Adoption of Improved Cassava Processing Technologies by Women Entrepreneur in South – West, Nigeria

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Abstract   The study examined factors influencing adoption of cassava processing technologies by women entrepreneur in South – West, Nigeria using primary data. A multistage sampling technique was used to select 373 respondents with the aid of a structured questionnaire. Descriptive statistics and probit regression model were used to analyse the data. Results revealed that majority (74%) of the women entrepreneur were under 50 years, 80% were married with an average age of 43 years. About 86.6% of the respondents had primary education with 51% of the respondents having 4 - 6 members per house. It further revealed that 67% of the women entrepreneur adopted improved technologies with cassava mechanical grater being the most used improved technology while the factors affecting adoption of the technologies were educational status, source of information, credit and raw material. It was also revealed that the challenges faced by the women entrepreneur were high cost of equipment, non-availability of the technologies, difficult to operate and lack of knowledge. The study concluded that there should be easy accessibility to improved technologies among women entrepreneurs.

Keywords: adoption, improved technologies, cassava processing, women entrepreneurs

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1. Introduction

To Entrepreneurship is the willingness to take risks, develop, organize and manage a business venture in a competitive global market place that is constantly evolving [1]. It is the adoption of new forms of business organization, technologies and enterprises producing goods not previously available at a location [2]. An entrepreneurial economy whether on the national, regional or community level differs significantly from a non – entrepreneurial economy in many respects; not only by its economic structure and economic vigorousness but by the social vitality and quality of life which it offers with a consequent attractiveness to people [3].

Nigeria is the highest cassava producer in the world; cassava production in Nigeria in 2004 jumped to about 30 million tons [4] which ranks cassava production higher in volume than yam, sorghum and rice. About 75 percent of the world's poor live in rural areas, yet resources and policies continue to be in favour of urban development. Most of the rural population depends directly and indirectly on small – scale food production and processing [5].

Processing activities especially cassava are widespread in the rural areas mostly among women which they see as a form of business or rather a way of generating income rather than a way of life. It has been seen as a way of reducing poverty, food security as well as employment generation. Being the most formal processed crop in the Southern and Middle Belt areas of the country, cassava processing equipment are by far more widespread in the country than any other agricultural implements [6]. Processing cassava tuber into dry form reduces its moisture content and converts it to a more durable and stable product with less volume which makes it more transportable. Cassava roots are processed by a variety of methods into different products according to local customs and preferences. Processing has been an integral part of cassava utilization because of the crop's poor storability and the need to reduce, if not eliminated the toxic substance that make it unfit for consumption.

Cassava processing using the traditional methods is not too efficient because of tremendous losses during processing and high labour inputs. These problems persist primarily due to the lack of appropriate postharvest facilities [7]. It has been commonly shown that acceptance of new technology practices take place over time [8]. Nigerian women play indispensable role in solving many problems that constitute bottlenecks in smallholder farming systems especially weeding, harvesting, processing and storage [9]. The improved technology which is the improved method of processing cassava conserves energy and is more hygienic. This improved processing equipment include: peeler, grater, hydraulic press, granulator, dryer, fryer, sifter, fermentation tank, hammer mill and grinder, which are capable of enhancing acceptability of cassava products.

This study seeks to investigate the adoption of improved processing technologies among small scale

women entrepreneurs who are into cassava processing in South West, Nigeria.

2. Literature Review

Adoption is said to be the continued use of innovation after individuals have passed through certain mental processes [10]. It could also be explained through different processes such as awareness, interest, evaluation and trial [10,11,12]. The adoption of improved technology is influenced by various factors such as; personal characteristics, traditional believes, institutional and socio economic factors [10].

Reference [13] found the rate of adoption of improved technologies to be relatively higher because the technologies were easy to operate. [14] on utilization of modern cassava processing techniques among women processor found that modern cassava processing techniques save time and increases production. [15] opined that women who engage in agricultural value chain often reject innovations when innovations are inappropriate or unrelated to their needs or problems. Technologies that are simple to understand and use tend to be readily adopted than the ones that are complicated.

Reference [16] defined diffusion of innovation as a process by which innovation spreads; classical diffusion adoption theory consists of diffusion process and adoption process. [17] and [10] differentiate between adoption and diffusion concepts that adoption is a concept which refers to the acceptance and continuous use of an idea or practice by single unit of a potential audience while diffusion is a concept which refers to the spread of idea through the totality of the potential audience or social systems.

3. Methodology

Study Area: The study was carried in South – West geo-political zone of Nigeria. The zone comprises of Lagos, Ekiti, Osun, Ogun, Ondo and Oyo States with a land mass of 76,852 square Kilometres and population of 25.2 million [18]. The South West zone owns about 60 percent of the nation's industrial capacity, 44 percent of banking assets, 68 percent of insurance assets and it has the nation's three deep sea ports of Apapa, Tin can Island and Roro. It is bounded in the North and East by the Kwara and Kogi states of Nigeria, in the west by the Republic of Benin and in the south by the Atlantic Ocean. The three main agro – ecological zones in the area are the swamp on the Atlantic coast, tropical rainforest in the middle and guinea savannah in the North. The people are the Yoruba with their very rich cultural heritages. The zone is agrarian with abundant permanent crops (such as cocoa, and oil palm) and food crops (such as cassava, maize, yam, cocoyam and varieties of vegetables). The people of the zone are the most educated in Nigeria and are highly significant in shaping the direction of the economy of the country.

Sampling Technique and Data Collection: Primary data were collected with the use of a well-structured questionnaire to collect different types of improved cassava processing technologies adopted by the women entrepreneur and the socio-economic characteristics of the

entrepreneurs. The data were sourced from women entrepreneurs who were into small scale cassava processing enterprises from Ogun, Ondo and Oyo States in the South – West. A multistage sampling technique was used to randomly select the respondents. The first stage was the purposive selection of the three states because of the preponderance of cassava products and processors as well as improved processing technologies in those States. The second stage was the random selection of three Local Government Areas (LGAs) per State. The third stage involved the selection of three communities per LGA using simple random technique. In the fourth stage, twenty small scale cassava processors were as well randomly selected, making a total of 540 respondents but 373 were valid for the analysis.

Analytical Techniques: The data collected were analysed using descriptive statistics such as frequency distribution and percentage to examine the socio – economic characteristics, level of adoption by the women entrepreneurs while probit regression model was used to examine factors influencing adoption of improved cassava technologies by women entrepreneurs in the study area.

The Probit regression Model is a model used in estimating the probability of events based on dependent dichotomous variables [19]. A dichotomous dependent variable assumes only two values (either zero or one).

The probit model to be estimated is given as:

$$P\left(Yt = \frac{1}{x^i}\right) = \frac{\exp(xi\beta)}{1+\exp(xi\beta)}.$$

An equivalent form can be stated thus,

$$\frac{\exp(xib)}{1+\exp(xib)} = \frac{1}{1+\exp(xib)}.$$

This can be expressed as,

$$q_{it} = bx_{it} + e_{it}$$

where q_{it} = an unobservable latent variable for adopters(1 for adopters and 0 for non adopters)

Xit $\quad$ = vector of explanatory variables
b $\quad$ = vector of parameter to be estimated
e_{it} $\quad$ = error term

The observed binary (1, 0) for entrepreneur who adopts or otherwise, is assumed in the usual probit model. The probability that the binary assumes the value 1 implies,

$$\text{Prob}(q_{it} = 1) = \frac{e_{it}^x + \beta_{it}^x}{1+e_{it}^x + \beta_{it}^x}.$$

Thus, in this study the explanatory variables (Xs) are: marital status (married =1 and 0 = otherwise), household size (numbers), educational status (years spent in school), experience (years), source of information (1 = Friends and 0 = otherwise), source of credit (1 = Cooperative and 0 = otherwise), source of raw materials and number of groups affiliated to.

4. Results and Discussion

Figure **Socio – economic Characteristics of the Cassava Processors:** The results from the analysis of the socio – economic characteristics of the women

entrepreneurs are presented in Table 1. The results revealed that over 74 percent of the small scale women entrepreneurs were under 50 years old and that the average age was 43 years while some (39. 5%) of them were in the age bracket of 40 – 49 years. This implies that the entrepreneurs were relatively young and they were still within the economically active age, which is similar to what [22] found out among women rural farmers in Ekiti State, Nigeria. It was shown that 80 percent of the entrepreneurs were married which implies that most of the respondents were matured and able to take care of their households. The women entrepreneurs were highly experienced in cassava processing experience and the average years of experience in cassava processing was 13 years. The average number of years spent in school was six years, while about 82.0 percent of the women entrepreneurs had at least primary school education and none of the sampled respondents had beyond secondary school education. This indicates that the level of educational attainment by the women entrepreneurs was fairly low and this could have implication on the adoption of improved technologies of cassava processing. This finding is not totally support [20] who reported that about 77% of Nigerian women are illiterates.

Table 2 showed the extent of adoption of the improved cassava processing technologies by women entrepreneurs. Among the technologies adopted, cassava mechanical grater was mostly utilized by the women entrepreneurs compared to traditional way of grating. The reason being that without grating of cassava in the production process, the different processed output from cassava cannot be achieved. The peeler was the least technology adopted because they are yet to understand the technicality involved as well as the efficiency of the peeler when compared to the traditional knives used. This is in line with [21] and [10] that the level of adoption was high with the use of mechanical grate, power screw dehydrating press and mechanical sifter.

Table 1. Socio – economic Characteristics of Cassava Processors in South – West, Nigeria

Processors Characteristics	Frequency	Percentage
Marital Status		
Single	12	3.2
Married	299	80.2
Widowed/divorced	62	16.6
Age (years)		
< 30	29	7.7
30 – 39	101	27.2
40 – 49	147	39.5
50 – 59	77	20.6
above 60	19	5.0
Education (years)		
No formal Education	67	18.0
Incomplete Primary Education	80	21.4
Completed primary Education	91	24.4
Incomplete Secondary Education	85	22.8
Completed Secondary Education	50	13.4
Household Size		
1 – 3	25	6.7
4 – 6	191	51.2
7 – 9	137	36.8
10 and above	20	5.3
Processing experience (years)		
1 – 5	84	23.0
6 – 10	121	32.0
11 – 15	57	15.0
16 and above	111	30.0

Source: Computed From Field Survey, 2013; Sample size 373.

Table 2. Distribution of the Respondents by the Use of Improved Cassava Processing Technologies

Modern Technologies	Frequently used	Occasionally used	Rarely used	Not used at all	Mean score	Rank
Hydraulic press	585	216	20	0	136.8	2nd
Cassava grater	702	180	40	-	153.6	1st
Fryer	630	26	150	-	134.3	3rd
Sifter	528	200	97	-	137.5	4th
Grinder	-	150	200	-	58.3	5th
Hammer mill	-	-	58	-	9.6	6th
Fermentation tank	210	76	265	-	91.8	7th
Peeler	-	-	28	-	4.6	8th
total						

Source: Computed from field survey, 2013

Table 3. Distribution by the level of adoption

Adoption of improved technologies	Frequency	Percent
Adopter	250	67.0
Non-adopter	123	33.0
Total	373	100

Source: Computed from field survey, 2013

Adoption of modern cassava processing technologies: - The results of the adoption rate of improved cassava processing technologies by women entrepreneurs are presented in Table 3. The result showed that 67 percent of the women entrepreneurs adopted improved cassava processing technologies while 33 percent did not adopt. This could be due to the fact that majority of the women entrepreneurs that adopted were innovators. This is because the women were able to adopt the commercialized improved technologies which is the innovation.

Benefits Derived from Using Improved Cassava Processing Technologies:

From Table 4, it was revealed that few (27.6%) of the women entrepreneurs adopted improved technologies because it increased their profits. The probable reason was that the technologies adopted were able to reduce wastage during the course of production to the barest minimum thereby increase the quantity vis-a-vis revenue. About 26.8% of the sampled respondents adopted improved technologies because it increased market value, while 26.0% and 12.1% based their judgement on increased in quality and quantity of the cassava products respectively. This is because most of this equipment was designed in

such a way that they are operated in hygienic conditions and properly packaged for consumption.

Table 4. Distribution of the respondents by benefits derived

Benefits	Frequency	Percent
Increased profit	103	27.6
Increased quantity	45	12.1
Increased quality	97	26.0
Reduced labour	28	7.5
Increased market value	100	26.8

Source: Computed from field survey, 2013.

Factors Influencing Adoption of Improved Cassava Processing Technologies among Women Entrepreneurs in the Study Area

The estimates of the probit analysis in Table 5 showed how the coefficients of the independent variables influenced the adoption of improved cassava technologies of the small scale women entrepreneurs. The results showed that educational status, source of information, source of credit and source of raw materials of the small scale women entrepreneurs were the major determinants of adoption in the study area. The coefficients of all the variables were positive except for source of raw materials and number of groups affiliated to. This implies that increase in the value of any of this variable will increase the probability of adopting improved technologies. For instance, the more experienced and educated the women entrepreneurs are, the likelihood of being able to adopt improved cassava processing technologies. This corroborated the findings of [10] who reported that there was significant influence of years of schooling on adoption of new improved technologies among farmers in Eastern Nigeria. On the other hand, source of raw materials and number of groups affiliated to had negative coefficients and significantly affected the level of adoption in the study area. An increase in the value of any of these variables increases the likelihood of not being able to adopt improved cassava technologies.

Table 5. Results of the Probit Regression Model

Explanatory Variables	Coefficients	Standard Error	Marginal Effects	Standard Error
Marital Status	0.101	0.213	0.337	0.071
Household Size	0.041	0.053	0.014	0.018
Educational Status	0.041*	0.025	0.013*	0.008
Experience	0.017	0.013	0.006	0.004
Source of information	0.026**	0.013	0.009**	0.004
Source of credit	0.314**	0.134	0.104**	0.043
Source of raw material	-0.716***	0.179	-0.238***	0.054
Number of groups affiliated to	-0.171	0.213	-0.034	0.045

Source: Computed from field survey, 2013.

Constraints to the Adoption of Improved Cassava Processing Technologies

Constraints in this context implies the problems and challenges prohibiting women entrepreneurs in cassava processing from realizing the expected yield in terms of production thereby affecting their profit in the course of adopting improved technologies. Table 6 showed the main constraints highlighted by the women entrepreneurs. It was shown that 40% of the respondents interviewed said that high cost of equipment, 19.6% said that non-availability of the equipment, 13.4% reported that the technologies most especially the machines were difficult to operate and 26.8% said lack of knowledge were the major challenges affecting the adoption of the improved cassava processing technologies. These problems need to be addressed in order to increase the level of adoption among the women entrepreneurs in order to accrue more profits and as well make the enterprise more attractive; and increase quality of the products.

Table 6. Distribution by the constraint to the adoption of modern technologies

Constraints	Frequency	Percent
High cost of equipment	150	40.2
Non availability of equipment	73	19.6
Difficult to operate	50	13.4
Lack of knowledge	100	26.8

Source: Computed from field survey, 2013.

5. Summary and Recommendation

The study revealed that majority (74%) of the women entrepreneurs were under 50 years, 80% were married with an average age of 43 years. About 82.0% of the respondents had at least primary education with 51% of the respondents having 4-6 members per household. It was further revealed that 67% of the women entrepreneurs adopted improved technologies with cassava mechanical grater being the most used improved technology in the area. The factors affecting adoption of the technologies were educational status, source of information, credit and raw material. It was also revealed that the challenges faced by the women entrepreneurs were high cost of equipment, non-availability of the technologies, difficulty in operation and lack of knowledge. It is therefore recommended that policies that would assist the women entrepreneurs in terms of reducing the cost of equipment should be encouraged and also, local fabricators should be encouraged to produce equipment at reduced cost.

References

[1] David, R, Entrepreneurship in Business Enterprise, 2013.

[2] Petrin, K, Entrepreneurship and supporting institutions: An analytical approach, International Rural Development Summer School, Herrshing Germany, 8-14 Sept., 1991.

[3] Khurram, H, *Introduction and implementation of TQM*.www.isixsigma.com, 2006.

[4] Central Bank of Nigeria (CBN) Statistical Bulletin. Vol. 14. December, p. 259-260.

[5] United Nations Industrial Development Organization, Report of the Secretary – General on the Review and Appraisal of the Progress Made in Achieving the Goals and Objectives of the Programme of Action of the International Conference on Population and Development, 2004. Population Newsletters Number 77. Population Division of the United Nations Secretariat, Department of Economic and Social Affairs New York, 2004. Retrieved from:

http://www.un.org/esa/population/publications/popnews/Newsltr-No.%2077.pdf, (Accessed on: December 06, 2010).

[6] Oni, B., Socio-economic Aspect of Cassava Cultivation and Use in Africa: Implications for Development of appropriate Technology, International Institute of Tropical Agriculture, Ibadan, Nigeria, COSCA Working Paper No.8 Collaborative Study of Cassava in Africa, 2006.

[7] Jerome, A, Technical efficiency in some privatized enterprises in Nigeria. *African Journal of Economic policy*, vol. 11, No1, pp 17-34.

[8] Nweke, F.I, Processing Potentials for Cassava Production Growth. Working Paper No. 11. Collaborative Study on Cassava in Africa International Institute of Tropical Agriculture, Ibadan, pp.50-52, 1994.

[9] Awoyemi, T.T, A Gender Analysis of Economic Efficiency of Cassava Based Farm holding. Unpublished PhD Thesis, Department of Agricultural Extension Services, University of Ibadan, Oyo State, 2000.

[10] Suleman, A, Factors Influencing Adoption of Improved Cassava Processing Technologies by Women Processor in Akoko-Edo, Edo State. Faculty of Agriculture, Ahmadu Bello University, Zaira, Nigeria. Published Thesis, 2012.

[11] Ekong, E.E, *An Introduction and Analysis of Rural Nigeria* (Second Edition), Dove Publishers Limited, Uyo, Nigeria pp 369, 2003.

[12] Agbamu, J.U, *Essential of Agricultural Communication in Nigeria*. Malthouse Press Limited, 11B Gorola Street, Off Adeola Victoria Island, Lagos, 2006.

[13] Yusuf, H.O, Factors Influencing Adoption of Improved Groundnut Oil Processing Technologies by Rural Women in Kaduna State, Nigeria. Unpublished M.Sc. Thesis, Department of Agricultural

Economics and Rural Sociology, Ahmadu Bello University, Zaria, 2009.

[14] Wole-Alo, F.I. and Okunlola, J.O, Utilization of Modern Cassava Processing Technologies among Smallholder Women Processor in Ondo State, Nigeria. Journal of Biology, Agriculture and Healthcare, 5(12): 29-33. 2015

[15] Mokonem, H, The Structure of Agricultural Production, Factors of Productivity and Technology Adoption In Cote 'd Ivore. *Dissertation Abstract International* 5(2):74, 1991.

[16] Rogers, E.M, *Diffusion of Innovations*. Collier Macmillan, 3rd edition, New York, 220p, 1995.

[17] Odoemenem, I.U, Capital Resource Mobilization and Allocation Efficiency by Small – Scale Cereal Crop Farmers of Benue State, Nigeria. Unpublished Ph.D. Dissertation, Department of Agricultural Economics Management and Extension, Ebonyi State University, Abakaliki, Nigeria, 2007.

[18] National Bureau of Statistics, Provisional Total 2006 census figures by Local Government Areas: http://www.nigeriastat.gov.ng/nbsapps as retrieved on 9th of March, 2010.

[19] Gujarati, D.N., Porter, D.C, "Basic Econometrics," Fifth Edition, McGraw – HILL International Editions Economics Series, Singapore, 2009.

[20] Ukoha, O.O, Contribution of women to farm family in Ikwuano Local Government Area of Abia State, Nigeria. *Journal of Agriculture*, 1(2): 125-130, 2003.

[21] Osuji, L.O, "Institutional Factors Associated with Adoption of New Farm Techniques Among Farmers in Eastern Nigeria, *Nigerian Journal of Agricultural Extension* 1(2):43-53, 1983.

[22] Oluwatayo, I.B, "Explaining inequality and welfare status of households in rural Nigeria: Evidence from Ekiti state," *In humanity and social science journal* 3 (1): 70-80, 2008.