Effect of Land Tenure System on Technical Efficiency of Selected Arable Crop Farmers in Akwa Ibom State, Nigeria

Emaeyak, Nyaknoabasi T.

Department of Agricultural Economics, Faculty of Agriculture, University of Uyo, Uyo Pmb 1017, Uyo

DOI: https://doi.org/10.47772/IJRISS.2026.1015EC00020

Received: 03 March 2026; Accepted: 11 March 2026; Published: 23 March 2026

ABSTRACT

This study was conducted to determine the effect of land tenure system on technical efficiency of arable crop farmers in Akwa Ibom State, Nigeria. A total of one hundred and thirteen (113) Arable Crop Farmers in Uyo Zone were selected for the study using a multistage sampling technique. Data were collected from the respondents using a questionnaire. Descriptive Statistics and the Stochastic Frontier Production Function was used to analyze the collected data. The result revealed that female farmers dominated the study area with a visible mean household size of 5 people per home. 59.3% of the respondents were married, 58.4% had a form of tertiary education while 70.8% of the respondents were visited atleast once by extension agents. The study also revealed that age, farm size, farming experience, level of education, credit, labour and land were part of the determinants of technical efficiency. It noted tenure security as a major influence to technical efficiency. Finding on the constraint to arable crop farmers indicated that out of 15 constraints analysed, thirteen were severe. From the result, the highest rated constraints to arable crop farmers was high cost of acquiring land, followed by land fragmentation/intensified s. Absence of mechanization, untimely farm inputs and insufficient capital were the next rated constraints. The table also showed the least rated constraint to arable crop production as communal instability, followed by Herders and Farmers clash. The study recommended the formulation of appropriate land policies geared towards land tenure security.

Keywords: Land Tenure, Technical Efficiency, Arable Farmers

INTRODUCTION

Agriculture has become the main sector of the economy which contributes significantly to the Gross Domestic Product (GDP) of most Sub Saharan Countries in Africa. It has added 70 to 80 percent growth in Employment, 40% of Export Earnings and 42% to the National GDP (National Bureau of Statistics, 2017). Conversely, agricultural productivity in Africa had declined over the last two decades leading to a progressive increase in food imports (African Union, 2013). It is important to state that about 25% of the population in Sub-Saharan Africa suffer from chronic food insecurity and the efficiency of resources used in production has become a major concern Shamsudeen *et al.*, (2014), acknowledged that global agricultural production can be expanded if available technology for farm productivity is increased by efficient utilization of its resources.

In Nigeria, agricultural production contributes over 70% to domestic employment and 40% of Gross Domestic Product. Despite the oil boom, it has been a major source of livelihood for Nigerians (Federal Ministry of Agriculture and Rural Development, 2014). Akwa Ibom State, located at the Southern part of Nigeria, is majority involved in subsistence Agricultural production. This is evident as stated by Udo and Ndaeyo (2000), who explained that agricultural production in Akwa Ibom State is carried out by rural dwellers who are majorly small holder farmers, possessing less than three hectares of land. This land is a major constraints limiting increased agricultural sector, causing a decline in yield and production inefficient. The decline in yield and production inefficiency caused by land is mostly due to poor land tenure system, teaching to small land size holdings. It is worthy of great note that farmers are likely to be technically efficient if their land tenure system is secured. Technical efficiency is the effectiveness with which a given set of inputs is used to produce an output. It is the ability of a farmer to produce maximum output from any given level of input. Udoh and Etim (2007) defines efficiency as the ability for a farm to provide the largest possible amount of output from a given set of input. To

increase technical efficiency, there is need for the use of efficient farm inputs, easy land availability and accessibility.

In Akwa Ibom State, the major land tenure system practiced were communal and inheritance. Because of the zeal for development, land today, is being sought for and used for other non-farm activities such as industrial development, construction, exploitation and recreation. This leaves quite a small hectare for agricultural production. These small land areas are cultivated by farmers who are traditionally linked to the patriarchal and/or existing tenure of production; the communal, inherited or lease/rented system of land ownership. This leaves barely enough parcels of land for expansion of arable crop production.

The problem of land unavailability has continued to attract the attention of experts and government over its effect in arable crop production. There is a continuous fight over land area by certain communities within Akwa Ibom, in an attempt to forcefully take over (Ndaeyo, Umoh and Ekpe, 2011). This results in land disputes, thus posing a threat to agricultural productivity and technical efficiency. Another challenge is the problem of lack of secured rights to land parcels. Arable crop farmers who may be willing to expand production and become technically efficient are being faced by lack of secured land rights. This renders the farmers subsistent in production.

While the broad objective of this study was to analyze the effect of land tenure system on technical efficiency of selected arable crop farmers in Akwa Ibom State, the specific objectives were:

i. To describe the socioeconomic characteristics of respondents within the study area
ii. To identify land tenure systems mostly practiced in the study area
iii. To analyze the effect of land tenure system on technical efficiency among selected arable crop farmers within the study area.
iv. To estimate the determinants of inefficiency on land tenure system in the study area
v. To identify farm specific constraints facing arable crop farmers in the study area

MATERIALS AND METHODS

The Study Area

The study was conducted in Akwa Ibom State which is located between latitudes $4^{0}32^{1}$ and $5^{0}33^{1}$ North and Longitudes $7^{0}35^{1}$ and $8^{0}25^{1}$ East. The state occupies a total area of 7,249sqkm with a population of 3,920,208 million people (National Population Commission, 2006). It is the 10^{th} largest state in Nigeria in terms of land mass and occupies about 960km of Nigeria's Atlantic Ocean coastlines. Akwa Ibom State is subdivided into six (6) agricultural zones namely; Uyo, Abak, Ikot Ekpene, Oron, Etinan and Eket (AKADEP, 2007). The Uyo AKADEP zone is made up of eight blocks namely; Afua, Asutan, Obot Idim, Ikpa, Ikot Ada Idem, Use Ikot Ebio, Ntiat and Uruan. The rainfall pattern has a bi-modal distribution with peaks in June and September, and periods of fewer precipitations. The vegetation of Akwa Ibom State falls in the tropical rainforest zone, filled with shrubs and foliage trees forming the chunk of the nations' oil palm belt. Akwa Ibom State is dominated by three major water zones: saline water swamp forest, fresh water swamp forests and the rainforests. The people of the state are predominantly farmers who are engaged in many forms of agricultural production, notably arable crop production.

Sample Size and Sampling Technique

A total of 120 respondents were selected for this study, using a multistage sampling procedure. The first stage was the purposive selecting of Uyo AKADEP zone for the study. The second was the purposive selection of all eight (8) blocks in Uyo zone. The third stage of sampling was the purposive selection of 15 farmers from each of the blocks to give a total of 120 respondents. Out of the 120 questionnaires administered, 113 were recovered and the responses were analyzed.

Analytical Technique

In this study, the Socioeconomic Characteristics of respondents (arable crop farmers) was analysed using Descriptive Statistics i.e. the use of means, frequencies and percentages.

To determine the effect of land tenure system on technical efficiency among selected arable crop farmers within the study area, a Stochastic Frontier Production Model was used. The frontier involves a production function specified for cross sectional data. The generic equation was expressed as:

$TEq = f(L_i; \beta) + e$ - - - - - - - - - (i)

Where;

TEq = Technical efficiency of arable crop farmers

L_i = Land tenure system of the selected arable crop farmers

β = Vector of unknowns parameters to be estimated

e = error term

The theoretical model is expressed as:

$y = f(x_i ; \beta) \exp(v_i - u_i < o)$ - - - - - - - - - (ii)

Where;

Y = Production of the ith farmer

X_i = Vector of input quantities of the ith farmer

β = Vector of unknown parameters to be estimated

V_i = Symmetric error components that accounts for random effects and exogenous shock

Ui < o = One sided error component that measuring technique efficiency

RESULTS AND DISCUSSION

Socioeconomic Characteristics

Table 4.1: Socioeconomic Characteristics of Respondents

Sex	**Frequency(F)**	**Percentage (%)**
Male	48	42.5
Female	65	57.5
Age (Yrs)		
1-25	25	22.12
26-50	49	43.36
51-75	32	28.31
76-100	7	6.19
Marital Status		
Single	28	24.77
Married	67	59.3
Widowed	11	9.7
Divorced	7	6.2
Level of Education (yr)		
No Formal Education	5	4.42
Primary Education	13	11.5
Secondary Education	29	25.7
Tertiary Education	66	58.4

Household Size		
1-3	25	22.1
4-6	63	55.8
7-9	23	20.4
10-12	2	1.8
Year of Farming Experience(yrs)		
1-10	71	62.8
11-20	21	18.5
21-30	12	10.6
31-40	9	8.0
Extension visit (no. of times met)		
Forth nightly	50	44.3
Monthly	19	16.8
Every 3 months	33	29.2
No visit at all	11	9.7

Source: Field Survey (2019)

The socioeconomic characteristics of the respondents are presented in table 4.1. Accordingly, the table revealed that majority (57.5%) of the respondents were female, 43.35% were within the age range 26 – 50years and 59.3% were married. It also showed that 58.4% had access to tertiary education, 55.8% had a household size of 4-6 members, 62.8% had between 1 – 10years of farming experience and 44.3% of the respondents were visited by extension agents.

Table 4.2: Distribution of Respondents based on Land Tenure System

Land Tenure System	**Frequency (F)**	**Percentage (%)**
Communal	6	5.3
Inheritance	51	45.13
Leasehold/Rent	12	10.61
Purchase	44	38.9
Total	**113**	**100**

Source: Field Survey, (2019)

The result in table 4.2 reveals that majority of the table 4.3 respondents (45.13%) own land through inheritance while only 5.3% had access to communal land. 10.61% of the respondents acquired land through household rent while a total of 38.9% used purchased land.

Table 4.3 Distribution of Respondents based the effect of land tenure system on technical efficiency

TE Score	Communal	Inheritance	Purchase	Leasehold/Rent	Total Sample (N=113)
=50	0	11	5	1	17
	1	6	6	4	17
	1	7	8	2	18
	3	8	4	0	15
	1	6	5	2	14
	0	13	16	3	32
Total	6	51	44	12	113
Minimum TE	**0.69**	**0.33**	**0.37**	**0.35**	
Maximum TE	**0.88**	**0.97**	**0.98**	**0.95**	
Mean TE	**0.68**	**0.75**	**0.80**	**0.69**	**(Σ=113)**

Source: Field survey (2019)

The frequency distribution of the effect of land tenure system on the technical efficiency of farmers in this study is presented in Table 4.3. The lowest level of technical efficiency of the sample was 0.33 and the best performing farmer achieved a technical efficiency of 0.98. Farmers operating under purchase tenure had the highest mean technical efficiency (0.80), followed by those under inheritance with 0.75. This was in apriori with Udoh and Etim (2007) who noted that farmers who had full right of ownership on their land attained the highest level of efficiency because they are free to make production decisions that will help boost their efficiency levels. The table showed that farmers operating under the different land tenure systems did not attain efficiency of 1.0 which implies that no farmer attained the production frontier.

Table 4.4: Estimating the Determinants of Inefficiency on Land Tenure System

Variable	**Parameters**	**Co-efficient**	**Standard error**	**t-ratio**
Constant	X_0	11.610	2.323	4.999
Farm Size	X_1	0.124**	0.075	1.653
Labour	X_2	0.337***	0.125	2.696
Chemical Fertilizer	X_4	0.152	0.380	0.400
Credit	X_5	0.467***	0.226	2.066
Inefficiency Effects				
Sex	Z_1	0.175	0.213	0.821
Age	Z_2	-1.150**	0.445	-2.584
Marital Status	Z_3	0.315	0.364	0.865
Educational Level	Z_4	-0.512**	0.205	-2.497
Farming Experience	Z_5	-0.395***	0.182	-2.170
Household Size	Z_6	0.046	0.057	0.807
Extension Contact	Z_7	-0.256***	0.124	-2.064
Land Tenure System	Z_8	-0.491***	0.206	2.383
Sigma	σ^2	**0.09**		
Gamma	γ	**0.973**		
Log Likelihood Function		**158.00**		

Source: Field Survey, (2019*).* 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.

Summary of Significant Variables Determining Efficiency of Land Tenure System Descriptive Statistics of Variables

Variable	**Mean**	**Standard Deviation**	**Minimum**	**Maximum**
Output	315,039	737,808	15,000	4,906,000
Farm Size	0.26	16.0673	0.01	1.35
Age	34.1606	9.1294	17	67
Farming Experience	12.1947	7.9005	1	36
Labour	79	48.631	13	121
Access to Credit	313,067.85	116,017	250,000	1,000,000
Educational Level	11.31	8.342	6	16
Extension Contact	17	11	7	24
Land Tenure System	108,926	79,209	300,000	4,000,000

Source: Field Survey (2019).

The Maximum Likelihood Estimates (MLE) of the stochastic production frontier model is presented in Table 4.4. The table shows that out of 12 parameters estimated, 8 variables were statically significant. These includes age, years of farming experience, credit, labour, farm size, educational level, extension contact and land tenure system. Age was positive and stability significant at 0.05 level. This means that older farmers were more

technically efficient. A positive and statistically significant effect from farmers' year of farming experience indicated that experience improves technical efficiency and reduces inefficiency. With respect to credit, the table indicates that it was significant, meaning that access to credit reduces inefficiency while imploring efficiency. Labour was also positively significant. This suggest that the availability of labour improves technical efficiency.

Based on farm size, educational level and extension contact, the positive and significant relationship indicates that larger farms operate more efficiently as a result of economics of scale. Attainment of a higher educational level implies that educated farmers utilize imputes and technology best thus leading to an improved efficiency. Asignment negative coefficient (in inefficiency model), means that extension services helps reduce technical efficiency, as it indicates improved adoption best practices. Land tenure system was also significant as a farmer who operates on a larger farm tends to achieve maximum technical.

Land tenure system was significant to technical efficiency because without land security, arable crop farmers will not be able to produce in large quantities. This is in consonance with the work of Erhabor and Emokaro (2007) who stated that land availability affects output of farmers, encouraging productivity hence, efficiency.

Table 4.5: Farm specific constraints to Arable Crop Farmers

S/N	Items	SA (4)	A(3)	D(2)	SD(1)	mean	rank	remark
		F %	F %	F %	F %			
1.	High cost of acquiring land	77 (68.1)	23 (20.4)	9 (8.1)	4 (3.6)	3.5	15	Severe
2.	Land fragmentation and intensified use	49 (43.4)	42 (37.2)	19 (16.8)	3 (2.7)	3.2	14	Severe
3.	Poor road network and lack of market outlet	37 (32.7)	54 (47.8)	16 (4.2)	6 (5.3)	3.0	9	Severe
4.	Absence of mechanization	35 (31.0)	57 (50.4)	19 (16.8)	2 (1.8)	3.1	12	Severe
5.	Untimely farm inputs	37 (32.7)	53 (46.9)	21 (18.6)	2 (1.8)	3.1	12	Severe
6.	Grazing by livestock	38 (33.6)	40 (35.4)	28 (24.8)	7 (6.2)	2.9	8	Severe
7.	Insufficient agro chemicals	28 (24.8)	49 (43.4)	25 (22.1)	11(9.7)	2.8	4	Severe
8.	Communal clashes (boundary issues)	29 (25.7)	40 (35.4)	30 (26.5)	14(12.4)	2.7	3	Severe
9.	Herders and farmers clash	25 (22.1)	42 (37.2)	33 (29.2)	13(11.5)	2.3	2	Non Severe
10.	Communal instability(political interest)	30 (26.5)	49 (43.4)	29 (25.7)	5 (4.4)	2.2	1	Non Severe
11.	Epidemic of pest and diseases	27 (23.9)	60 (53.1)	22 (19.5)	4 (3.5)	2.9	8	Severe
12.	Improper agronomic practices	27 (23.9)	55 (48.7)	28 (24.8)	3 (2.7)	2.9	8	Severe
13.	Insufficient capital	39 (34.5)	56 (49.6)	16 (14.2)	2 (1.8)	3.1	12	Severe
14.	Unfavorable weather condition	29 (25.7)	55 (48.7)	26 (23.0)	3 (2.7)	2.9	8	Severe
15.	Inadequate agro extension service	31 (27.4)	41 (36.3)	33 (29.2)	8 (7.1)	2.8	4	Severe

Source: Field survey (2019) (values in brackets are percentages)

The summary statistics of variables indicated that some arable crop farmers could not operate above the frontier level due to the problems/constraints confronting arable crop farmers. The result indicates that out of fifteen items rated as constraints to arable crop production, (using a four point likertz scale measurement), thirteen (13)

were severe while two (2) weren't. The most highly rated constraints to arable crop production was high cost of land acquisition. The cost of acquiring land is high and this poses a challenge to farmers who may wish to expand production and be technically efficient. Ndaeyo, Umoh and Ekpe (2011) observed that farmers had farms less than 2 hectares in size as a result of inability to acquire larger parcels of land due to high cost. This agrees with the work of Abang *et al.* (2011) who also noted that the small area of land cultivated by farmers is linked to the existing tenure system, and is shown to have adverse effect on farm production, because population growth increases agricultural land scarcity due to the struggle for use of agricultural lands for non-farm activities.

Other highly noted constraints were land fragmentation and intensive use, Absence of mechanization, untimely farm inputs and insufficient capital. Other noted constraints to arable crop partners include; poor road network and lack of market out let, grazing by livestock, epidemic of pest and disease, improper agronomic particle and unfavourable weather condition.

The least rate constraint was communal instability (political interest) herders and farmers clash, communal clashes as a result of boundary issues, insufficient agro chemicals and inadequate agro extension service.

CONCLUSION AND RECOMMENDATIONS

The result of the study conducted shows that technical efficiency of arable crop production in Uyo agricultural zone of Akwa Ibom State is relatively high. The frequency distribution of technical efficiency of farmers in the study shows the lowest minimum technical efficiency as 0.33 while the maximum level, technical efficiency is 0.98. This implies that the least farmer in terms of technical efficiency is 0.67 away from the expected production frontier.

Empirical research indicates that there are cases of fragmented land holdings and a reduction on fallow periods since the farmers tend to cultivate the land annually. This implies that land sustainability in the study area is threatened. Therefore land management should be given appropriate attention. This will help enhance technical efficiency of arable crop farmers within the study area. Further recommendations includes the reformation of the land use Acts to give room for expansion of agricultural land, the provision of agricultural incentives to farmers to boost efficiency and enhancement of extension programmes to improve farmers knowledge on how to expand production and become technically efficient.

REFERENCES

1. Abang, S. O, E. Ekpeni and W. W. Usani (2011). Technical and Allocative Efficiencies of Small-scale Cassava Growers in Five Selected Local Government Areas of Cross River State. Global J. Applied Sci. 1:37-42.
2. African Union, NEPAD (2013). In Ariuk, D. K., C. N. Ritho, et al., (2008). Analysis of the Effect of Land Tenure on Technical Efficiency in Small Holder Crop. Conference on International Research on Food Security, Natural Resources Management and Rural Development, Tropentag 2008, University of Hohenheim.
3. Akwa Ibom State Agricultural Development Programme (2007). Agricultural Zones in Akwa Ibom State 2(4):31-49.
4. Erhabor, P. O. and C.O Emokaro (2007). Relative Technical Efficiency of Cassava Farms in the Three Ecological Zones of Edo State, Nigeria. Journal of Applied Science, 7(19): 2818-2823
5. Federal Ministry of Agriculture and Rural Development (2014). Federal Republic of Nigeria Community – Based Agricultural and Rural Development Programme (CBARDP). https://www.isad.org>documents
6. National Bureau of Statistics (2017). Nigerian Gross Domestic Product Report. https://nigeriastat.gov.ng >e library
7. National Population Commission (2006). Report of Nigeria National Population Commission on the census. Population and Development Review, 33(1):206-210
8. Ndaeyo, N.U; G.S Umoh and E.O Ekpe (2011).Farming Systems in South Eastern Nigeria: Implications for Sustainable Agricultural Production. Journal of Sustainable Agriculture 17:75-89
9. Oluyede, P. A. O. (1999). Nigerian Conveyance Practice. Drafting and Precedent, Hienemann Educational Books.

10. Onyenweaku, C. E. and J. C. Nwaru (2005). Application of a Stochastic Frontier Production Function to the Measurement of Technical Efficiency in Food Crop Production in Imo State, Nigeria. Nigerian Agricultural Journal, 36: 1-12.
11. Pender, J., Nkonya, E., Jagger, P., Sserunkuma, D., and Ssaili, H. (2004).Strategies to Increase Agricultural Productivity and Reduce Land Degradation: Evidence from Uganda. Agricultural Economics, 31:181-195.
12. Place F., M. Roth and P. Hazell (1994). Methodology in: Bruce J. W. and S.W. Migot-Adholla (Eds.). Searching for Land Tenure Security in Africa. Washington D. C.: The World Bank, International Bank for Reconstruction and development Washington DC 20433.
13. Place, F., (2006).Land Tenure and Agricultural Productivity in Africa: A Comparative Analysis of Economic Theory, Empirical Results and Policy Statements. World Agro – Forestry Centre Nairobi Kenya. https://ideas.repec.org/a/eee/wderel/v37y2009i8p 1326-1336.html.
14. Plateau, J. P. (2000). "Does Africa Need Land Reform". In: C. Toulmin and J. Quan (Eds). Evolving Land Rights, Policy and Tenure in Africa, London DFID/IED/NRI. 4-21
15. Rauf, M. (2010). Pattern of Land Use among the Selected Crop Farmers in Osun State, Nigeria. Research Journal of Soil and Water Management, 1: 1 – 4.
16. Ravinder G. C., S.M. Virmani and S. K. Singh (2017). Soil Related Abiotic Constraints for Sustainable Agriculture. Library of Congress Catalog. Card Number 94-77729
17. Rocker, R. (2015). What is the Likert Scale and how is it used? https://www.quora.com
18. Sebates-Wheeler, R. (2002). Consolidation Initiatives after Land Reform: Responses to Multiple Dimensions of Land Fragmentation in Eastern European Agriculture. Journal of International development, 14(7):1005-1018
19. Sekaran, U. (2003).Research Methods for Business: A Skill – Building Approach. Open Access Library Journal, 3(11):21-32
20. Seyoum, E. T., G. Battese and E. M. Fleming (1998). Technical Efficiency and Productivity of Maize Producers in Eastern Ethiopia: A Case Study of Farmers within and Outside the Sasakawa – Global 2000 Project. Journal of Agricultural Economics, 3: 341 – 348.
21. Shamsudeen, M. N., Y. Rusil, A.B. Radam., and K. Ibrahim (2014). Technical Efficiency in Maize Production and its Determinants: A Survey of Farms across Agro Ecological Zones in Northern Nigeria. Trends in Agricultural Economics, 7(2):57-68.
22. Sundqrist, P. and Anderson, M. (2006): A study of the Impacts of Land Fragmentation on Agricultural Productivity in Northern Vietnam. Bachelor Thesis, Department of Economics. Uppsala University. Sweden.
23. Udo, A. J. and Ndaeyo, U.U (2000). Crop Productivity and Land Use Efficiency in Cassava Systems as Influenced by Cowpea Melon Populations. Tropical Agriculture (Trinidad), 77(3):150-155
24. Udoh, E. J. and N.A. Etim(2007). Application of Stochastic Production Frontier in the Estimation of Technical Efficiency or Cassava Based Farms in Akwa Ibom State, Nigeria. Agricultural Journal 2(6): 731-735
25. Udoh, E.J.(2005). "Demand and Control of Credit from Informal Sources by Rice Producing Farmers of Akwa Ibom State, Nigeria". Journal of Agricultural and Social Sciences. 1(2):152-155.
26. Vranken, L. and J. Swinnen (2006). Land Rental Markets in Transition. Theory and Evidence from Hungary. Article in World Development. 34(3): 481-500.