361    -10.71416    3.898126
--------------+----------------------------------------------------------------
   /lnsig2v |   1.092963   .0757202    14.43   0.000     .9445545    1.241372
   /lnsig2u |  -9.313631    151.943    -0.06   0.951    -307.1165    288.4893
--------------+----------------------------------------------------------------
```

```
     sigma_v |   0.09000   .0653906                  1.603642    1.860204
     sigma_u |   .0949967   .7214755                  2.04e-67    4.41e+62
      sigma2 |   2.983191   .2259962                  2.540247    3.426135
      lambda |   1.054984   .7258586                 -1.417158    1.428155
------------------------------------------------------------------------------
LR test of sigma_u=0: chibar2(01) = 0.00            Prob >= chibar2 = 1.000

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
         TTe |       349     .753237    .0018771     .74868      .7571

Paired t test
------------------------------------------------------------------------------
Variable |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
totalr~e |     349    689573.3      102762     1919752    487460.6      891686
     tvc |     349    337980.2    27860.93    520485.1    283183.2    392777.2
---------+--------------------------------------------------------------------
    diff |     349    351593.1    104900.8     1959709    145273.7    557912.4
------------------------------------------------------------------------------
     mean(diff) = mean(totalrevenue - tvc)                        t =   3.3517
 Ho: mean(diff) = 0                              degrees of freedom =      348

 Ha: mean(diff) < 0           Ha: mean(diff) != 0           Ha: mean(diff) > 0
 Pr(T < t) = 0.9996         Pr(|T| > |t|) = 0.0009          Pr(T > t) = 0.0004

Paired t test
------------------------------------------------------------------------------
Variable |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
     lts |     349    .9856734    .0094858    .1772099    .9670166     1.00433
    tfp2 |     349     .516361    .0485982    .9078899    .4207778    .6119442
---------+--------------------------------------------------------------------
    diff |     349    .4693123    .0484476    .9050761    .3740254    .5645993
------------------------------------------------------------------------------
     mean(diff) = mean(lts - tfp2)                                t =   9.6870
 Ho: mean(diff) = 0                              degrees of freedom =      348

 Ha: mean(diff) < 0           Ha: mean(diff) != 0           Ha: mean(diff) > 0
 Pr(T < t) = 1.0000         Pr(|T| > |t|) = 0.0000          Pr(T > t) = 0.0000

Paired t test
------------------------------------------------------------------------------
Variable |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
constr~s |     349    30.44413    .0995726     1.86017    30.24829    30.63997
     tee |     349    .7532367    .0001005    .0018775     .753039    .7534343
---------+--------------------------------------------------------------------
```

```
   diff |     349    29.69089    .0995619    1.859969    29.49507    29.88671
------------------------------------------------------------------------------
    mean(diff) = mean(constriants - tee)                      t = 298.2155
 Ho: mean(diff) = 0                             degrees of freedom =      348

 Ha: mean(diff) < 0          Ha: mean(diff) != 0          Ha: mean(diff) > 0
 Pr(T < t) = 1.0000        Pr(|T| > |t|) = 0.0000          Pr(T > t) = 0.0000

      Source |       SS       df       MS              Number of obs =      78
-------------+------------------------------           F(  1,    76) =    2.98
       Model |  2.25545174     1  2.25545174           Prob > F      =  0.0881
    Residual |  57.4292633    76  .755648201           R-squared     =  0.0378
-------------+------------------------------           Adj R-squared =  0.0251
       Total |   59.684715    77  .775126169           Root MSE      =  .86928

------------------------------------------------------------------------------
        tfp2 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          lt |   .5379133   .3113546     1.73   0.088    -.0822032     1.15803
       _cons |  -.0514224   .3417999    -0.15   0.881    -.7321759    .6293312
------------------------------------------------------------------------------

      Source |       SS       df       MS              Number of obs =     155
-------------+------------------------------           F(  1,   153) =    0.55
       Model |  .508933087     1  .508933087           Prob > F      =  0.4594
    Residual |  141.570108   153   .92529482           R-squared     =  0.0036
-------------+------------------------------           Adj R-squared = -0.0029
       Total |  142.079041   154  .922591173           Root MSE      =  .96192

------------------------------------------------------------------------------
        tfp2 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          lt |  -.2538666   .3423065    -0.74   0.459    -.9301241    .4223909
       _cons |   1.098235   .6977379     1.57   0.118    -.2802091    2.476679
------------------------------------------------------------------------------

      Source |       SS       df       MS              Number of obs =      47
-------------+------------------------------           F(  1,    45) =    2.00
       Model |  2.26552554     1  2.26552554           Prob > F      =  0.1644
    Residual |  51.0183048    45  1.13374011           R-squared     =  0.0425
-------------+------------------------------           Adj R-squared =  0.0212
       Total |  53.2838304    46  1.15834414           Root MSE      =  1.0648

------------------------------------------------------------------------------
        tfp2 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          lt |  -1.521439   1.076284    -1.41   0.164    -3.689185    .6463078
       _cons |   5.176594   3.209711     1.61   0.114    -1.288097    11.64128
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