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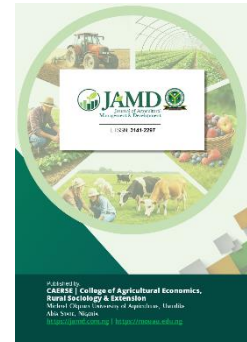
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Utilization of Improved Cassava Processing Technologies by Women Farmers in Igbo-Etiti Local Government Area, Enugu State, Nigeria

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ABSTRACT

The study analyzed the utilization of improved cassava processing technologies by women farmers in Igbo-Etiti Local Government Area, Enugu State, Nigeria. A multi-stage and purposive sampling techniques were used to collect data for the study. A total of 80 respondents were used as sample size. Data were collected from primary source using structured questionnaire and analyzed using descriptive statistics, such as frequency distribution, percentages, mean and inferential statistics. Major findings showed a high level of access to the cassava processing technologies with a grand mean of 2.63 and a high level of utilization of the technologies by the women with a grand mean of 2.71. The regression result at $P < 0.05$ with a F-ratio of 7.369** indicated a significant relationship between the level of access and level of utilization of the cassava processing technologies by the women farmers thereby rejecting the null hypothesis. The study concluded that, there was a high level of utilization of improved cassava processing technologies by women farmers in the study area and therefore recommends that the women should be encouraged to form Cooperative Societies to enable them pool their resources together and acquire the capital-intensive cassava processing machines, to boost their enterprise.

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Introduction

Cassava (*Manihot spp*) is a tropical root crop that feeds an estimated 800 million people (Awoyemi, Adesokan, Kayode, Omotesho and Osona, 2020). Cassava is primarily grown by small-holder farmers in sub-Saharan Africa, frequently on marginal lands and is an essential crop for ensuring food security and income generation. Nwakwasi, Umunakwe, Okeke, Onwuma and Nwaozuzu, (2020) asserts that in Nigeria, much of the cassava tubers produced is used for human food, with over 50% used as processed products. Cassava is a versatile crop; all parts of the plant including its root have been processed into a number of

products. These include food for human consumption, animal feeds and industrial based products. Cassava food products include garri, lafun, fufu, flour, tapioca and chips. Dextrins, starch, syrups, alcohols and dextrose are products from cassava. The cassava value chain in Nigeria is primarily built upon the labor of women for both farm-level production and value addition. This is because majority of labor associated with cassava processing is carried out by women (Forsythe, Posthumus and Martin, 2016).

Processing activities of cassava are widespread in the rural areas mostly among women who see it as a form of business or a way of generating income rather than a way of life. International Fund for Agricultural Development (IFAD, 2013) stated that in Africa about 600 million people are dependent on cassava for their food, of which garri is the major cassava product eaten by them on a daily basis. Women play a central role in cassava production, harvesting, processing and marketing contributing about 58% of the total agricultural labour in the southwest, 67% in the southeast and 58% in the central zones (Onyemauwa, 2012). Igbo-Etiti in Enugu state is one of the top leading producers of cassava in Enugu, Nigeria. Women play a central role in cassava production, processing and marketing in the state. They are almost entirely responsible for cassava processing, which provide additional income earning opportunity, and enhances their ability to contribute to household food security (Ojo *et al.* 2021).

Processing of agricultural produce requires both human and machine effort because of its complexity. According to Adiaha (2017), processing in agriculture involves the biological, physical, mechanical, and biochemical manipulation of agricultural produce in order to preserve it for further use. It involves the series of operations taken to change agricultural products into a consumer-finished product. Cassava is the most perishable of the roots and tuber crops and can deteriorate within two or three days after harvest. So, there is need to process it within the shortest time after harvest. Technologies are technical skills or instrument used in carrying out an operation that could be tedious for manual operation. For instance, processing involves transformation and preservation through physical or chemical alteration, storage, packaging and distribution (Okpeke and Onyeagocha, 2015). Kehinde and Subuola (2015) noted that the unit operations involved in cassava processing include harvesting, peeling, grating, de-watering or extracting water, sieving and frying. However, the manual operation of these processes is time consuming and very tiresome to carry out. It requires the use of various technologies in each of the unit operations for reduced human efforts (Onyenwoke and Simonyan, 2014).

Though appreciable progress has been made in the development of cassava processing technologies resulting in the successful mechanization of some of the laborious and time-consuming cassava processing operations such as peeling, grating, dewatering, frying etc, using mechanical peelers, mechanical graters, hydraulic press, granulators, dryers, fryers, sifters etc in Igbo-Etiti Local Area of Enugu State Nigeria. Therefore, this study becomes appropriate to ascertain the level of utilization of the improved cassava processing technology of women farmers in the area.

The specific objectives of the study were to:

- i. ascertain the various improved cassava processing technologies disseminated to the respondents;
- ii. ascertain their level of access to the improved cassava technologies by the respondents and;
- iii. determine the level of utilization of improved cassava processing technologies by the respondents.

H₀: there is no significant relationship between the respondents' level of access and level of utilization of the cassava processing technologies by the women farmers

Methodology

Igbo Etiti is a Local Government Area in Enugu State, Nigeria. Its headquarters is in the town of Ogbede. It has an area of 325 km² and a population of 209,248 at the 2006 census. Igbo Etiti LGA is 325 square kilometers in size and has an average temperature of 27 degrees Celsius. The region has two primary seasons: dry and wet, with total recorded rainfall in the LGA averaging 1900 mm per year. In Igbo Etiti, the average wind speed is 10 km/h. Farming is a primary source of income in the Igbo Etiti LGA, with crops such as cassava, yam, kola nut, and cocoyam being produced in large quantities.

The population of the study comprised of all the women farmers that are into cassava processing in Igbo-Etiti Local Government Area of Enugu State, Nigeria.

Multi-stage random sampling technique was used to determine the utilization of improved cassava processing technology by women farmers in Igbo-Etiti local Government Area of Enugu State, Nigeria. In the first stage a purposive sampling technique was adopted to select 4 communities utilizing the improved cassava processing technology in the area. The 4 communities Aku (idueme), Diogbe/umunko, Ekwegbe, and Ukehe in Igbo-Etiti LGA, Enugu State were selected and two villages were randomly selected from each of the four (4) communities making (8) eight villages in the second stage. Purposive sampling was used in the final stage to select ten (10) women farmers that are involved in cassava processing from the (8) eight villages as the sample size which is totaling 80 women farmers used for the study.

Data were collected from primary source using structured questionnaire and analyzed using descriptive statistics, such as frequency distribution, percentages, mean and inferential statistics like the simple linear regression.

Objective i (ascertain the various improved cassava processing technologies disseminated to the respondents) was analyzed using a 4-point Likert rating scale of: Always = 4; Sometimes = 3; Rarely = 2, Never = 1. These were summed up to obtain the bench mark mean $(4+3+2+1 = 10/4 = 2.50)$ of 2.50. Any mean value above the bench mark mean was adjudged to be a highly disseminated improved cassava processing technologies as agreed by the women while below the benchmark mean score was adjudged otherwise.

Objective ii which is the level of access to the improved cassava technology was analyzed with the use of a 4-point Likert rating scale of: Always = 4; Sometimes = 3; Rarely = 2, Never = 1. This were summed up to obtain the bench mark mean $(4+3+2+1 = 10/4 = 2.50)$ of 2.50. Any mean value above the bench mark mean was adjudged to be high level of access to the improved cassava processing technologies while below the benchmark mean score was adjudged to be low level of improved cassava processing technologies.

For Objective iii, the level of utilization of improved cassava processing technologies was analyzed with the use of a 4-point Likert rating scale of: Always = 4; Sometimes = 3; Rarely = 2, Never = 1. This were summed up to obtain an average of $(4+3+2+1 = 10/4 = 2.5)$. Any mean value above bench mark mean of 2.5 was adjudged to be high level of utilization of improved cassava processing technologies while below the benchmark mean score was adjudged low level of utilization of improved cassava processing technologies.

The hypothesis was tested with simple linear regression model. This is explicitly expressed thus:

$$Y = a + b_0 + X, e_i \quad (1)$$

Where,

Y = Level of access to improved cassava processing technologies (Mean Scores)

X = Level of utilization of improved cassava processing technologies (Mean Scores)

Results and Discussion

Cassava Processing Technologies Disseminated to Women Farmers

Entries in Table 1 showed a grand mean of **2.73** implying that the technologies were disseminated to the women processors. Furthermore, apart from Cassava peeler ($\bar{x} = 2.15$) and Milling machine ($\bar{x} = 2.26$), which were rated below the bench mark of 2.5, all the other technologies, Pressing machine ($\bar{x} = 3.03$), Dewatering machine ($\bar{x} = 2.85$), Sifting machine ($\bar{x} = 2.64$), Dryer ($\bar{x} = 2.93$), Fryer ($\bar{x} = 3.28$) were considered as technologies highly disseminated to the women processors. The Fryer ($\bar{x} = 3.28$) was the widely disseminated processing technology on improved cassava to the women, closely followed by Pressing machine ($\bar{x} = 3.03$) and Dryer ($\bar{x} = 2.93$).

Level of Access to the Improved Cassava Technologies by the Women Farmers

Table 2 is a result of the level of access of the cassava processing technologies disseminated to the women farmers in the study area. The result showed a grand mean of 2.63 which is above the bench mark of 2.5 implying that the women farmers have high level of access to the cassava processing technologies. Furthermore, apart from Cassava peeler ($\bar{x} = 2.23$), and Sifting machine ($\bar{x} = 2.25$) which rated below the bench mark, indicating low level of access to the technologies, all the other technologies such as Pressing machine ($\bar{x} = 2.83$), Dewatering machine ($\bar{x} = 2.68$), Milling machine ($\bar{x} = 2.99$), Dryer ($\bar{x} = 2.76$), and Fryer ($\bar{x} = 2.68$) were highly accessed by the women processors. This could be attributed to the fact that majority

of the women farmers were aware of the technologies as disseminated by the extension agents to them. This finding agrees with that of Ukoha (2025), that farmers highly access technologies they are very much aware of.

Level of Utilization of Improved Cassava Processing Technologies Disseminated to the Respondents

Table 3 is a result of the level of utilization of the cassava processing technologies disseminated to the women farmers in the study area. The result showed a grand mean of 2.71 which is above the bench mark of 2.50 implying that the women farmers have high level of utilization of these cassava processing technologies. Furthermore, apart from Cassava peeler ($\bar{x} = 2.26$) which rated below the bench mark, all the other technologies like Pressing machine ($\bar{x} = 2.74$), Dewatering machine ($\bar{x} = 2.65$), Milling machine ($\bar{x} = 2.96$), Sifting machine ($\bar{x} = 2.53$), Dryer ($\bar{x} = 2.99$) and Fryer ($\bar{x} = 2.75$) were highly utilized by the women processors. Similarly, the finding agrees with the finding of Odoemelam *et al*, (2016), that stated that farmers can only utilize technologies when they are aware of the technologies.

Test of Hypothesis

There is no significant relationship between the level of access to improved cassava processing technologies and the level of utilization by the women farmers. Table 4. is a test of significant relationship between access of improved cassava processing technologies and utilization by the women farmers. At $P < 0.05$, level of access with a t-ratio of -2.539** was significant and had a relationship with their level of utilization of the improved processing technologies. This finding collaborates the findings of Nwokocha (2022) that farmers accept and utilize innovations when they are fully aware of the relevance of the innovation. We therefore reject the null hypothesis that there is no significant relationship between access to improved cassava processing technologies and utilization by the women farmers and accept the alternate.

Conclusion and Recommendations

The study concluded that there is high utilization of improved cassava processing technologies by women farmers in Igbo-Etiti Local Government Area, Enugu State, Nigeria and therefore recommends that more of improved cassava processing technologies should be made more accessible and affordable for every woman farmer to acquire and utilize especially the lowly accessed ones such as cassava peeling machine for increased income. Again, the women should be encouraged to form Cooperative Societies to enable them pool their resources together and acquire the capital-intensive cassava processing machines, to boost their enterprise.

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Appendix

Table 1: Distribution of Women Farmers According Cassava Processing Technologies Disseminated to them

Cassava Processing Technologies	Strongly Agree 4	Agree 3	Disagree 2	Strongly disagree 1	$\sum fx$	Mean $\sum fx/n$	Remark
Cassava peeler	13(16.3)	2(2.25)	49(61.3)	16(20.0)	172	2.15	7 th
Pressing machine	27(33.8)	37(46.3)	7(8.8)	9(11.3)	242	3.03	2 nd
Dewatering machine	41(51.3)	7(8.8)	11(13.8)	21(26.3)	228	2.85	4 th
Milling machine	8(10.0)	34(42.5)	9(11.3)	29(36.3)	181	2.26	6 th
Sifting machine	16(20.0)	28(35.0)	27(33.8)	9(11.3)	211	2.64	5 th
Dryer	21(26.3)	41(51.3)	9(11.3)	9(11.3)	234	2.93	3 rd
Fryer	53(66.3)	7(8.8)	9(11.3)	11(13.8)	262	3.28	1 st
Grand Mean						2.73	

Source: Field Survey Data, 2023

Table 2: Distribution of Respondents Based on Level of Access to Technologies

Technologies	Always 4	Sometimes 3	Rarely 2	Never 1	$\sum fx$	Mean $\sum fx/n$	Remark
Cassava peeler	20(25.0)	15(18.8)	8(10.0)	37(46.3)	178	2.23	low
Pressing machine	27(33.8)	21(26.3)	23(28.8)	9(11.3)	226	2.83	high
Dewatering machine	27(33.8)	9(11.3)	35(43.8)	9(11.3)	214	2.68	high
Milling machine	46(57.5)	3(3.8)	15(18.8)	16(20.0)	239	2.99	high
Sifting machine	13(16.3)	29(36.3)	3(3.8)	35(43.8)	180	2.25	Low
Dryer	1039(48.8)	5(6.3)	14(17.5)	22(27.5)	221	2.76	High
Fryer	28(35.0)	8(10.0)	34(42.5)	10(12.5)	214	2.68	High
Grand Mean						2.63	

Source: Field Survey Data, 2023

Table 3: level of utilization of improved cassava processing technologies disseminated to the respondents

S/N	Technologies	Always 4	Sometimes 3	Rarely 2	Never 1	$\sum fx$	Mean $\sum fx/n$	Remark
1	Cassava peeler	21(26.3)	1(1.3)	36(45.0)	22(27.5)	181	2.26	Low
2	Pressing machine	27(33.8)	16(20.0)	26(32.5)	11(13.8)	219	2.74	High
3	Dewatering machine	16(20.0)	34(42.5)	16(20.0)	14(17.5)	212	2.65	High
4	Milling machine	36(45.0)	15(18.8)	19(23.8)	10(12.5)	237	2.96	High
5	Sifting machine	27(33.8)	9(11.3)	23(28.8)	21(26.3)	202	2.53	High
6	Dryer	46(57.5)	3(3.8)	15(18.8)	16(20.0)	239	2.99	High
7	Fryer	9(11.3)	52(65.0)	9(11.3)	10(12.5)	220	2.75	High
	Grand Mean						2.71	

Source: Field Survey Data, 2023

Table 4: Relationship between level of access to improved cassava processing technologies and utilization by the women farmers

Variables	B	Std. Error	t-value
(Constant)	4.248	0.858	4.952***
Access	-0.538	0.350	-2.539**
F-ratio			7.369**
R ²			0.529
Adjusted R			0.424

Computed from field survey data, 2023. Key: ns = not significant; * = 10%; ** = 5% significant; *** = 1% significant.