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Cassava Production and Options of Sales Outlets in Oyo State

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Abstract **- To ensure continuity in cassava production, the farm household has an option of selling to the general market or to the cassava processing industries about which little research have been done. The study therefore focused on the effect of sales outlets on cassava production with the specific objectives to describe the socio-economic characteristics of the cassava farmers, examine the profitability of producing cassava, highlight factors affecting cassava production and determine the factors affecting choice of sales outlets. Multistage sampling technique was used in selecting the respondents (Cassava Farmers) in the study area. A total of 120 respondents but only 100 of the questionnaires returned were found useful for the analyses; 56 from those that sell to the market and 44 from those that sell to the industry. Primary data were collected using structured questionnaire. The tools used in analyzing collected data include; descriptive statistics, farm budgeting techniques, log it and multiple regression analysis. The result showed that majority (29.5 %) of the respondents selling to the industry and to the market (32.1%) are between the ages of 30-40years and 20-30years respectively. Majority (77.3%) of those that sold to the industry are male while majority (71.4%) of sellers to the market are female. Likewise, most of the respondents were learned and have one form of formal education or the other. Sellers to the industries are more visited by the extension agents than sellers to the market and sellers to the market have larger farm size than sellers to the industry. The respondents selling to the industry make more profit than the respondents selling to the market at a difference of #636.50 on the average. This implies that the production of cassava is more profitable when sold to the industry. The inferential statistics showed that farm size, number of children in school, extension visits and selling time have significant relationship with the output of cassava sales among the farmers to the industry compared to the sex of the respondents, family size and the selling time that significantly determined the output sold to the general market. The logit regression result revealed that sex of the respondents, years spent in school and the selling time are the significant variables affecting the choice of sales outlet by the respondents. The study recommended among others, quick government intervention to encourage agricultural mechanization. This will assist the farmers to increase their scale of production with better efficiency for higher outputs and supply not only to the general markets but to the industries in particular. This will also translate to higher income for the farmers and reduce their level of poverty.**

Keywords **– Cassava Production, Profitability, Sales Outlets, Market, Industry.**

I. INTRODUCTION

Agriculture is a major and strategic component of the Nigerian economy contributing between 19.65% and 26.63% to real GDP in 2014 (NBS, 2015). Crop production constituted an important activity in the agriculture sector and the main driver of growth contributing between 85.39% and 90.13% between first quarter and third quarter in 2014 (NBS, 2015). Only cassava and yam among all other food crops are producing at a level of comparative advantage in Nigeria (Oyewole et al, 2008)

Cassava (*Manihote sculenta* Crantz) 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 its average consumption exceeds 300 kg per person annually in some areas of Africa (Omotayo et al., 2016). It is an important staple 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 (Adebowale *et al.,* 2008).) The roots are processed into garri, fufu, tapioca, chips and cassava flour for human consumption (Sanni *et al.,* 2008; Adebowale *et al.,* 2008). The leaves are edible while the roots are also a good source of ethanol and are rich in minerals, vitamins, starch and protein (Adegbola *et al.,* 1978; Ravindran, 1992). It is believed to be predominantly cultivated by small scale farmers with poor resources (Ezebuiro *et al.,* 2010). International Fund for Agricultural Development (IFAD), (2013) 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.

Access to good sales outlets affects household welfare outcomes through at least two channels; first, it alleviates the capital restriction on agricultural household. Expenditure input must be incurred during the planting and growth period of crops, while returns are received only after the harvest several months later. Likewise, it removes the fear of where to store the excess produce so far there is the assurance of demanding market.

In many years of research which focused on improving cassava productivity have not affected the much needed impact on poverty. The research community has accepted that productivity enhancing technologies alone without access to profitable markets cannot get poor farmers out of poverty. Cassava dependent farmers in remote locations have no access to markets for their fresh roots, traditionally processed cassava products are unkindly refused in more rewarding markets because of their characteristic poor quality and safety. Though government at various levels have been trying in various ways to encourage rural farmers to adopt the modern cassava production technologies in order to increase the rural farmers' productivity. The technologies are use of hybrid cassava stake, use of insecticides, use of inorganic fertilizer, and use of tractor, appropriate spacing, planting date and tillage practices, yet the influence of good market outlets to cassava production cannot be overemphasized and need be central of focus.

To ensure continuity in cassava production, the farm household must either sell to the general market or to the cassava processing industries. Hence, access to good sales outlets can significantly increase the financial ability of poor household with no or little savings to acquire needed modern inputs for next production season and meets other financial ends. Access to willing buyers also reduces the opportunity cost of capital of intensive assets relative to family labour, thus encouraging labour saving technologies and raising labour productivity. A report by FAO (2003) noted that an efficient, integrated and responsive market that is marked with good performance is of crucial importance for optimal allocation of resources and stimulating households to increase output. It is on this background that this study examines the effect of sales outlet on cassava production in Oyo state, Nigeria by attempting to provide answers to the following research questions-:

1. What are the socio-economic characteristics of the cassava farmers?
2. How profitable is cassava in the study area?
3. What are the factors affecting cassava production in the study area?
4. What are the factors that determine the choice of sales outlets?

II. Research Methodology

The study was conducted in Oyo State which occupies part of the southwestern zone of Nigeria. It lies between latitude 8 00'N and longitude 4 00'E, it is bounded on the east by Osun state, on the north by Kwara state, and on the west by part Ogun state and part republic of Benin. It has a density of 200/km^2 and an area of 28,454 square kilometers and elevation of 230m (750ft). It has 33 local government areas and four agricultural zones. Agriculture is the major occupation of the residents. The location of Oyo 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.

Primary data was collected using a pre-tested structured questionnaire from the respondents in the study area. Multistage sampling technique was used in selecting the respondents (Cassava Farmers) in the study area. The first stage involved the purposive selection of Ibadan/Ibarapa and Saki Agricultural zones of the state. This is due to the fact that these zones are known to have predominantly cassava farmers. The second stage involved the selection of 2 wards each from the zones. The third stage involved stratification of the cassava farmers based on their sales outlet into those that sell to the general market and those that sell to cassava processing industry within the selected wards. The last stage is the random selection 60 cassava farmers from each of the strata making a total of 120 respondents but only 100 of the questionnaires returned were fund useful for the analyses; 56 from those that sell to the market and 44 for those that sell to the industry.

Descriptive analysis, specifically frequencies table and percentages were used to describe the respondents' socioeconomic characteristic as well as the constraint to cassava production in the study area. Budgetary analysis was used to estimate the profitability of cassava production in the study area.Net profit (π) is given as

$$\pi = TR - TC \quad (1)$$

$$GM = \pi - (TVC + TFC) \quad (2)$$

Where;
TR = total revenue
TVC = total variable cost
TFC = total fixed cost
GM = Gross Margin

The multiple regression model was used to determine the factors affecting cassava production in the study area.

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 U_i \quad (3)$$

Y =Cassava output
X_1 = Age
X_2 =Sex
X_3 =Family size
X_4 =School years

X_5 =Children in school
X_6=Extension visit
X_7=Selling time
X_8 =Marital status
X_9 =Farm size
Ui = The Error Term.

Logit regression analysis was used to determine the factor affecting sales outlet in the study area. . A logistic model is estimated with dependent variable being the dichotomous variable. If Yi is the random variable (dichotomous), it can then be assumed that Yi takes on the value 0 or 1, where 0 denotes the non-occurrence of the event in question and 1 denotes the occurrence.

The logit model (Gujarati, 1995) in the explicit form is specified as:

$$Yi = \log \frac{Pi}{1-Pi} = \beta o + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + Ui \quad (4)$$

Where:
Y_i = sales outlet of ith cassava farmer
1 = if sold to the market
0 = if otherwise)
X_1 = Age (years)
X_2 = level of education
X_3 = Family size1
X_4 = visitation by extension agent
U_i = Error term

To measure the effect of the sales outlet on cassava production, chow test analysis was used. The formula for chow test is given below:

$$\mathbf{Fcal} = \frac{S_5 / k}{S_4 / df} \quad (5)$$

Where:
S1 = Residual sum of squares for pooled
S2 = Residual sum of squares for sellers to the industry
S3 = Residual sum of squares for sellers to the market
S4 = S2+S3
S5 = S1-S4
Df = n1+n2 – 2k
n1 = no. of sellers to the industry
n2 = no. of sellers to the market
k = no of variables + constant
Ftab = F (k, df)

Decision rule:

i. If fcal > ftab: H0 is rejected
ii. If fcal<ftab: Ho is accepted

III. Result Discussion Descriptive Statistics

Table I presents the farm characteristics of cassava farmers in the study area. The table shows that majority 56 of the farmers sells to the market while 44 sell to the industry. It also shows that majority of the respondents selling to the industry 29.5 % and to the market 32.1% are between the ages of 30-40years and 20-30years respectively. It revealed that majority (77.3%) of those that sold to the industry are male while majority (71.4%) of sellers to the market are female, this may be due to the female dominated nature of most Africa markets. It also indicates that only 6.8% and 7.1% of the respondents that sells to the industry and market respectively are single while majority of them 77.3% and 64.3% of the respondents respectively are married. On educational level, for those selling to the industry, majority (52.3%) completed their secondary education, also majority (48.2%) of those selling to the market completed their secondary education, this result reveals that majority of the respondents were learned and has one form of formal education or the other. The table also showed that, 63.6% of the respondents selling to the industry have family size of 1 and 3, for respondents selling to the market, 55.4% had family size of between 1 and 3 people. This indicates that majority of the respondents selling to the industry and market have family size between 1 and 3 members in their household which is expected to have provided a source of family labour. The table also revealed 88.6% of those selling to the industry belong cooperative society compared to only 42.9% among sellers to the market. Most (57.1%) of the sellers to the market do not belong to any cooperative society. For respondents selling to the industry, extension agents visited 1-2 times 75% of the time while they visited 3-4 times 25% of the time. On the contrary, sellers to the market are only visited 3-4 times 28.6% of the time. There are more sellers to the market who cultivated on farm land not less than 4 hactares than sellers to the industry, Only 27.3% of sellers to industry has cassava farm size of at least 4 hectares. About 66.1% of the sellers to the market sell within 5 months and above while majority of sellers to the industry (88.7%) sell within 1 month and 4 months.

Table I. Socio-economic characteristics of Cassava Farmers

	Industry		**Market**	
	Frequency	Percentage	Frequency	Percentage
Age(years)				
<20	11	25	9	16.1
20-30	12	27	18	32.1
30-40	13	29.5	17	30.4
>40	8	18.2	12	21.4
Total	**40**	**100**	**56**	**100**
Sex				

	Industry		Market	
	Frequency	Percentage	Frequency	Percentage
Male	34	77.3	16	28.6
Female	10	22.7	40	71.4
Total	**40**	**100**	**56**	**100**
Marital Status				
Single	3	6.8	4	7.1
Married	34	77.3	36	64.3
Divorced	0	0	3	5.4
Widowed	7	15.9	13	23.2
Total	**40**	**100**	**56**	**100**
Educational Level				
Primary	16	36.4	25	44.6
Secondary	23	52.3	27	48.3
Tetiary	5	11.4	4	7.1
Total	**40**	**100**	**56**	**100**
Family Size				
1-3	28	63.6	31	55.4
4-6	15	34.1	22	39.2
≥6	1	2.3	3	5.4
Total	**40**	**100**	**56**	**100**
Cooperative Association	39	88.6	24	42.9
Yes	5	11.4	32	57.1
No				
Total	**40**	**100**	**56**	**100**
Extension Visit				
1-2	11	25	40	71.4
3-4	33	75	16	28.6
Total	**40**	**100**	**56**	**100**
Farm Size				
1-3	32	72.7	6	10.7
4-6	7	15.9	38	67.9
>6	5	11.4	12	21.4
Total	**40**	**100**	**56**	**100**
Selling time(Months)				
1-4	39	88.7	19	33.9
≥5	5	11.3	37	66.1
Total	**40**	**100**	**56**	**100**

Source: Field Survey, 2017.

IV. Cost and Returns Associated with Cassava Production

Table II shows gross margin analysis shows that the respondents selling to the industry make a slightly high profit than the respondents selling to the market at a difference of #636.50 on the average.

Table II. Costs and Returns.

	Industry	Market
Parameters	Costs (Naira) Value (Naira)	Costs (Naira) Value (Naira)
Revenue	468,972.70	524,187.50
Variable costs:		
Fertilizer	14,102.27	15,955.36
Hired labour	64,225.00	63,057.14
Family labour	30,479.00	38,428.57
Transportation	9,613.64	10,723.21
Herbicides/weeding	45,352.27	45,998.21
Total variable costs	163,772.18	174,162.49
Fixed costs:		
Cutlass	3,677.27	3,691.96
Knife/file	1,908.64	1,675.54
Hoe	1,931.36	1,838.81
Basket	1,538.18	1,550.804
Total fixed costs	9,055.45	8,757.11
TC = TVC + TFC	172,827.63	182,919.60

Source: Field Survey, 2017.

To calculate the profit of respondents selling to the industry

PROFIT = TR – TC

= #468,972.7 – #172,827.63

= #296,145.07

AVERAGE PROFIT = 29,6145.069/ 44
= #6,730.57

To calculate profit of respondents selling to the market
PROFIT = TR – TC
= #524,187.50 – #182,919.60
PROFIT = #341,267.90

AVERAGE PROFIT= #341,267.90/ 56
= #6,094.07

V. Regression Analysis for the Respondents Selling to the Industry

Table II shows estimates of the regression analysis in the table below shows the factors affecting the choice of sales outlet of the farmers that sell cassava to the industry. The R^2 = 0.617, which implies that 61.7% of the residual variation cassava output is explained by independent variables. Farm size, numbers of children in school, extension visits and selling time have significant relationship with the amount of cassava output sold to the industry. This implies that a hectare increase in farm size and number of children in school will reduce the amount of cassava sold to the industries because they both have a negative and significant relationship with output sold at 10% level. This may be due to the farmers' inability to manage larger farms at the current low application of agricultural technology. Extension visits and selling time are positively associated with output sold to the industries at 10% and 5% significant levels respectively. The more the extension visits to these farmers, the more information on the benefits/likely profit to make from the quantity sold. Most of the farmers considered sales to the industries as a wiser choice profit-wise.

Table III. Regression Analysis of Respondents Selling to the Industry.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	1.708[a]	.617	.540	.175

Model	Unstandardized Coefficients	Standardized Coefficients	T	Sig.
	B	Std. Error	Beta	
(Constant)	23.197	7.465		3.107	.004
Age	.067	.180	.144	.372	.712
Sex	-.171	2.135	-.014	-.080	.936
Marital Status	-.550	.951	-.104	-.578	.567
sch yrs	.156	.331	.097	.471	.640
Farm size	-.865*	.512	-.406	-1.689	.100
Fmlysz	.384	.780	.113	.492	.626
Chldernsch	-.041*	.0.021	-.066	-1.991	.069
Extvisit	1.290*	0.707	.203	1.824	.055
sellingTm	.122**	.056	.034	2.179	.039

Source: Field Survey, 2017
Dependent Variable: Output sold

- * Significant at 10%
- ** Significant at 5%

VI. Regression Analysis for the Respondents Selling to the Market

Table IV shows estimates of the regression analysis in the table below shows the factors that determined the amount of cassava output sold to the general market. The R^2 = 0.731, which implies that 73.1% of the residual variation cassava output is explained by independent variables. Sex as a variable is inversely related to the amount of cassava output sold to the general market at 10% level of significant and sex, being a dummy (1 for male and 0 for female) implies that female cassava farmers preferred to sell more to the market than their male counterparts. But family size and the selling time are both positively related to output sold to the general market, significant at 10% level. This implies that the higher the family size the higher the amount of cassava output sold to the market. Likewise, the longer it takes to sell the output the higher the likelihood that the more of the product will be sold to the market particularly by some women farmers who considered no alternative to sale than to the general market.

Table IV. Regression Analysis of Respondents Selling To The Market

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	1.461[a]	.731	.599	.129

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	13.920	9.239		1.507	.139
Age	-.057	.208	-.076	-.273	.786
Sex	-1.422*	.751	-.091	-1.893	.083
sch yrs	-.646	1.119	-.091	-.577	.567
Marital Status	.264	.350	.114	.753	.455
Farm size	.741	.771	.235	.962	.341
Fmlysz	1.303*	.675	.313	1.931	.090
chldernsch	.354	.182	.346	1.942	.082
Extvisit	1.462	1.246	.170	1.174	.247
sellingTm	.906*	.536	.247	1.691	.098

Source: Field Survey, 2017
Dependent Variable: Output sold
Note: * represents level of significance at 10%

VII. Analysis of Factors Affecting the Choice of Sales Outlets

Table V indicates that sex of the respondents, years spent in school and the selling time are the 3 significant variables affecting the choice of sales outlet. Sex of the respondents negatively influenced the choice at 5% significant level. Being a female farmer has higher likelihood of sale to the market. Likewise, there is an inverse relationship between years spent in school and the choice of choice of sales outlet. The more educated the farmers are the lower the probability of sale to the industries. This may be due to lack of adequate information on the benefits derived from selling to the industries. But selling time has a positive and significant association with choice of sales outlet at 1% significant level. The longer the sale times the higher the chance of sale to the industries.

Table IV. Logit Result of Factors Determining the Choice of Sales Outlets.

Sellingpt Coef. Std. Err. z P>|z| [95% Conf. Interval]

age .069 .051 1.34 0.180 -.032 .170
sex -.854** .401 -2.13 0.169 -2.072 .364
marital status .147 .290 0.51 0.612 -.422 .716
school years -.073* .042 -1.74 0.807 -.663 .517
extension visit no -.146 .514 -0.28 0.777 -1.153 .861
farm size -.102 .184 -0.55 0.582 -.463 .260
family size .126 .227 0.55 0.580 -.319 .571
children schooling -.079 .066 -1.19 0.235 -.209 .051
extension visit .489 .326 1.50 0.134 -.150 1.128
selling time .735*** .175 4.19 0.000 .391 1.078
_cons -3.328 3.304 -1.01 0.314 -9.804 3.148

Source: Field Survey, 2016

- *** Significant at 1%, ** Significant at 5% and * Significant at 10%
- Dependent Variable: Dummy (1 if Sale to industry and 0 if otherwise)

VIII. Test of Hypothesis using the Chow Test

$$Fcal = \frac{S_5 / k}{S_4 / df}$$

S1 = Residual sum of squares for pooled
S2 = Residual sum of square for sellers to the industry
S3 = Residual sum of squares for sellers to the market
S4 = S2+S3
S5 = S1-S4
Df = n1+n2 – 2k
n1 = no. of sellers to the industry
n2 = no. of sellers to the market
k = no of variables + constant
Ftab = F (k, df)

Decision rule**:**
i. If fcal > ftab: Ho is rejected
ii. If fcal <ftab: Ho is accepted

n1=44
n2=56
k=9
df =100-18= 82
Ftab = F (k,df)
Ftab = F(9,82)
S5/K = 10.379/ 9 = 1.1532
S4/df = (S1 + S2) = 28.972/82 = 0.3533
Fcal = 1.1532/0.3533 = 3.2640

At 5% significant level, Ftab =1.93 which means that Fcal > Ftab

Therefore the null hypothesis (Ho) is rejected which states that there is significant difference between the outputs of farmers that sell to the industry and those that sell to the general market.

The study therefore recommended that:

1. Quick government intervention is needed to encourage agricultural mechanization. This will assist the farmers to increase their scale of production with better efficiency for higher outputs and supply to the industries for sale. This will also translate to higher income for the farmers and reduce their level of poverty.
2. Also, seminars and other forms of public awareness should be created for the farmers on the benefits in selling to the industries more so that it are more profitable to do so in the study area.
3. Government should make available more frequent extension agent visits to educate the farmers for better choice of sales outlets.

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