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PRODUCTION AND PROCESSING FUNCTION AMONG FEMALE CASSAVA FARMERS IN OHAJI/EGBEMA LGA, IMO STATE

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Abstract

The study analyzed the production and processing (*gari*) function of cassava among women farmers in Ohaji/Egbema Local Government Area (LGA) of Imo State. The study elicited data from 90 female farmers using a multistage random sampling procedure. The study showed that about 6.78 tonnes of roots were produced from average farm size of 0.45 hectares established by the farmers in the study area. About 4.52 tonnes of cassava roots were also processed, with estimated quantity of 1.29 tonnes of *gari* and 2.26 tonnes consumed in other forms. The results also showed a direct relationship between fresh cassava tubers produced and quantity of *gari* processed by farmers. The coefficient of farm size, labour and capital had a direct relationship with cassava output and were highly significant at 1% level with R^2 value of 0.9034. The coefficients of cassava roots, capital and red oil used had a direct relationship with quantity of *gari* produced with an R^2 value was 0.7540. The results also showed that the major constraints militating against production and processing include lack of credit and labour intensity. The results therefore call policies that would make credit and more land accessible and available to female cassava farmers for increased cassava output and processing into gari.

Keywords: Participation, Women, Cassava, Production, Processing and Gari

Introduction

Sabo (2006), noted that women contribute between 40 to 65% of all hours spent in agricultural production and processing, and undertake 60 to 90% of the rural agricultural product marketing, thus providing more than two thirds of the workforce in agricultural production and marketing. The attendant increase in agricultural production arising from women will increase the farm output of the households and improve their standard of living (Chinasaokwu, 2012). However, men and women differ in their knowledge of resources, and these imply differences in their resource use in cassava production and processing. Such differences in resource use and knowledge are important for biodiversity conservation and resource management, and underscore the importance of a gender-based analysis of how spaces and places are used, valued, and struggled over in specific cultures (Eze, 2012). Cassava is one of the traditional crops in Nigeria that have been identified for the promotion of food security because of its ability to withstand adverse climatic conditions, and high potential for value addition (GoK, 2005). It is consumed in many parts of West Africa in the form of gari, fufu, tapioca and flour. Cassava also has the potential to increase farm incomes, reduce rural and urban poverty and help close the food gap (Nwakor and Nwakor, 2012).

Studies have clearly shown that women play vital roles in agricultural production in general, and cassava production in particular (FAO, 2006). Although, women have little knowledge about and very little access to modern technology that could benefit not only themselves, but also the nations which they feed (Fonjong and Athanasia, 2007). Women often have little access to or have been discriminated against in the distribution of production factors (Kinkingninhoun-Mêdagbé *et al.*, 2008). These situations affect the productivity, efficiency, income generation and hence the welfare of men and women differently (Basile, 2001). In this view, this research analyzed production and processing function of cassava among women farmers in Ohaji/Egbema LGA, Imo State.

Methodology

This research was conducted in Ohaji/Egbema LGA, Imo State. The Local Government is one of the largest LGAs in Imo State with an estimated population of 251,900 people (NPC 2019). Bounded by Owerri, Oguta LGA and Ogba/Egbema/Ndoni in Rivers State to the east, north and south-west respectively. Made up of 16 autonomous communities which include; Egbema, Awara, Ohuba, Mgbbrirchi, Umuapu, Umuokanne, Obosina, Umunwa, Oloshi, Mmabu, Obiakpu, Obititi Umuagwo and Opuoma Egbema. A multi stage random sampling technique was used in selecting the respondents for this study. In the first stage, 5 autonomous communities out of the 16 autonomous communities were randomly selected. In the second stage, 3 villages' were selected randomly from each of the selected communities, and finally, 6 female cassava farmers involved in cassava production and processing were selected randomly each from the villages, giving a sample size of 90 respondents for the study. Structured questionnaire was used to collect data for the study. The level of cassava production and processing was analyzed by the use of descriptive statistics. The effect of cassava production on processing analyzed by the use of correlation coefficient and determinants of level of cassava production and processing among female farmers estimated by the use of the use of ordinary least square regression analysis. The Pearson's Product Moment Correlation coefficient model is expressed thus:

$$r = \frac{n\sum xy - \sum x \sum y}{\sqrt{[n(\sum x^2) - (\sum x^2)] - [x(\sum y2) - (\sum y2)]}} \ldots\ldots (1)$$

Where;
r = Correlation coefficient
x = Quantity of gari processed (tonnes)
y = Quantity of cassava roots (tonnes)
n = Number of respondents

Ordinary Least Square regression model (OLS) was used to estimate production and processing function among female cassava farmers. Four functional forms were estimated and lead equation selected based on high R^2 value, number of significant explanatory variables and conformity to *a priori* expectations. The model is expressed thus;

$Y = f(X_1, X_2, X_3, X_4, X_5) + e \ldots\ldots (2)$
Where;
Y = Quantity of cassava root produced in tonnes
X_1= Farm size (hectare)
X_2 =Labour (mandays)
X_3= Quantity of fertilizer used (kg)
X_4= Quantity of planting materials (bundles)
X_5= Capital inputs depreciated (₦)
e_i = error term

The model for processing function is also expressed thus;
$Y = f(X_1, X_2, X_3, X_4, X_5, X_6) + e \ldots\ldots (3)$
Where;
Y = Quantity of gari processed (kg)
X_1= Quantity of cassava root (kg)
X_2 =Labour (manday)
X_3= Capital inputs depreciated (₦)
X_4= Quantity of firewood (₦)
X_5= Quantity of water (litre)
X_6= Volume of red oil (litre)
e = error term

Results and Discussion

Cassava Production and Processing among Female Farmers

The results in Table 1 show the quantity of cassava produced, processed into gari, consumed in other forms, and the quantity of gari obtained.

Table 1: Quantity of Cassava Production and Processing by Female Farmers

Variable	Mean	Std.Dev	Min	Max
Farm Size (ha)	0.45	0.18	0.05	5.60
Cassava Output (kg)	6,783.90	3,914.31	751.90	83,615.51
Quantity of roots Consumed in other forms (kg)	2,261.30	1,304.77	182.89	27,682.43
Quantity of roots processed into gari (kg)	4,522.60	2,651.97	301.74	52,571.65
Quantity of gari (kg)	1,292.17	816.11	93.14	14,812.00

Source: Field Survey, 2018

The results in Table 1 show an average level of cassava output of 6.78tonnes from about 0.45ha cultivated by the female farmers. About 4.52tonnes of this was processed into gari, with an output of about 1.29tonnes. This implies that most of the cassava produced was processed into gari being one of the major staples in the study area. FAO (2000), noted that with the increasing male migration, women are becoming the sole producers and processors in the household economy. The results agree with Unamma (2003), who stated that cassava production and processing is dominated by women and cassava being regarded as women's crop.

Relationship between quantity of gari processed and quantity of cassava root

The results in Table 2 below show the relationship between cassava production and gari processed.

Table 2: Correlation analyses between quantity of cassava processed and the quantity of gari obtained

	Cassava output
Cassava output	1.00
Quantity of gari processed	0.82***
	(0.000)
Quantity of roots processed into gari	0.67**
	(0.008)

Source: Results from STATA 13A. * and ** is significant at 1% and 5% level respectively. The figures in parenthesis are t- values**

Table 2 showed a correlation coefficient of 0.82 and 0.67 which was significant at 1% and 5% level respectively. This was positive implying a direct relationship between cassava output and quantity of gari processed and quantity of roots processed into gari each. This also implies that gari was the major product of processing going by the significant level of this relationship. This might not be far from the conclusion that the demand for gari both for household consumption, schools and food vendors were high.

Production function for cassava among female farmers

The results in Table 3 show the determinants of cassava production among female farmers. The exponential functional form was chosen as the lead equation based on a high R^2 value, number of significant factors and agreement with *a priori* expectations. The R^2 value of 0.9034 indicates 90.34% variability in output was explained by the independent variables included in the model. The F value was also highly significant at 1% level indicating goodness of fit of the regression line. The coefficient of farm size was positive and highly significant at 1% level. This implies that an increase in farm size will lead to a corresponding increase in cassava output. Similarly, the coefficient of labour was also positive and highly significant at 1% level. This implies that any increase in labour will lead to a corresponding increase in cassava output. Capital was positive and highly significant at 1% level, implying a direct relationship with cassava output. This result is in line with those of Eze *et al*. (2012), Girei and Dire (2013), Ogunbameru and Okeowo (2013), Girei, *et al.* (2014) and Onumadu *et al.* (2014) in different States of Nigeria.

Table 3: Production Function for Cassava among Female Farmers

Variable	Linear	+Exponential	Cobb-Douglas	Semi-Log
Constant	9515.70	6.482	4.9698	1910.304
	(3.24**)	(36.92***)	(22.66***)	(0.16)
Farm size	9286.009	0.3376	1.0384	18520.35
	(9.42***)	(5.73***)	(3.70***)	(10.34***)
Labour	167.975	0.0126	0.9711	11439.09
	(24.71***)	(31.16***)	(8.66***)	(7.38***)
Fertilizer	-173.175	-0.0059	-0.0764	-11190.43
	(-2.57**)	(-1.49)	(-1.22)	(-3.28**)
Planting Materials	81.906	0.0016	0.0086	1.239.41
	(1.01)	(0.35)	(0.28)	(0.75)
Capital	0.580	0.0001	0.0023	413.503
	(1.26)	(4.24***)	(0.22)	(0.73)
R^2	0.8634	0.9034	0.8969	0.8045
Adjusted R^2	0.8574	0.8991	0.8863	0.7958
F	144.08***	213.17***	17.80***	92.98***

Source: Results from STATA 13A. *, ** and * is significant at 10%, 5% and 1% level. Figures in parenthesis are t values. + = lead equation**

Processing Function for Cassava into Gari among Female Farmers

The results in Table 4 show the determinants of cassava processing into gari among female farmers in the study area.

Table 4: Processing Function Estimation for Gari among Female Farmers

Variable	Linear	+Exponential	Cobb-Douglas	Semi-log
Constant	-40.667	2.1785	-8.8964	-614.8172
	(-2.53**)	(7.71***)	(-5.10***)	(-5.98***)
Cassava Roots	0.0504	0.0010	0.5947	31.6744
	(4.67***)	(5.36***)	(5.04***)	(4.56***)
Labour	0.3431	-0.0007	0.0151	2.3693
	(0.39)	(-0.05)	(0.12)	(0.31)
Capital	0.0124	0.0002	1.0504	53.7189
	(3.49**)	(3.76***)	(4.49***)	(3.90***)
Firewood	-1.0059	-0.0053	-0.0825	-4.1676
	(-0.67)	(-0.20)	(-0.82)	(-0.71)
Water	0.4771	0.0025	0.0905	5.0346
	(0.98)	(0.29)	(0.92)	(0.87)
Costs of Red Oil	1.5481	0.0212	0.1169	7.45792
	(2.25*)	(1.75*)	(1.47)	(1.59)
R^2	0.7369	0.7540	0.7478	0.7038
Adjusted R^2	0.7071	0.7261	0.7136	0.6703
F	24.74***	27.07***	25.50***	20.99***

Source: Results from STATA 13A**.** *, ** and *** in significant at 10%, 5% and 1% level figures in parenthesis are t values. + = lead equation**.**

Table 4 show the processing function estimation for gari in the study area. The results showed that the exponential functional form was the lead equation based on a high R^2 value, number of significant factors and agreement with a *priori* expectations. The R^2 value of 0.7540 indicates 75.40% variability in the value of gari was explained by the independent variables included in the model, and F value indicating goodness of fit of the regression line. The coefficient of cassava roots was positive and highly significant at 1% level. This implies that any increase in cassava roots will lead to a corresponding increase in the quantity of gari processed in the study area. This is expected and in accordance with *a priori* expectations because of the high demand for gari in the study area. The female farmers increase the output of roots produced to enable them meet up with demand for more gari which is one of the major staples in Imo State. The coefficient of capital inputs was positive and highly significant at 1% level. This implies that any increase in capital will lead to a corresponding increase in gari processed in the study area. The coefficient of red oil cost was also positive and significant at 10% level. This implies that any increase in quantity of red oil will also lead to a corresponding increase in quantity of gari processed in the study area.

Constraints militating against Cassava Production and Processing in the study area

The results in Table 5 showed the constraints militating against cassava production and processing into gari by female farmers in the study area.

Table 5: Constraints Militating Against Cassava Production and Processing in to Gari

Constraints	*Frequency	%(Percentage)	Rank
Lack of credit	82	91.11	1
Lack of improved planting materials	68	75.56	6
Crude implements	72	80.00	4
Lack of inputs	69	76.67	5
Climate change	53	58.89	9
Lack of processing machine	65	72.22	7
High cost of labour	75	83.33	3
Land tenure system	55	61.11	8
Low shelf life	23	25.56	14
Labour intensive	80	88.89	2
Lack of extension contacts	32	35.56	12
Poor marketing	12	13.33	17
Poor yield	50	55.56	10
Low adaptability	22	24.44	16
Pest and disease attack	28	31.11	13
Poor packaging	10	11.11	19
Poor product quality	9	10.00	20
Unavailability of water	11	12.22	18
Inconsistency in government policy	23	25.56	14
Cattle menace	47	52.22	11

Source: Field Survey, 2018. * = Multiple responses recorded

The results showed that the most important constraint militating against production and processing was lack of credit (91.11%) which ranked the highest. This was followed by labour intensity (88.89%), high cost of labour (83.33%), crude implements (80.00%), lack of inputs (76.67%), lack of improved planting materials (75.56%), and lack of processing machines (72.22%) which ranked second, third, fourth, fifth, sixth and seventh in that order. Other important constraints include; land tenure system (61.11%), climate change (58.89%), poor yield (55.56%) and cattle manure (52.22%) which ranked eighth, ninth, tenth and eleventh respectively.

Conclusion

Results show positive relationship between cassava production and processing into gari among the female farmers. The determinants of cassava production were farm size, labour, and capital, and for cassava processing as quantity of cassava roots produced, capital input and quantity of red oil used. Lack of credit, labour intensity, high cost of labour, crude implement, lack of inputs, improved planting material and processing machines were the most important constraints militating against cassava production and processing in the study area among the women. The results therefore call for land reform policies that will enable the women access to more lands for cassava production and capital inputs. There is also need for credit policies that will enable the women access to credit at low interest rates for cassava production and processing, enhance and ensure efficient use of labour, which was a major variable cost of production in the study area. This will increase cassava output, productivity, and processing into gari in the study area.

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