

## **SOCIO-ECONOMIC FACTORS INFLUENCING ADOPTION OF CASSAVA VALUE ADDED INNOVATIONS AMONG RURAL WOMEN IN ABIA STATE, NIGERIA**

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### **Abstract**

The study assessed the socio-economic factors influencing adoption of cassava value added innovations among rural households in Abiastate, Nigeria. Multistage sampling techniques were used in selecting 120 rural women for the study. Descriptive statistics was used for data analysis while Ordinary Least Squares regression model was used to test the hypothesis. The results showthat majority (62.5%) of the rural women were between the ages of 38 and 57years; 85% were educated; 75.8% were married while their average household size was six persons. About 91% of the respondents were aware of cassava value added innovations and there was alsohigh level (2.53) of adoption of cassava value added innovations among the women. OLS regression analysis showed that factors such as Access to credit (1%) had significant positive relationship with adoption of cassava value added innovations whileLevel of education (10%), Household size (10%), and Extension contact (10%) had significant negative relationship with adoption of cassava value added innovations in the study area. The study concluded that awareness and adoption of cassava value added innovations were high in Abia State, and that access to finance, level of education, household size, and extension contact were the socioeconomic factors that influenced the level of adoption of cassava value added innovations. As a result, it is recommended that the government place a greater emphasis on participatory research, among other things. This would assure farmers' active engagement in technological development processes, as well as their successful adoption of better technologies.

**Keywords:** Socio-economic factors; Adoption; Cassava; value added innovation; rural women

## **Introduction**

Cassava (*Manihot esculenta* Crantz) is a starchy root crop that belongs to the family Euphorbiaceae and grown widely in West Africa. It is one of the fastest-growing staple food crops in cassava-consuming countries, and it has maintained its popularity among farmers even as industrial demand continues to rise (Food and Agricultural Organization FAO, 2018). Cassava has consistently grown at a rate of well over 3% per year around the world (FAO, 2018). According to FAO (2018), global cassava production was around 278 million tonnes in 2018, with Africa accounting for about 170 million tonnes (almost 56% of global production) (FAOSTAT, 2019). Nigeria produced almost 60 million tonnes during the same time period (FAOSTAT, 2019).

Following the federal government of Nigeria's presidential cassava program, cassava now has a key role in foreign exchange revenues. This program brought cassava and its potential to the attention of the entire country. The initiative's purpose was to promote cassava as a viable foreign exchange earner while simultaneously developing the production infrastructure to meet the country's need (Sanni et al., 2009).

It is impossible to overstate the importance of women's position and ability to meet the challenges of agricultural development (Albright, 2006; Rahman, 2008). Women are the primary producers of agricultural goods in Nigeria (Adisa and Okunade, 2005). It is, also, not new for them to be active in African agriculture in general. Women's contributions to agricultural production should never be underestimated, according to Damisa and Yohanna (2007), because they play critical roles in society's domestic economic life. Women play significant roles in agriculture, the world over. About 70% of the agricultural workers, 80% of food producers, and 10% of those who process basic foodstuffs are women and they also undertake 60-90% of the rural marketing; thus, making up more than two third of the workforce in agricultural production (Rahman, 2004). They are almost entirely responsible for processing cassava which provides them with additional income earning opportunity and enhances their ability to contribute to household food security. Women contribute about 67% of the total agricultural labour in the Southeast zone of Nigeria (FAO, 2005). Government intervention and the efforts of non-governmental organizations have led to a number of measures that support the production, processing and marketing of cassava. Among those measures is cassava value-added innovations targeted at producing various types of food forms. These innovations have been taken to rural farm households through trainings. It is

intended that farmers' adoption of cassava value-added innovations will improve cassava value chain, boost revenue, and generate jobs. However, the extent of adoption of cassava value-added innovations remain uncertain. In addition to that, Aniedu (2006) indicated that personal issues such as gender, availability of resources required for the use of innovations, priority and benefits expected to be gained motivate farmers to adopt innovations. In the light of the foregoing, the research is anchored on the following objectives describe the socio-economic characteristics of rural women in the study area; ascertain rural women's awareness of cassava value added innovations; and assess rural women's level of adoption of cassava value added innovations in the study.

### **Methodology**

The study area was Abia State, Nigeria. The state lies between Latitude: 5° 06' 60.00" N of the equator and Longitude: 7° 21' 59.99" E of the Greenwich Meridian. The population for the study consisted of rural women who had been trained in value addition to cassava by National Root Crops Research Institute, Umudike in the state. The study adopted a multistage random sampling technique in the selection of respondents. The first stage involved purposive selection of two agricultural zones from the State. The second stage involved purposive sampling of two Local Government Areas (L.G. As) from each of the agricultural zones. The reason for purposive selection is because root and tuber crops' value-added innovations have been massively disseminated in the agricultural zones and LGAs. From each of the chosen LGA, a list of rural women beneficiaries was obtained from Women-in-Agriculture Unit of the institute. This formed the sampling frame for the rural women beneficiaries from which samples of two women groups were randomly selected in each of the selected LGA, thus giving a total of 1200 women beneficiaries. In the last stage, ten percent of the beneficiaries (60) women were randomly chosen from each of the LGAs. This gave a total sample of one hundred and twenty (120) rural women. Structured questionnaire was administered to elicit data from 120 rural women. Information were garnered from various reports relevant to the study and the web. The data were analyzed using descriptive statistics, 4-point adoption score model, and OLS regression model. The level of adoption of cassava value added innovations was measured using 4-point adoption score model. The following scaling point was adopted; Never (1), Sometimes (2), Often (3), Always (4). To determine the mean Likert level =  $X_s = \frac{\sum X.X_s}{n}$  of each item were computed by multiplying the frequency of each response pattern with its appropriate nominal value and

dividing the sum with the number of respondents to the items. This can be summarized with the equation thus;

$$X_s = \sum fn/N \dots\dots\dots (1)$$

Where,  $X_s$  = mean score;  $\Sigma$  = summation;  $f$  = frequency;  $n$  = Likert nominal value

$N$  = number of the respondents

$$X_s = 1+2+3+4 = 10/4 = 2.5.$$

The level of adoption was categorized as follows; 3.5 – 4.0 = Very High; 2.5 – 3.0 = High; < 2.5 = Low

To determine socio-economic factors influencing adoption of cassava value-added innovations, Ordinary Least Squares regression was adopted. The four functional forms were explicitly specified as follows:

Linear function:  $Y = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + e_i \dots\dots\dots (1)$

Double log function:

$$\ln(Y) = b_0 + b_1\ln x_1 + b_2\ln x_2 + b_3\ln x_3 + b_4\ln x_4 + b_5\ln x_5 + e_i \dots\dots\dots (2)$$

Semi-log function:

$$Y = b_0 + b_1\ln x_1 + b_2\ln x_2 + b_3\ln x_3 + b_4\ln x_4 + b_5\ln x_5 + e_i \dots\dots\dots (3)$$

Exponential function:

$$\ln(Y) = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + e_i \dots\dots\dots (4)$$

$Y$  = Level of Adoption of cassava value-added innovation (measured with the mean point of the 4-point adoption scale)

The independent variables are:  $X_1$  = Age of respondents in years;  $X_2$  = Marital status (married = 1; unmarried = 0);  $X_3$  = Household size (number of members of farm households);  $X_4$  = Level of education (number of years spent in school);  $X_5$  = Processing experience (number of years in farming);  $X_6$  = Major occupation (Farming=1, Trading= 2, Civil Servant= 3, Artisan= 4, Others= 5);  $X_7$  = Income from technology use (in Naira);  $X_8$  = Extension contact (No of visits);  $X_9$  = Cooperative Membership (Yes= 1, No = 0);  $X_{10}$  = Access to credit (Yes = 1, No = 0);  $e$  = Error term.

**Results and Discussion**

Table 1 describes the socio-economic characteristics of the respondents. The table reveals that 32.50 percent of the respondents were within the range of 38 to 47 years while 30 percent were within the age range of 48 to 57. The mean age of the respondents was 49 years which implies that the women were mostly middle aged that were within the

*Socio-Economic Factors Influencing Adoption of Cassava ... Nwaeke, et al*

active productive work force. Odoemenam and Obinne (2010) reported that middle aged farmers are relatively more open to risk taking and have longer planning horizon than older people.

**Table 1: Distribution of respondents according to their socioeconomic characteristics (n = 120).**

Variable	Frequency	Percentage
<b>Age (Years)</b>		
18 – 27	3	2.5
28 – 37	16	13.33
38 – 47	39	32.50
48 – 57	36	30.00
Above 57	26	21.67
	<b>120</b>	<b>100</b>
<b>Mean</b>		<b>48.68</b>
<b>Level of Education</b>		
No formal education	15	12.50
Primary school	43	35.80
Secondary school	52	43.30
Tertiary school	10	8.40
	<b>120</b>	<b>100.0</b>
<b>Mean</b>		<b>8.29</b>
<b>Household size (Persons)</b>		
1 – 5	36	30.00
6– 10	82	68.33
More than 10	2	1.67
	<b>120</b>	<b>100</b>
<b>Mean</b>		<b>6</b>
<b>Marital status</b>		
Married	91	75.80
Single	6	5.00
Widowed/Divorced	23	19.20
	<b>120</b>	<b>100</b>
<b>Major Occupation</b>		
Farming	82	68.34
Trading	25	20.83
Civil Service	6	5.00
Artisan	7	5.83
	<b>120</b>	<b>100</b>
<b>Processing Experience (Years)</b>		
1 -10	21	20.00
11 -20	71	67.62
21 -30	13	12.38
	<b>105</b>	<b>100</b>
<b>Mean</b>		<b>20.34</b>
<b>Membership of Cooperative/Association</b>		
No	37	30.80
Yes	83	69.20
	<b>120</b>	<b>100</b>
<b>Extension Contact</b>		
No	46	38.30
Yes	74	61.70
	<b>120</b>	<b>100</b>
<b>Access to Credit</b>		
No	93	77.50
Yes	27	22.50
	<b>120</b>	<b>100</b>
<b>Income realized from sale of products (N)</b>		
No amount	104	86.70
< 10,000	9	7.50
10,000 – 20,000	3	2.50
20,001 – 30,000	4	3.30
	<b>120</b>	<b>100</b>

Source: Field survey, 2021

In terms of level of education, 12.50% of the women had no formal education, 35.80% had primary education, 43.30% had secondary education, while only 8.40% had tertiary education. By implication, majority of the farmers were literate, as about 92.17 percent of them had one form of education or other. The mean number of years spent in school is 8.29 years. The high proportion of literate people in the state implies that majority of them are in a better position to be aware, understand and adopt cassava value-added innovations. This corroborates the findings of Anyairo and Onyemaechi (2014). According to Ibe (2013), educated farmers are more likely to be open to new practices.

Furthermore, majority (68.33%) of the rural women had between 6 and 10 persons per household, 30.0% had between 1 and 5 persons per household, while only 1.67% had more than 10 persons per household, with a mean household size of 6 persons. Subsistence farm households are resource poor and depend on family labour for agricultural activities like processing which in most instances is labour intensive (Idrisa, 2009).

Majority (75.8%) of the respondents as shown in table 1 were married, while 19.20% were widowed and only 5.0% were single. Married farmers are advantaged in the adoption of improved agricultural technology because spouses and children of married farmers constitute the major labour force. This result confirms the assertion of Uhuegbulem et al., (2016) that majority of the rural farmers in South-east consisted of married people.

Results of the analysis on major occupation of the respondents showed that 68.34% of the women indicated farming as their major occupation, 20.83% indicated trading as their major occupation, while only 5.0% and 5.83% were civil servants and artisans respectively. This means that majority of the respondents in the State had farming as their major occupation. This is in agreement with Mbanaso (2011) who found that most of the rural households in South-east, Nigeria have farming as their major occupation.

The result also revealed that majority of the women (67.62%) had processing experience of between 11 and 20 years, 20.0% had processing experience of between 1 and 10 years while 12.38% had processing experience of more than 20 years. Okoye (2009), indicated that experience is a major factor in the adoption of technologies and should serve as an advantage for increased investment and technology utilization.

Table 1 also revealed that majority (69.20%) of the respondents belong to farmers'/social organizations, while only 30.80% did not belong to any farmers'/social organization. This is beneficial to farming since farmers'/social organizations serve as an effective channel for

extension contact, as well as opportunities for participatory interaction with extension organizations (Mbanaso, 2010). This increases farmers' uptake of new innovations.

As regards extension contact, majority (61.70%) of the respondents had contact with extension agents while 38.30 % had none. This means that most of the respondents are expected to be more exposed to agricultural innovations like cassava value-added innovations. This corroborates the findings of Udemezue and Nwalieji (2018).

Concerning access to credit, table 1 showed that majority of the respondents (about 77.5%) had no access to credit while the remaining 22.5% had access to credit. Accessibility to farm credit encourages adoption and utilization of innovation (Okpukpara, 2010). Lack of collateral could be the reason why the women had poor access to credit. This corroborates the findings of Nse-Nelson, Ekweanya, and Osondu, (2021).

The analysis on income realized from sale of product showed that majority of the respondents (86.70%) as shown in table 1 realized no income from producing cassava value-added products, 7.50% realized less than N10,000 while 5.80% of the respondents earned N10,000 and above per month from selling cassava value-added products. This implies that majority of the respondents produce these products for consumption and do not realize income from their sale. These innovations were developed to diversify the income sources of rural women thereby improving their living standard. There is therefore the need to commercialize its production in order to achieve the main objective of developing the innovations.

Table 2 shows the distribution of rural women according to their awareness of cassava value added innovations in Abia state. Results on table 2 revealed that 95.8%, 90.8%, 90.0%, and 87.5% of the respondents were aware of high quality cassava flour, cassava chin-chin, cassava doughnut and cassava fufu flour respectively while 48.3%, 77.5% and 55.8% of the respondents were aware of cocoyam chips, cocoyam soup thickener and cocoyam flour respectively.

**Table 2: Distribution of women according to their awareness of cassava value added innovations**

	Innovation	Aware		Unaware	
		Frequency	Percentage	Frequency	Percentage
1	High quality cassava flour	115	95.8	5	4.2
2	Cassava chin-chin	109	90.8	11	9.2
3	Cassava doughnut	108	90.0	12	10.0
4	Cassava fufu flour	105	87.5	15	12.5

Source: Field survey, 2021

This implies that majority of the women were aware of cassava value added innovations in the study area. This result confirms the reports of Nwakoret *al.*, (2007) and Anieduet *al.*, (2012) that these technologies have been disseminated in the area.

Table 3 shows level of adoption of cassava value added innovations by rural women in Abia State, Nigeria. According to table 3, the respondents had high ( $\chi=2.53$ ) level of adoption of cassava value-added innovations.

**Table 3: Level of adoption of cassava value added innovations in Abia State**

	Innovation	Always	Often	Sometimes	Never	Total	Mean	Remark
1	High Quality Cassava Flour	27 (108)	19 (57)	71 (142)	3 (3)	310	2.58	High
2	Cassava chin-chin	28 (112)	18 (54)	62 (124)	12 (12)	302	2.52	High
3	Cassava doughnut	23 (92)	20 (60)	65 (130)	12 (12)	294	2.45	Low
4	Cassava fufu flour	32 (128)	18 (54)	55 (110)	15 (15)	307	2.56	High
	<b>Grand mean</b>						<b>2.53</b>	<b>High</b>

Source: Field survey, 2021; Mean score = 2.50



Respondents had high level of adoption of high quality cassava flour ( $\chi=2.58$ ), cassava chin-chin ( $\chi=2.52$ ) and cassava fufu flour ( $\chi=2.56$ ). However, they had low level of adoption of cassava doughnut ( $\chi=2.45$ ). Specifically, the most adopted cassava value added product by the women in the study area was high quality cassava flour, with a mean adoption score of 2.58. This was followed by cassava fufu flour ( $\chi=2.56$ ) and cassava chin-chin ( $\chi=5.81$ ). However, cassava chin chin recorded moderate adoption rates ( $\chi=3.33$ ). This corroborates the findings of Anyairo and Onyemachi (2014). The high level of adoption of cassava value added innovation in the area could be attributed to the fact that the state houses the research institute that developed and disseminated the innovation.

**Test of hypothesis**

H0<sub>1</sub>: The selected socio-economic characteristics of rural women participants do not significantly influence adoption of cassava value-added innovations

**Table 4: Regression estimate on the relationship between selected socio-economic characteristics and adoption of cassava value added innovations by the rural women**

Variables	Linear	Semi-log	Double Log	Exponential +
Constant	2.711 (5.44)***	.944 (4.67) ***	.615 (1.18)	2.028 (1.57) *
Age	.008 (1.06)	.004 (1.10)	.181 (1.32)	.422 (1.24)
Level of education	-.039 (-2.27) **	-.016 (-2.37) **	-.078 (-1.89) *	-.189 (-1.86) *
Household size	-.045 (-1.18)	-.015 (0.95)	-.118 (-1.50) *	-.341 (-1.76) *
Marital status	.014 (0.16)	-.002 (-0.05)	-.004 (-0.06)	.017 (0.10)
Occupation	.014 (0.15)	.007 (0.19)	-.014 (-0.19)	-.034 (-0.19)
Processing experience	-.009 (-0.89)	-.004 (-0.88)	-.005 (-1.19)	-.013 (-1.19)
Cooperative membership	.161 (0.93)	.067 (0.95)	.066 (0.94)	.160 (0.92)
Extension contact	-.326 (-2.00) **	-.141 (-2.15) **	-.130 (-1.98) **	-.297 (-1.83) *
Access to credit	2.45e-06 (2.95)***	8.60e-07 (2.55)**	8.51e-07 (2.53)**	2.43e-06 (2.94)***
Amount from sale	.063 (0.53)	.028 (0.58)	.040 (0.44)	.082 (0.36)
F-statistics	1.89 **	1.74 *	1.71 *	1.90 **
R <sup>2</sup>	0.348	0.338	0.335	0.349

Source: Field survey, 2021; Keys: \*\*\* = significant at 1%, \*\* = significant at 5%, \* = significant at 10%

Table 4 shows multiple regression estimates of the relationship between selected socio-economic characteristics and adoption of cassava value added innovations among rural women in the Abia State, Nigeria. The four functional forms were fitted in the regression model and based on some econometric criterion, such as the number and level of the significant variables and their conformity to *a priori* expectation, the lead equation was chosen. The Exponential function was chosen as the lead equation. The  $R^2$  value was 0.349 indicating that 34.9% of the variation in the adoption of cassava value added innovations was accounted for by the explanatory variables expressed in the models. The F-ratio was significant at 5% level indicating the goodness of fit of the model used in the analysis. The coefficient of level of education, household size, extension contact and access to credit were statistically significant.

The coefficient of level of education was significant at 10% level and was inversely related to adoption of cassava value added innovations. This implies that the higher the level of education of rural women, the less the utilization of cassava value added innovations in the study area. This finding does not conform to *a priori* expectation. The reason could be that the more educated women would prefer to engage in other activities than cassava value addition. Household size was significant at 10% level and was inversely related to adoption of cassava value added innovations in the study area. This implies that a unit increase in household size of the rural households would decrease the adoption of cassava value added innovations. The finding does not conform to *a priori* expectation, the reason could be that a large household signifies a higher consumption leaving little or no cassava to process for future use. The result is in line with the submissions of Adeyonu *et al.*, (2016).

Extension contact was negative and significant at 10% level of probability. This result is contrary to *a priori* expectation. Extension contact had a negative effect on level of adoption of cassava value addition. This result is in line with the findings of Adegbola *et al.*, (2019) who investigated the relationship between utilization of manual screw press for gari production and socioeconomic factors (which includes extension contact) and found out that there was a negative though not significant relationship between extension contact and utilization of manual screw press in Kwara state. The reason could be that the respondents received the training through extension agents but did not assimilate it.

Access to credit was directly related to the level of adoption of cassava value added innovations. This implies that an increase in credit access would increase the adoption of

cassava value addition. This is understandable because, access to credit makes it possible for farmers to purchase value addition inputs that will aid cassava value addition.

### **Conclusion and Recommendations**

Findings from the study show that most of the women were aware of cassava value added innovations in the study area. In a similar vein, level of adoption of cassava value added innovations in the study area was high. Despite the high level of adoption of cassava value added innovations in the study area, majority of the respondents realized no income from utilizing the innovations. Major determinants of cassava value added innovations in the study area were level of education, household size, extension contact and access to credit. This result is a clear indication that adoption of cassava value added innovations have not improved the livelihood and wellbeing of rural women in the study area.

The study thus recommends:

1. Agricultural research in Nigeria should adopt participatory research to ensure the development of tailor-made technologies.
2. Policy makers should consider farmers' socio-economic factors like level of education when designing extension intervention strategies. This will ensure that the right programmes are targeted at the right people.
3. Soft loans should be provided to trainees after trainings on value-added innovations to enable them go into commercial production of these products. Through their cooperatives, they can partner with financial institutions to facilitate release of credit.

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