ECONOMICS OF CASSAVA PRODUCTION IN OBOKUN AND ORIADE LOCAL GOVERNMENT AREA OF OSUN STATE, NIGERIA

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ABSTRACT

This study examines Economics of Cassava Production in Obokun and Oriade Local Government Area of Osun State, Nigeria. Sample size of 180 cassava farmers were selected using multi-stage sampling method. Structured questionnaire were used for data collection. Data collected were analyzed using descriptive statistics gross margin analysis and stochastic profit frontier analysis. The total cost incurred by cassava farmers was ₦130,143 per ha, average net farm income was ₦84,904.2 with an average gross margin of ₦103,792. The coefficient of normalized cost of stem, normalized cost of labor, cost of fertilizer cost of herbicides and cost of transportation, all have significant effect on the profit of cassava farmers. The profit efficiency result showed that cassava production in the study area is profitable. However, its expansion is greatly hampered by inadequate capital; hence the farmer in the study area cannot meet up with the basic requirement to sustain cassava production The most serious constraints faced by cassava farmers were inadequate capital and poor access to credit. It is recommended that that government through credit agencies should make available loanable fund and credit available to cassava producers and farmers should be encouraged to invest on cassava production for its profitability and economic value

Keywords: Cassava; Stochastic frontier and Production

INTRODUCTION

Cassava (*Manihotesculenta*) is a root tuber which is cultivated in rainforest and derived in savannah zones of Nigeria. It is one of the most important staple food crops in Nigeria, and 300kg is averagely consumed per person annually in some areas of Africa (Omotayo*et al*., 2016). It is an important staple crop that is grown in the tropics and consumed by almost every household (Bassey *et al.,* 2014). It easily adapts to different climatic and soil conditions, hence its ability to grow and be available all year round, which gives it advantage over other tuber crops like yam, cocoyam and potato. It is attractive to farmers because its products are generally accepted by all classes of Nigerians (Itam *et al.,* 2014).It is an important source of dietary carbohydrate and provides food for over 60 million people in Nigeria (Raufu *et al.,* 2018).) The roots are processed into garri, fufu, tapioca, chips and cassava flour for human consumption (Raufu *et al.,* 2018). The leaves are edible while the roots are also a good source of ethanol and are rich in minerals, vitamins, starch and protein (Raufu *et al.,* 2018). It is believed to be predominantly cultivated by small scale farmers with poor resources (Ezebuiro *et al.,* 2010). International Fund for Agricultural Development (IFAD), (2012) reported that Africa is one the continents of the world where some 600 million people are dependent on cassava for food.

A key to Nigeria‘s economic growth is through investment and trade in the agriculture sector, which contributed to 40 percent of the country‘s GDP, and which is the largest employer of labor. However, agricultural productivity is stagnant, improved technologies and inputs are not accessible, and market linkages are weak, resulting in high post-harvest losses and low

production. Cassava is still largely characterized by production and direct sale of its outputs in its raw form with weak market and very little capacity for transformation of produce from its raw form to other value added products.This perhaps has been responsible for poor wealth creation by farmers resulting in low farm and household incomes. In spite of the various uses cassava is known for, as an agent of self-sufficiency in food production, the gain derived from its production by rural farmers is still not sufficient to keep the resource poor farmers above the poverty line. Efforts aimed at increasing cassava output to meet the demand for the output cannot be properly directed unless profit efficiency is been improved. If this is done, farmers will be guided on inputs to focus on, thereby, increasing profit which will in turn result to higher standard of living. Establishing cassava farmers' economics is salient for policy implication to address factors responsible for minimal production and bring about increased incomes of the farmers. The study attend this objectives estimate the cost and returns of cassava producers in the study area; determine the profit efficiency of cassava producers in the study area and identify the constraints faced by cassava producers in the study area.

METHODOLOGY

Study Area

The study was conducted in Obokun and Oriade Local Government Area of Osun State, Nigeria. located at the South-West geo-political zone of the country. Specifically, Osun State lies between Latitudes 6°59' and 9° North and Longitude 21.65° and 6.75° East of Greenwich meridian.Osun state is an inland state in south-western Nigeria. Its capital is Oshogbo. with a total land area of 9,251 square kilometers. It has a population of about 3,416,959 people (NBS, 2015). The location of Osun State give rise to a variety of climatic condition which favors the growth of a number of agricultural crops such as staple grains, fruits, vegetables, cereals, root and tubers, providing both small and large industries with raw materials.The state was divided into three agro-ecological zones namely Iwo, Oshogbo and Ife/ijesha under the Osun state Agricultural Development Programmed (OSSADEP, 2019). Each zone contains five blocks and five cells per block. A multi-stage sampling technique was used to select smallholder farming households in the study area. The first stage involved the purposive selection of one out of the three agro-ecological zone in Osun State because of high numbers of cassava farmers in the area. The second stage involve a random selection of two Local Government Areas from the zone namely; Obokun and Oriade Local Government Area. In the third stage, 8 villages were selected randomly from the local government area selected. The last stage was the random selection of 180 cassava farmers from each of the villages based on Yamanne's equation for appropriate sample size determination as used by (Abdullahi *et al*., 2018). Data were collected from the cassava farmers with the use of questionnaire.

Gross Margin Analysis

Objective I was analysed using budgetary techniques analysis such as gross margin and Net farm Income was used to estimate the costs and returns of cassava production in the study area. (James *et al.*, 2011).

The formula is explicitly defined as follows;

$\pi = TR-TC$

Where:

TR = PQ (Price x Quantity)

TC = Total Fixed Cost + Total Variable Cost

GM = TR-TVC

NI = TR-TC
GM: Gross Margin (₦)
TR: Total Revenue (₦)
TVC: Total Variable Cost (₦)
TFC: Total Fixed Cost (₦)
NI: Net Income (₦)
Profitability Index (P2)
P1 = NI/TR X 100%
Rate of Return on Investment = NI/TC x 100

Stochastic Profit Frontier Analysis

ObjectiveII was analysed using stochastic frontier profit function(Cobb- Douglas functional form) specified below as:

$I_n Y_i = \beta_o + B_1 X_1 + B_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 +$

Where :
I_n = Logarithm to base
Yi: = Output of cassava (kg/ha)
X_1: = normalized cost of transportation (₦)
X_2: = Normalized cost of fertilizer per kg (₦)
X_3: = Normalized cost of herbicides per liter (₦)
X_4: = Normalized cost of stems (₦)
X_5: = Normalized cost of Hired Labor (man-days)
X_6: = Normalized cost of land per ha (₦)
The inefficiency model U_i is defined by

$U_i = \delta + \delta_1 Z_1 + \delta_2 Z_2 + \delta_3 Z_3 + \delta_4 Z_4 + \delta_5 + Z_5 + \delta_6 + Z_6$

Where;
U_i= Profit inefficiency
Z_1: farmers' age (years)
Z_2: Farmers' experience (years)
Z_3: Farm size (hectare)
Z_4: Educational level (years)
Z_5:Household size (number of household)
Z_6: Sex (male and female)
Objective III was analysed usingdescriptive statistics such as (frequency, percentages and mean).

RESULTS AND DISCUSSIONS

Cost and Return Analysis

The result of the costs and returns of cassava in the study area is presented in Table 1.It showed that on average, the estimated total cost incurred was ₦130143 per ha. The result indicated that variable cost accounted for a substantial percentage of 85.48% of the total cost of production while the fixed cost accounted for about 14.51% of the cost of production. On the basis of cost component analysis, labor recorded the highest cost incurred (26.89%) followed by cost of hiring tractor (12.99%), stem cutting (10.83%) and transportation (10.30%) while cost of cutlass and hoe recorded the least cost of production 2.88%, 2.59% respectively.

Furthermore, it was revealed on Table 1 that the average net farm income was ₦84904.2 with an average gross margin of ₦103792. Base on the Net Farm Income analysis, it can be inferred that cassava production in the study area is profitable. This result agrees with previous work of Kingsley *et al,* (2018). However, the return on capital invested was 0.93kobo, which indicated that for every naira spent on cassava production in the study area, a return of 0.93kobo was realized. Also, the gross ratio of 0.52 as well as operating ratio of 0.61 indicated that cassava production is profitable in the study area Olukosi *et al,* (2010) stated that ―the lower the gross and operating ratios, the higher the profitability of the farm and reverse is also the case‖.

Table 1: Cost and return analysis of cassava farmers

Items	Average Cost/ ha	Percentage of total cost
Variable costs		
Stem cutting	14105.26	10.83828
Hired labor	28095	21.58
Family labor	6907.78	5.30784
Cost of hiring tractor	16907.77	12.99169
Fertilizer	13863	10.65282
Agrochemicals	1199.72	9.220414
Transportation	13405.56	10.30064
Storage cost	5970.21	4.587424
Total variable cost	**111, 255.2**	
Fixed cost		
Cost of knapsack	4080	3.135014
Cost of hoe	3376.94	2.594792
Cost of cutlass	3753.06	2.883798
Depreciation (fixed input)	7677.78	5.899497
Total fixed cost	**18, 887.78**	
Total cost	**130143**	**100**
Returns		
Cassava output	215047.2	
Gross margin = TR-TVC	103792	
Net farm income = TR – TC	84904.2	
Gross ratio = TFE/GI	0.517352	
Operating cost = TOC/GI	0.605183	
Return on capital invested=GM/TVC	0.932918	

Maximum likelihood estimate of the stochastic profit frontier function of cassava production

The estimated parameter of maximum likelihood estimate in Table 2 indicated that all the five explanatory variables included in the model namely; normalized cost of stem, normalized cost of labor, cost of fertilizer cost of herbicides and cost of transportation, all have significant effect on the profit at 1% probability level. The estimate of mean output in relation to all the five variables were 0.1519, 0.0335, 0.0899, 0.1234 and 0.1599 respectively. The implication of these results are that for every 1% increase in cost of stem, cost of labor, cost of fertilizer cost of herbicides and cost of transportation the output will definitely increase by 0.1519%, 0.0335%, 0.0899%,

0.1234% and 0.1599% respectively.Household size with MLE estimates of 0.0158 carried positive sign and is statistically significant at 10% which is positively related to profit inefficiency. This means that as the farmers increase in household size, the level of profit inefficiency also increases, this could be attributed to increase in consumptions and daily needs of the household as they increase in size. The coefficient of gender was found to be negative with -0.610514 and significant at 5% probability level. This negative sign implies that male farmers tends to be more efficient in cassava production

In addition, the estimated sigma ($\zeta 2$= 0.215) and the gamma (γ=0.62) are quite high and highly significant at 1% and 5% level of probability respectively. The high and significant value of the sigma square ($\zeta 2$) indicated a goodness of fit of the model. The estimate of gamma (γ = 0.62) obtained indicated that about 0.06% of the variation in profit among cassava farmers was due to differences in farmer's practices rather than random variability.

Table 2: Maximum Likelihood Estimates (MLE) of the Cobb-Douglas frontier for cassava producers

Values	parameters	Coefficient	Standard error	Z-value
Constant	β_0	3.513581	0.0000502	7.0e+04***
Stem cutting (x_1)	β_1	0.1518505	0.0000116	1.3e+04***
Labor (x_2)	β_2	0.0334753	6.37e-06	5254.59***
Fertilizer (x_3)	β_3	0.0899461	2.10e-06	4.3e+04***
Herbicides (x_4)	β_4	0.123427	9.65e-06	1.3e+04***
Transportation (x_5)	β_5	0.1598634	6.97e-06	2.3e+04***
Inefficiency model				
Constant	δ_0	0.997247	0.600525	16.61
Age (z_1)	δ_1	-0.001789	0.0013349	-1.34
Years of experience (z_2)	δ_2	7.58e-06	0.0005813	0.01
Education (z_3)	δ_3	-0.0003166	0.001754	-0.18
Household size (z_4)	δ_4	0.0157865	0.0089095	1.77*
Gender (z_5)	δ_5	-0.610514	0.238778	-.256**
Variance parameter				
sigma square	δ^2	0.21495	0.226586	0.946***
Gamma	γ	0.6222	0.024435	14.708**
Log likelihood function		73.39		
L R test		61.17		

Source: computer output from frontier analysis, 2021

***, **, *** implies statistically significance at 0.10, 0.05, 0.01 levels of probability respectively**

Profit efficiencies of cassava producers in the study area

The result of profit efficiency of cassava farmers it score ranged between 0.19 and 0.99 with an average mean of 0.70. The average profit efficiency score of 0.70 implied that an average cassava farmer in the study area could increase profits by 30 percent by improving allocative efficiency in cassava production. This result conformed to the findings of Oladeebo *et al,* (2014) who reported mean profit efficiency levels of 0.79 for farmers respectively. It also indicated that 87.87% of cassava farmers in the study area operate within the profit range of between 0.31 and

0.90. This is in line with the findings of Oladeedo (2014) who stated that the majority of cassava farmers operate between 0.61 and above. The estimation is skewed to the right, implying high level of efficiency.

The minimum efficiency is 0.19 which indicates gross underutilization of resources while Maximum Profit efficiency is 0.99. Given that about 87.87% of cassava producers in the study area have profit efficiency indices above average (0.50), the frontier cassava farmers therefore are more or less output maximizers while the non-frontier farmers represent only 12.13%. The mean profit efficiency score is 0.70 on average farmer can expand their output by 1.30% ((1/0.70) – 1) * 100) if the farmers were to attain profit efficiency of one. This implies that the farmers can increase their input 1.30% by using the existing inputs better.

Table 3: Distribution of Respondents of Profit efficiency estimates from the Stochastic Frontier Model.

Profit efficiency index interval	Frequency	Percent
<0.1	4	2.31
0.10 – 0.30	38	9.88
0.31 – 0.60	114	65.90
0.61 – 0.90	24	21.97
Total	180	100
Mean	0.70	
Minimum value	0.19	21.97
Maximum value	0.99	

Source: Field survey, 2021

Constraints faced by cassava producers in the study area

The result from Table 3 indicated that inadequate capital tends to be the major problem faced by cassava farmers in the study area with the average mean of (=2.59), followed by poor access to credit with average mean of (=2.43) ranked 1st and 2nd respectively.The least problem faced by the respondents are insect pest infestation (=1.67) and scarcity of land with average mean of (=1.96), scarcity of land was revealed by the study as one of the least problem face by the farmers in the study area. `

Table 4: Constraints affecting cassava production in the study area

Constraints	**Mean**	**Rank**
inadequate capital	2.59	1st
Poor access to credit	2.48	2nd
High cost of planting materials	2.43	3rd
Low income of farmer	2.43	3rd
Scarcity of labor	2.17	4th
inadequate transportation	2.16	5th
inadequate communication on prices and market demand	2,15	6th
Scarcity of land	1.96	7th
Insect pest infestation	1.67	8th

Source: Field survey, 2021

Conclusion and Recommendations

The study concluded that the cassava production was found profitable and most cassava producers were profit efficient and this has the potential of contributing to improved livelihoods of the farmers. There were various constraints to cassava production, which inadequate fund and poor access to credit top the list. It was now concluded that source of capital favor personal savings and high interest rate requested by money lender and inadequate access to credit making inadequate capital as one of the major problem facing cassava producers in the study area. It is recommended that government through credit agencies should make available loanable fund and credit available to cassava producers. Also, farmers should be encouraged to invest on cassava production for its profitability and economic value.

REFERENCES

Abdullahi, A., Salihu, I.T., Umar, I.S. & Hassan, S. (2018). Adoption of organic farm practices Among Rural maize farmers in Nigeria. *Journal of rural sociology,*18(2, 21-27

Bassey, N.E., Akpaeti, A.J. &Umoh, I.U. (2014). Determinants of Cassava Output among Small Scale Farmers in Nigeria: A Survey of AkwaIbom State Farmers. *Asian Journal of Agricultural Extension, Economics & Sociology,* 3(4), 319-330.

James, A. Nandi, Patience, G., & Evans, N.Y. (2011).Economics Analysis of cassava production. *Asian Journal of Agriculture Science* 3(3), 205-209

Ezeburio, N.C., Ironkwe, A.G., Ugboaja, C.I. &Okoro, B.O. (2010).Adoption of improved cassava varieties by women in Umuahia agricultural zone of Abia State Nigeria.*Nigerian Journal of Rural Sociology,* 10 (1),17-24

Kingsley, O, Eucharia, A. A. &Mediong J. U. (2018). Comparative cost and return analysis of cassava production by adopters and non-adopters of improved cassava varieties among farmers in ibesikpoasutanLGA, AkwaIbom State, Nigeria,*Global Journal of Agricultural Sciences.* 17(18), 33-41

IFAD. 2012. *Global consultation on cassava as a potential bioenergy crop*, byE. Kueneman, V. Raswant, N. Lutaladio& R. Cooke. Accra.

Itam, K.O., Ajah, E.A. &Agbachom, E.E. (2014).Analysis of Determinants of Cassava Production *Environment*, 6: 97- 104.And Profitability in Akpabuyo Local Government Area of Cross River State, Nigeria.*International Business Research,* 7(12): 128-135.

Olukosi, J.O. and P.O. Erhabor (2010) ―Introduction to Farm Management Economics: Principles and Application‖. Agitab Publishers Ltd. Zaria, Nigeria.

Omotayo, A. O &Oladejo A. J (2016). Profitability of Cassava-based Production Systems.*Journal of Human Ecology*, 56 (1, 2): 196-203.

Osun State Agricultural Development Program Reports (OSADEP) (2019). Pp.1-52

National Bureau of Statistics (2015) Nigeria in 2014: Economic Review and 2015 – 2017 utlook

Raufu, M. O., Adesina, B.A., Abdulazeez, A. A &Marizu, J.T. (2018). Cassava production and options of sales outlets on Oyo State.*International Journal of Research in Agricultural Sciences,* 5(4) 2348 – 3997