International Journal of Agriculture Innovations and Research
Volume 6, Issue 1, ISSN (Online) 2319-1473
Manuscript Processing Details (dd/mm/yyyy) :
Received: 11/07/2017 | Accepted on : 17/07/2017 | Published : 26/07/2017

Economic Efficiency and Returns to Scale of Cassava Production in Southeast Nigeria

Nwike, M.C.[1], Okoli, T.O.[1], Oghenehogagame, P.[1] and Ugwumba C.O.A.[2*]
[1]Department of Agricultural Science Education, Federal College of Education (Technical), Umunze Anambra State, Nigeria.
[2]Department of Agricultural Economics and Extension, Chukwuemeka Odumegwu Ojukwu University, Igbariam Campus, Anambra State, Nigeria.
*Corresponding author email id: profcele2014@gmail.com

Abstract – **The need to examine the economic efficiency and returns to scale of cassava production in South Eastern Nigeria, so as to utilize findings for better policy formulation towards increased productivity, profitability and sustainable supply of this vital staple food crop informed this study. The study examined the economic efficiency, determinants of efficiency, returns to scale and constraints to cassava production. Multistage and random sampling methods were used to select 240 respondents. Primary data were obtained through the administration of pre-tested questionnaires. Data analyses were actualized using descriptive and parametric statistics. Results indicated maximum, minimum and mean economic efficiency scores of 0.85, 0.48 and 0.76 respectively for all farm group. Labour and material inputs significantly determined production output while farming experience, educational attainment, credit accessed, extension visit and age were significant sources of inefficiency. The farm groups operated at increasing returns to scale. Most serious constraints to cassava production in the area were high cost of labour followed by inadequate capital, high cost of fertilizer and agro chemicals, insufficient farm mechanization, poor technical knowledge and crop yield. Economic efficiency and enterprise profitability would improve if government broadens extension services and education for the provision of soft loans, subsidized agro inputs and mechanized farm operations through various cooperative societies.**

Keywords – **Efficiency, Yam Production, Cobb-Douglas Model, Southeast, Nigeria.**

I. Introduction

Cassava (*Manihot esculenta crantz*) is a woody shrub of the euphorbiaceae family and genus manihot. It is a dicotyledonous plant with over 200 wild species identified and described in its origin of Latin America (Acquah, 2005). Cassava was introduced into Nigeria and West Africa by early Portugese traders and ex-slaves in the 16th century. It is cultivated extensively in the tropical and sub-tropical regions for its edible starchy tuberous roots (Nweke, 2004). Cassava tubers are rich in calories but low in protein and micronutrients and has provided major source of dietary energy to vast population of the country. The leaves are also consumed in some places as vegetables and are rich in vitamins and amino acids (Agbato, 2009).

The many food products derived from cassava root tuber include garri, fufu, flour, tapioca, lafun, kpokpogarri, and starch (International Institute for Tropical Agriculture (I.I.T.A.), 2005a). Garri, a creamy white granular flour with slightly sour taste made from fermented and gelatinized tubers is the major food product of cassava. Apart from food, cassava products have good uses in many other areas ranging from animal feed production to pharmaceutical industry. According to I.I.T.A. (2005a), cassava products can be used in the following areas, namely; production of composite flour for the bakery industry; distillation of beverages, medical and industrial alcohol; thickening and glazing of confectionaries; and making of sweeteners from cassava glucose and fructose for use in fruit juice and jam industries. Other uses include, acting as binding and filling agent in the manufacturing of pharmaceutical tablets, making of glues and gums, starch for textile and paper industries, manufacturing of biodegradable polymer for replacement of polythene as packaging materials and livestock feed production among others. The major industrial products of cassava in Nigeria are cassava starch, high quality cassava flour (H.Q.C.F) or bakery flour, cassava chips and pellets (Mefoh, 2007; Nwike, 2010; Babatunde, 2011).

Nigeria has over the past decade maintained leading position in world cassava production ahead of Indonesia, Thailand and other producing nations. The country's annual output rose from 23.8 million tonnes in 1994/95 season to 35.6 million tonnes in 2005/2006 season (National Bureau of Statistics (N.B.S), 2012). The Federal Department of Agricultural Extension (F.D.A.E) (2013), put the nation's output in 2013 at 54.02 million tonnes, an increase of 6% over the previous year figure of 50.96 million tonnes.

In Nigeria, cassava is grown in all the ecological zones ranging from the swampy rainforest of the south to the arid sahel savannah of the far north (Nweke, 2004). The crop's ability to withstand drought, flooding and other harsh weather conditions, endears it to the farmers, who mainly depend on nature for production (Babalaye, 2004). According to N.A.E.R.L.S. and F.D.A.E. (2014), on regional basis, the North Central Zone is currently the leading producer with 2013 estimated output figure of 15.95 million tonnes followed by South West Zone, 12.33 million tonnes and South South 11.60 million tonnes. The figure for South East Zone was 11.35 milllion tonnes. The North Central Zone also has the highest land area under cultivation of 2.96 million hectares, followed by South South Zone (1.68 milllion hectares) and 968,000 hectares for South East Zone. North East Zone has the lowest land area under cultivation as well as the least production level. On yield per hectare, the N.A.E.R.L.S. and F.D.A.E. reported that South West Zone topped other zones with average yield of 14.50 tonnes followed by South East Zone (11.70 tonnes) and South South Zone (6.90 tonnes). Again, north east zone recorded the lowest per hectare yield of 2.80 tonnes. On State basis, Enugu State ranked first in the South

East Zone with 2013 output level of 3.7 million tonnes followed by Imo State with 3.6 million tonnes.

Cassava cultivation in the region is also carried out on both the low land and upland ecologies with the latter being more widespread. According to the Anambra State Agricultural Development Programme (2013), the best soil for cassava cultivation is well drained fertile loamy soil. Marginal soils, however, can be improved using manure and other recommended cultural practices. Cultivation of cassava in the zone is mostly undertaken by small scale farmers with farm holdings of less than two hectares and average of about 0.5 hectare (N.B.S, 2012). Production under this system is often labour intensive with low level of mechanization. Major operations such as land preparation, planting, weeding, fertilization and harvesting are done using manual labour.

In the predominantly rainforest region of southeast, two peak cassava planting seasons are observed, namely, early season of between April and June and late season of between August and October. Production under the two seasons often vary in terms of level of resource use, yield, cost of production and product pricing (I.I.T.A., 2005b). Early season cropping is often constrained by high cost of production resulting from hike in labour and other production costs. The high labour cost experienced during early season planting is caused by competition for limited labour force by producers of various arable crops such as cassava, yam, rice, maize and cocoyam which are planted mainly within this period. Again, late season planting is often characterized by less weed intensity occasioned by onset of dry season, hence less cost of weeding (National Root Crops Research Institute, 2009).

With over-dependence on manual labour use and with ever increasing cost of labour and other production factors, there has been steady increase in cassava tuber prices in the local markets in recent years (N.A.E.R.L.S. & F.D.A.E., 2014). If the trend continues unabated, the common staple food of Nigerians may get beyond the reach of the masses. It will also adversely affect the ongoing Federal government transformation of the cassava industry for improved value addition and export. There is, therefore, the need for efficient resource allocation and utilization by cassava farmers in the country to reduce cost and achieve high level of productivity and profitability.

Cassava is a major staple crop with good prospects for improving food security in the country because of its versatility, wide acceptability and productivity. According to F.A.O. (2003), cassava has become an essential part of the diet of more than 70 million Nigerians, with per capita consumption of 226.93g. In the Southeast region, there has been widening gap between demand and supply of cassava in the past years (Nwike, 2012). For instance, the eight million tonnes of cassava tubers produced in the South Eastern region in 2009 was far below the local demand of 14 million tonnes (Central Bank of Nigeria (C.B.N.), 2012). The production shortfall was caused by the subsistence system of production, high production costs and dwindling soil fertility resulting from lack of appropriate techniques for replenishing and maintaining the quality of agricultural land for enhanced yield and income levels. The problems of subsistence agriculture which include the use of traditional technology, inadequately funded extension services and poor distribution of agricultural inputs, all leading to inefficiency were also highlighted by Ike and Inoni (2006). The ability of cassava producers to adopt new technologies and achieve sustainable production level depends on their level of economic efficiency since efficiency increment is a factor for productivity growth (Ugwumba, 2011). Greater cassava productivity can be achieved with a proper analysis that will enhance knowledge of the levels of economic efficiency, returns to scale, determinants of inefficiencies, and constraints to both early and late season cassava production in Southeast Nigeria, hence this study.

II. Materials and Methods

South Eastern Nigeria, also known as southeast geopolitical zone, constituted the study area. The zone is made up of five states, namely, Abia, Anambra, Ebonyi, Enugu and Imo. It has an estimated land mass of 32,610 km^2 and a 2006 population of 22,583,076 (National Population Commission, 2006). The area lies between longitude 2^{o}61 and 6.32 East and latitudes 6^{o}74 and 8^{o}15 North of Equator (Agboola, 1979). The zone is bounded by Benue and Kogi States in the north, Rivers, Akwa Ibom and Bayelsa States in the south, Delta and Edo States in the west and Cross River State to the east. South-Eastern Nigeria has two distinct ecological zones – the tropical rainforest to the south and derived guinea savanna to the north. The mean annual temperature ranges from 21.6^{o}C to 32.4^{o}C while the annual rainfall ranges from 720 mm to 1440 mm in the rainforest region (N.A.E.R.L.S. and F.D.A.E., 2013). The major occupations of the people are farming, trading, civil service and teaching. Major crops farmed by the inhabitants include yam, cassava, cocoyam, maize, vegetables, plantain and rice. The major livestock reared in the area are chicken, sheep, goat, pig and scanty Muturu cattle population. Tree crops such as oil palm, citrus, mango, breadfruit and coconut are often grown in homesteads and plantations. The southeast zone is rated fourth amongst the six geopolitical zones in the country in cassava production, with estimated output of 11.35 million tonnes cultivated on 968,000 hectares of land in 2013 at an average yield of 11.7 tonnes per hectare (N.A.E.R.L.S. and F.D.A.E., 2014).

The study population was made up of all 1015 registered sole cassava farmers in the five states of South Eastern Nigeria, namely Abia, Anambra, Ebonyi, Enugu and Imo. Multistage and random sampling techniques were used to select 240 respondents for the study. At stage I, three States namely, Abia, Anambra and Imo were randomly selected from the five states in the zone. Stage II involved the random selection of two Local Government Areas (LGAs) from each of the three States to arrive at six L.G.As. At stage III, two autonomous town communities were selected from each of the six selected L.G.As bringing the total number of communities to 12. The final stage (Stage IV) involved random sampling of 20 sole cassava farmers from each of the twelve selected communities, thus arriving at 240 respondents. Of the 20 sampled farmers in a community, 10 each were selected from early season

International Journal of Agriculture Innovations and Research
Volume 6, Issue 1, ISSN (Online) 2319-1473

growers of between March and June and late season growers of August to October.

Data for the study were collected from primary source using well-structured and pre-tested questionnaire administered through personal interview. In all, 240 copies of the questionnaire were administered through the help of trained enumerators fluent in both English and Igbo languages. Data were collected on socio-economic variables of the respondents such as age, gender, household size, marital status, educational level, amount of credit obtained, sources of income, farming experience, contact with extension agents and membership of cooperative society and availability of storage facilities. Data on production variables such as farm size, material inputs, labour supply and use, output of cassava with their current market prices, and cassava production constraints were also elicited.

III. Cobb-Douglas Efficiency Model

The Cobb-Douglas stochastic frontier production function model derived from Ike and Inoni (2006) and Adetunji and Adeyemo (2012) was used for this study to determine the economic efficiency of cassava production. The model is specified as:

$$InYij = \beta o + \beta_1 InX_1ij + \beta_2 X_2ij + \beta_3 X_3ij + Vij - Uij$$

Where subscripts ij refer to the jth observation of the ith farmer:

In = Logarithm to base e.

Y = Revenue from cassava output in naira.

X_1 = Rental value of farm land (₦).

X_2 = Labour used in cassava production (₦), and.

X_3 = Material inputs of fertilizer, pesticides and cassava stems (₦).

It is assumed that the inefficiency effects are independently distributed and Uij arises by truncation (at zero) of the normal distribution with mean Uij and variance σ^2, where Uij is defined by the equation:

$$Uij = \varsigma o + \varsigma_1 Z_1ij + \varsigma_2 Z_2ij + \varsigma_3 Z_3ij + \varsigma_4 Z_4ij + \varsigma_5 Z_5ij$$

Where:

Uij = economic inefficiency of the ith farmer and jth observation of the farmer.

Z_i = Years of experience of the ith farmer in cassava production.

Z_2 = Years of formal education of the ith farmer.

Z_3 = Amount of credit available to the farmer (₦).

Z_4 = Number of meetings with extension agents per farming season.

Z_5 = Planting season (dummy: early = 1; Late = 2).

The β and ς coefficients are unknown parameters to be estimated by the method of maximum likelihood, using the computer programme Frontier version 4.1.

Elasticity of Production and Returns to Scale

Elasticity of production measures the degree of responsiveness between inputs and output. Returns to scale are measured by the ratio: percentage increase in output divided by percentage increase in input; under the conditions that all factors be increased by the same proportion. For Cobb- Douglas function, the elasticities of individual factors are their exponents in the production function or regression equation. These individual elasticities can be summed to determine the scale coefficient, i.e. indicating the percentage by which output will increase if all factors are increased by one percent (Ugwumba, 2011). From the foregoing relationships, returns to scale (RTS) for this study was expressed as:

$$RTS = \Sigma x_1 + \Sigma x_2 + \Sigma x_3$$

Where:

$\Sigma x_1 + \Sigma x_2 + \Sigma x_3$ are individual elasticities of output with respect to land, labour and material inputs. If $\Sigma x_i > 1.0$, there is increasing returns to scale; If $\Sigma x_i < 1.0$, decreasing returns to scale and if $\Sigma x_i = 1$, it implies constant returns to scale.

IV. Results and Discussions

Cassava Farmers Economic Efficiency Score

Distribution of the cassava farmers' economic efficiency scores by farm groups is shown in Table 1. The result indicated that majority (70.44%) of respondents in the all farm group fell within the economic efficiency range of 0.61 to 0.80. A maximum efficiency score of 0.85, minimum of 0.48 and mean value of 0.76 were computed for the all farm group. This implied that the cassava farmers were economically efficient in cassava production, however mean economic efficiency gap of 0.24 (24%) still existed.

Table 1. Estimated economic efficiency scores of the cassava farmers

Economic efficiency	All farms (Pooled data)		Early planting		Late planting	
Score range	Frequency	%	Frequency	%	Frequency	%
0.50 and less	15	6.52	10	8.70	5	4.35
0.51-0.60	38	16.52	23	20.00	15	13.04
0.61-0.70	68	29.57	40	34.78	28	24.35
0.71-0.80	94	40.87	37	32.17	57	49.57
0.81-0.90	15	6.52	5	4.35	10	8.70
0.90-1.00	-	-	-	-	-	-
Mean	-	0.76	-	0.63	-	0.78
Maximum	-	0.85	-	0.82	-	0.89
Minimum	-	0.48	-	0.48	-	0.50

Source: Computed from survey data, 2015.

The maximum economic efficiency attained by early and late season cassava farmers in the area were 0.82 and 0.89 respectively while the minimum scores were 0.48 and 0.50 respectively. Meanwhile the mean economic efficiency scores of 0.63 and 0.78 were computed for early season and late season producers respectively. The gap created by the inefficiency levels suggested that opportunity existed for increasing productivity and income through increased efficiency in resource utilization by cassava farmers in South Eastern Nigeria. The finding is in consonance with Onu and Edon (2009) and Eze and Nwibo (2014) who reported existence of efficiency gap in early and late season cassava production in Taraba and Delta States respectively.

Estimates of the Parameters of the Cobb-Douglas Stochastic Frontier Production Function

The results obtained from the stochastic frontier production function analysis for cassava production using maximum likelihood estimates (MLE) are presented in Table 2. All coefficients of the production variables (land, labour and material inputs) in the model exhibited the expected positive *apriori* sign. However, only the coefficients of labour and material inputs for all farms, and early and late season farms had positive and statistically significant effect on output at the 5% level of probability. This implied that the farmers who increased the quantities of labour and material inputs used were likely to have significant increase in their output. The result agreed with Ibekwe, Orebiyi, Henri-Ukoha, Okorji, Nwagbo and Chidiebere-Mark (2012) on resource use efficiency in cassava production in Delta State, Nigeria, which stated that cassava farmers in the country were able to increase their output by increasing the quantities of labour and material inputs use.

Table 2. Maximum likelihood estimates of parameters of the Cobb-Douglas stochastic frontier production function for cassava production in Southeast Nigeria

Variable	Parameter	All farms (Pooled) data		Early planting		Late planting	
		Coefficient	T-ratio	Coefficient	T- ratio	Coefficient	T-ratio
Production factor:							
Constant	β_0	0.18	1.24	0.24	0.89	o.36	1.56
Rental value of land	β_1	0.05	1.79	0.04	1.92	0.03	2.10
Labour Cost	β_2	0.61	4.36*	0.68	3.14*	0.70	4.76*
Material inputs cost	β_3	0.42	2.13*	0.36	2.01*	0.31	3.11*
Inefficiency:							
Constant	δ^0	0.13	0.33	0.51	1.46	0.76	1.58
FAE	δ^1	0.99	1.99*	0.14	2.13*	0.37	2.23*
EDU	δ^2	0.17	1.87*	0.22	2.01*	0.31	1.98*
ACO	δ^3	-0.12	-3.33*	-0.18	-3.01*	-0.17	-3.46
EXT	δ^4	0.14	2.14*	0.34	2.02*	0.16	3.21*
AGE	δ^5	0.21	5.21*	0.17	2.46*	0.12	5.86*
HOS	δ^6	-0-10	-1.41	-0.12	-0.98	-0.14	-1.14
Diagnostic Statistics:							
Log likelihood ratio (Hi)			87.41		121.54		135.51
Sigma Square	δ^2		7.62		6.23		12.01
Gamma (ɣ)			0.81		0.71		0.88

Source: Survey data, 2015. Note: *= Significant at 5% level. FAE; EDU, ACO, EXT, AGE and HOS as earlier defined.

Determinants of Inefficiency

The sources of inefficiency as shown in the stochastic frontier production function analysis for cassava production using maximum likelihood estimates (Table 2) were farming experience, educational level, extension visits, age, amount of credit obtained, and household size. Out of the six predictors included in the model, five, namely, farming experience, educational attainment, amount of credit, extension visits and age were statistically significant, while household size was not.

The estimated coefficient of educational attainment was positively signed and significant at 5% level implying that farmers who spent more number of years in school were more efficient in cassava production. This could be the result of enhanced capacity to acquire new knowledge and skills as well as more receptive attitude towards new ideas aimed at improving their productivity. This finding corroborates Nandi, Gunn and Yakasi (2011) who reported in the study on cassava production that farmers with higher educational level were more efficient than their less educated counterparts in the use of resources.

The coefficient of extension visits was also found to be positive and significant at 5% level for early season, late season and all farms groups. This implied that farmers who had more contact with extension agents were more efficient in production. This is attributable to their higher exposure to improved farming techniques through extension services, thereby enhancing their production efficiency. The finding is in line with Obiora and Emodi (2013) who opined that farmers' resource use efficiency could be enhanced through the adoption of modern farming practices obtained from regular contacts with extension agent.

The coefficients of age and farming experience were also positively signed and significant at 5% level. The implication is that older farmers with higher farming experience tended to be more efficient in resource use than young and inexperienced ones. Younger farmers, though having more physical strength, lack managerial experience leading to inefficiency (Adewayi, Agbonlahor and Oke, 2013).

On the other hand, the coefficient of household size was found to be negative which implied that larger households were less efficient in use of resources. The finding is in agreement with Adetunji and Adeyemo (2012) who reported a negative relationship between household size and efficiency level of resource use in pig production. Omojola (2014), however, contradicted the finding, reporting a positive effect of household size on economic efficiency level in yam production. The negative effect of household size in the study area could, therefore, be explained by problem of efficient coordination of household members in their use of farm resources.

The estimated values of Sigma square (δ^2) of 7.62, 6.23 and 12.01 for all farms, early and late season farms, respectively, were large and significant at 5% level. This, therefore, indicated a good fit for the model and correctness of the specified distributional assumptions.

Elasticity of Production and Returns to Scale

The estimated coefficients of the cassava production inputs were determined using the Cobb-Douglas Stochastic frontier production function analysis (Table 2). The result indicated the respective elasticities of land, labour and material inputs as 0.05, 0.61 and 0.42 for all farms; 0.04, 0.62 and 0.36 for early planting; and 0.03, 0.70 and 0.30 for late planting farms. Returns to scale which is the sum of the output elasticities of the production inputs as shown in Table 3 indicated increasing returns to scale for the three farm groups (all farms, early and late planting farms). This meant that for the all farms group, holding land and labour constant, a one percent.

Table 3. Estimated output elasticities and returns to scale for cassava production

Variable	All farms	Early Planting	Late planting
Land	0.05	0.04	0.03
Labour	0.61	0.68	0.70
Material inputs	0.42	0.36	0.30
Total	1.08	1.08	1.04
RTS	Increasing	Increasing	Increasing

Source: Computed from survey data, 2015. Note: RTS = Returns to scale.

Increase in material inputs led to 0.42% increase in output. Likewise, holding labour and material inputs constant, a 1% increase in land gave a 0.05% rise in output. Similarly, a 1% increase in labour gave rise to a 0.61% increase in output, land and material inputs held constant. Similar scenario was obtained for the three inputs under early and late season production. The implication of the findings is that there are still rooms for improvement in output among cassava farmers in southeast Nigeria. Efforts should, therefore, be tailored towards increasing output level of cassava farmers in the area through increasing resource use efficiency, and thus the farmers' net farm income. The findings are in agreement with Onu and Edon (2009), Oladebo and Oluwaranti (2012) and Nwike and Ugwumba (2016) who reported different levels of inefficiency in resource use among cassava and yam farmers in different parts of Nigeria.

Constraints to Cassava Production in Southeast Nigeria

Cassava production in the area was constrained by factors such as insufficient capital, high labour cost, pests and diseases infestation, low level of mechanization, inadequate modern farming techniques, poor product price among others. Analysis of the constraints was achieved by comparing the calculated mean scores with the cut-off point (mean) of 2.50 obtained using a 4-point Likert-type scale. Items with mean scores of 2.50 and above were regarded as serious constraining factors to cassava production while those below 2.50 were not. Again the calculated means were also ranked so as to determine the order of seriousness of the factors. Result of the analysis as presented in Table 4 indicated that high cost of labour was considered by the farmers as the most serious production constraint in the area with mean score of 3.84. The second major constraint to cassava production in the area was inadequacy of capital as judged by the mean score of 3.76. High cost of fertilizer and agrochemicals was also identified by the respondents as the third major challenge to cassava production in the southeast zone of the country,. The problem stems from the farmer's inability to access these inputs at subsidized rate from government approved agencies and as such resorting to open market purchases. The finding is consistent with N.A.E.R.L.S and F.D.A.E (2014) who in the agricultural survey report of southeast Nigeria for the year 2013 identified exorbitant cost of fertilizer, agrochemicals and other inputs as serious constraints to enhanced cassava production in the area. The fourth major constrain to cassava production in the area was poor mechanization with mean score of 3.55. The finding was consistent with by National Agricultural Extension and Research Liaison Services (N.A.E.R.L.S.) and Federal Department of Agricultural Extension (F.D.A.E) (2014) who reported low level of tractorisation by cassava and arable crop farmers in the Southeast zone due to dearth of functional tractors and implements.

Other highly rated constraints to cassava production in the area arranged in descending order of seriousness included poor technical knowledge of the farmers, poor crop yield, poor product price, scarcity of improved cultivars, high cost of transportation, fire outbreak, inadequacy of land and poor roads. The finding is consistent with National Root Crops Research Institute (2009) which identified the major problems to improved cassava production in the Southeast zone of Nigeria to include poor technology base of farmers, use of unimproved cultivars, low mechanization rate, high cost of inputs, poor extension services, poor crop yield among others. Further supporting the findings, Obiora and Emodi (2013) traced the poor performance of crop farmers in Nigeria to lack of knowledge of improved farming techniques caused by inactive extension system. The dearth of quality extension services in the zones as manifested in the low output of extension agents has over the past years denied farmers access to improved farming techniques leading to poor yield. As could also be seen from the result (Table 4) only poor demand for product with mean score of 2.29 and pest and disease attack (2.38) were considered by the farmers as not being serious constraint to production. Supporting the finding Mefoh (2007) and Ibekwe *et al.* (2012) reported the ready availability of market for cassava tubers in the Southeast zone of Nigeria, where cassava is a major staple for the people.

Table 4. Constraints to cassava production in the area

Constraint	Mean score	Rank	Remark
High cost of labour	3.84	1st	Serious
Inadequate capital	3.76	2nd	Serious
High cost of fertilizer and agrochemicals	3.63	3rd	Serious
Insufficient farm mechanization	3.55	4th	Serious
Poor technical knowledge	3.43	5th	Serious
Poor yield	3.39	6th	Serious
Poor product price	2.98	7th	Serious
Scarcity and high cost of improved cassava stem	2.98	8th	Serious
High cost of transportation	2.90	9th	Serious
Fire outbreak	2.88	10th	Serious
Inadequate cultivable land	2.65	11th	Serious
Inadequacy of good roads	2.62	12th	Serious
Adverse weather effect	2.41	13th	Not Serious
Pest and disease attack	2.38	14th	Not Serious

Constraint	Mean score	Rank	Remark
Poor demand for product (tubers)	2.29	15th	Not Serious

Source: Computed from field survey data, 2015.

V. Conclusion

The early and late season cassava farmers were found to be economically efficient in production, though meaningful inefficiency gaps still abound. There existed no significant differences between the means of net farm income and economic efficiency scores attained by the early and late season producers of cassava. Numerous factors were identified to be militating against cassava production in the area. Addressing these constraints through formulation and implementation of good policies and programmes will enhance economic efficiency, production level, and net farm income realized by the farmers.

References

[1] Acquah, G. (2005). *Principles of crop production: Theory, techniques and technology*. New Delhi, India: Prentice Hall Press.

[2] Adetunji, M. O. and Adeyemo, K. E., (2012). Economic efficiency of pig production in Oyo state, Nigeria: A stochastic production frontier approach. *American Journal of Experimental Agriculture,* 2(3), 382- 394.

[3] Adewayi, A.S., Agbonlahor, A.S., and Oke, A.T. (2013). Technical efficiency analysis of cassava farmers in Ogun State, Nigeria. *International Journal of Agriculture and Food Science (IJAFS), 4* (1 & 2), 515 – 522.

[4] Agbato, S.O. (2009). *Principles and practice of crop production*. Oyo, Nigeria: Odumatt Publishers.

[5] Anambra State Agricultural Development Programme (2013). *Tips on commercial production of cassava*. Awka, Nigeria: Kucerna Damian press.

[6] Babalaye, T. (2004). *Cassava: A crop for hard times and modern times* (Brochure). Akure, Nigeria: Feed Well Charitable Trust.

[7] Babatunde, J. (2011, September 20). Value addition key to cassava revolution in Nigeria. *Vanguard Newspaper,* p. 16.

[8] Central Bank of Nigeria (2012). *Annual report and statement of account for the year ended 31st December 2012.* Abuja, Nigeria: Author.

[9] Eze, A.V. and Nwibo, S.U. (2014). Economic and technical efficiency of cassava production in Ika North East L.G.A. of Delta State. *Journal of Development and Agricultural Economics*, 6 (10), 429 – 436.

[10] Federal Ministry of Agriculture and Rural Development. (2011). *The transformation agenda road map*. Abuja, Nigeria: Federal Ministry of Information Press.

[11] Food and Agricultural Organization. (2003). *Food insecurity: When people must live with hunger and fear starvation the state of food insecurity in the world.* Rome, Italy Author.

[12] Ibekwe, U.C., Orebiyi, J.S., Henri-Ukoha, A., Okorji, E.C., Nwagbo, E.C., and Chidiebere-Mark, N.M. (2012). Resource use efficiency in cassava production in South East Nigeria. *Economics and Sociology, 1* (1), 16-21.

[13] Ike, P.C., and Inoni, O.E. (2006). Determinants of yam production and economic efficiency among small holder farmers in South Eastern. Nigeria *Journal of Central European Agruculture,* 7(2), 337-342.

[14] International Institute for Tropical Agriculture. (2005 a). *Cassava, the multipurpose crop*. Ibadan, Nigeria: IITA Press.

[15] International Institute for Tropical Agriculture. (2005 b). *Starting a cassava farm*. Ibadan, Nigeria: IITA Press.

[16] Mefoh, N.C. (2007). *Cassava for wealth and good nutrition*. Awka, Nigeria: Amaka Dreams Press.

[17] Nandi, A.J., Gunn, P. and Yurkushi, E.N. (2011). Economic analysis of cassava production in Obubra L.G.A. of Cross River State, Nigeria. *Asian Journal of Agricultural Sciences,* 3 (3), 205-209.

[18] National Agricultural Extension and Research Liason Services., & National Food Reserve Agency. (2013). *Agricultural performance survey report of Nigeria: 2009 wet season*. Ibadan, Nigeria: FGN Publication.

[19] National Agricultural Extension and Research Liaison Services & Federal Department of Agricultural Extension. (2014). *Agricultural performance survey report of 2013 wet season in Nigeria*. Zaria, Nigeria: FGN Publication.

[20] National Bureau of Statistics and Federal Ministry of Agriculture and Rural Development (2012). Collaborative survey on national agricultural sample survey 2010/2011 Draft Report. Abuja, Nigeria: NBS. Press.

[21] National Population Commission (N.P.C) (2006). *Nigeria population census figures, 2006*. Abuja, Nigeria: N.P.C. Publication.

[22] National Root Crops Research Institute (2009). *Guide to cassava production in Nigeria*. Umudike, Nigeria: NRCRI Publication.

[23] Nweke, F.I. (2004). New challenges in the cassava transformation in Nigeria and Ghana: A view point. *IITA Research,* 14/15.

[24] Nwike, M.C. (2010). Investments and profitability in cassava enterprise in Nigeria. *Nigeria Vocational Association (NVA), Book of Reading. 3* (1), 1-7.

[25] Nwike, M.C. (2012). Combating the scourge of kidnapping in the south east through investment in cassava enterprise. *Eastern COEASU Journal of Technical Education (ECOJOTE)*, *4* (2).

[26] Nwike, M.C., and Ugwumba, C.O.A. (2016). Economic analysis and determinants of profit from seed yam *Dioscorea spp.* (Dioscoreales: Dioscoreacea) production in South Eastern Nigeria. *International Journal of Agricultural Policy Research (IJAPR).* 4(7), 111-116.

[27] Obiora, C.J., and Emodi, A.I. (2013). Restructuring agricultural extension for effective agricultural transformation agenda in Nigeria. *Greener Journal of Agricultural Science, 3* (6), 211-218.

[28] Oladeebo, J.O., and Oluwaranti, A.S. (2012). Profit efficiency among cassava producers: Empirical evidences from South Western Nigeria. *Journal of Agricultural Economics and Development, 1* (2), 85-92.

[29] Omojola, J.T. (2014). Economic efficiency and profitability of yam production in South Western Nigeria. (Doctoral dissertation). Department of Agricultural Economics & Extension, Chukwue--meka Odumegwu Ojukwu. University, Igbariam campus, Anambra State, Nigeria.

[30] Onu, J.I. and Edon, A. (2009). Comparative economic analysis of improved and local cassava varieties in selected Local Government Areas of Taraba State, Nigeria. *Journal of Social Sciences, 19* (3), 213 – 217.

[31] Ugwumba, C. O. A. (2011). Technical efficiency and profitability of catfish production in Anambra State, Nigeria. *Ph.D dissertation*, Delta State University, Asaba Campus, Asaba, Nigeria.