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Analysis of Factors Influencing Women Participation in Cassava Post Harvest Technologies in Abia State, Nigeria

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Abstract

This study was undertaken to analyze women participation in various trainings on cassava post-harvest technologies in Abia State, Nigeria. Purposive and multistage random sampling techniques were used to select ninety (90) women. Data for the study were collected through a structured questionnaire and analyzed with descriptive statistics and inferential statistics (probit regression analysis). The socio-economic characteristics of the women revealed that 63.33% of the women were married. The women had a mean age of 49.5 years and 48.89% of them acquired secondary education. Also mean processing experience of the women was 4.5 years and processing income of ₦226, 500.00. The result showed that the women participated in cassava odourless fufu and cassava cake technologies with mean ratings of 2.20, cassava flour ($\bar{X}$=2.00), cassava flakes ($\bar{X}$=2.00) and cassava biscuit ($\bar{X}$=2.00), with a participation index of 66%. The result of probit regression estimates showed that coefficients for age, education, processing income and cooperative membership influenced women participation in cassava post harvest technologies. Drying of processed cassava products, distance to training centres, inadequacy of processing facilities and type of cassava varieties used in processing were problems encountered by women. The study, therefore, recommends training and re-training of women, cooperative formation and access to processing facilities to encourage active participation in cassava post harvest technologies.

Keywords: Influence, Participation, Cassava, Post harvest, Technologies.

Introduction

Cassava (*Manihot esculenta Crantz*) is a staple food crop. Cassava processing, essentially involves conversion of the fresh root into other forms acceptable to consumers (Olaniyi and Adewale, 2014). There are numerous ways of processing and consuming cassava depending on locality. In Nigeria, the production and consumption of cassava varies according to ecological zones. In the South-West zone, it is processed into garri, lafun, fufu, tapioca; in the South-South zone, it is consumed as

garri, fufu and akpu, while in the North-Central it is processed into garri, fufu, and starch and in the North-East – fufu, garri and abacha (Odebode and Adetunji, 2015). Cassava is gaining importance as a reliable crop for farming systems that have a deteriorating resource base and an increasingly unpredictable climate, therefore the success achieved by increasing yield requires to be adequately matched with increasing processing of cassava roots into various products, since cassava roots are liable to high deterioration (NRCRI, 2012). At present, Nigeria produces about 54 million metric tons of cassava annually (FAOSTAT, 2013). Irrespective of the current global glut in the local market, the present level of cassava output may not sustain the economy for too long, based on emerging trends for commodity trade. Therefore, there is need for increased production of the crop, through diversification viz-a-viz value addition. Cassava has been identified to promote agro-enterprises development in Nigeria and supports the National Agricultural Transformation Agenda (ATA) through market and value chain development and investment to unlock growth opportunities, food security, jobs and income creation, value addition and competitiveness (Gwera, 2009).

Despite the fact that, Nigeria is the world's leading cassava producer (Phillip *et al*,, 2004), the living standard and income generation of cassava farmers still remain low because of glut experienced in the subsector which can be linked to the fact that, in Nigeria large proportion of cassava product is derived from traditional processing equipment, which limits effective utilization of the crop. These products are mainly consumed in the country, while a small percentage of them are exported. Cassava roots are equally processed at household and cottage level, in rural areas of the major cassava producing states, particularly in the Southern and North Central parts of the country. Cassava roots must be processed into various forms in order to increase the shelf –life reduce bulk and improve quality because they cannot be stored for too long as they rot within 3 – 4 days of harvest. Processing would lead to reduced marketing costs, and make cassava competitive with food grains hence expand the cassava market. Also cassava value addition would facilitate cassava production expansion. Alternative uses of cassava through value addition have resulted in emergence of wide food recipes which involves conversion of edible food to another form more acceptable or convenient to the consumer (Nwaobiala *et al*., 2009).

From the foregoing, sustained improvement in the agricultural sector is inconceivable without the active participation of rural women who are responsible for substantial proportion of agricultural production and processing in Nigeria (Akinnagbe *et al.*, 2008). The participation of women as an important segment of rural

population in agriculture is germane to sustainable agricultural development. Hence, promoting access and utilization of various categories of agricultural information that can support farmers and rural development therefore plays an important role in the social and economic development of a nation (Mangual, 2010). The contributions of women in agriculture are poorly understood and their specific information needs are ignored in the development planning. In spite of that, women have been found to play active roles in Nigeria's agricultural production especially in activities such as production, processing and marketing of produce (Ogbonna and Nwaobiala, 2015). Public agricultural research, both national and international, like much of development strategies has bypassed the needs of small and marginal farmers while concentrating primarily, on better endowed regions, commodity-intensive production systems and commercial crops. Small producers, particularly those operating in resource-poor areas, have benefited much less from the recent technological breakthroughs in agriculture (Tokula *et al*., 2013). Cassava roots have high moisture content and are highly perishable. Soon after harvest, its storability is very low. The inability of most people not keeping abreast of different methods of processing cassava root into various forms posed a problem in its utilization and therefore, the value addition technique developed by National Root Crops Research Institute (NRCRI), Umudike is commendable. The institute developed technologies in cassava post harvest technologies aimed at diversifying the uses of cassava in Nigeria. These have been extended to many communities in the South-East Agro-ecological zone especially Ikwuano, Umuahia South and North, Ukwa East and West, Ohafia Local Government Areas of Abia state to mention a few and beyond. Groups and co-operative members were taught at different times while, trainings and exhibitions were mounted at different places in the country showcasing the various food forms from cassava which encouraged women participation (Ezebuiro *et al.,* 2009).

Despite the dissemination of cassava post harvest technologies to women in Abia state, there is dearth of empirical data on their participation in these technologies, hence this study was designed to analyze factors influencing women participation in cassava post harvest technologies in Abia State, Nigeria.

The specific objectives of the study were to;

1. describe socio-economic characteristics of cassava women in Abia state, Nigeria;
2. assess the levels of participation of women in trainings on various cassava post harvest technologies in the study area and;
3. identify problems encountered by women participating in these technologies in the study area**.**

Hypothesis of the study

H_0: There is no significant difference between socio economic characteristics of women and their participation of cassava post harvest technologies in the study area.

Methodology

Study Area

This study was conducted in Abia State, Nigeria. Abia State lies between longitudes 7^o 23^1 and 8^o 2^1 East of the equator and latitudes 4^o 47^1 and 6^o 12^1 North of the Greenwich Meridian. The State is located East of Imo State and shares boundaries with Anambra to the North, Enugu and Ebonyi states to the West and East respectively. On the East and South East, it is bounded by Cross River and Akwa Ibom States and by Rivers State on the South. Abia State is made up of 17 Local Government Areas, and most of the people especially, the rural dwellers are engaged mainly in subsistence farming. They engage in the production of arable crops such as cassava, yam, rice, maize and sweet potatoes.

Purposive and simple random sampling techniques were adopted in this research. Purposively, cassava women processors were selected because they participated in value addition trainings organized by National Root Crops Research Institute (NRCRI) Umudike, which formed the sampling frame. From the list of trained women, simple random sampling technique was used to select ninety (90) cassava processors across the seventeen (17) Local Government Areas of the State. Objectives i, ii and iii were realized with descriptive statistics such as frequency counts, percentages and mean score, while the hypothesis was tested with probit regression analysis. The levels of participation of women processors in cassava post harvest technologies were measured using 10 (ten) cassava post harvest technologies disseminated to the women and rated on a 3 -point Likert-type scale of high, moderate and low participation. A midpoint was obtained thus; 3+2+1 =6/3 =2.00. The following decision rule was used.

Decision rule;

Any mean score between;
1.00-1.49 = low participation
1.50-1.99 = moderate participation and
2.00 and above = high participation

The participation indices of the respondents adopted in this paper followed that of Aphunu and Agwu (2014) and were calculated as follows:

a) Computation of the total mean participation score per technology. This was computed by dividing the total participation score by the number of respondents involved.

b) Computation of the grand mean participation score. This was calculated by adding all the mean participation scores and dividing by the number of innovations considered.

c) Computation of the participation index. This was carried out by dividing the grand mean participation score by 3 (that is, the 3 levels of participation).

Model Specification

The Probit regression analysis was used to determine socio-economic factors that influence participation of women in cassava post harvest technologies at 95% confidence level, that is; $P \leq 0.05$ %. This variable can be written using an index function approach.

The probit regression model

$Y1^* = Bx_1+E$

$Y1^* = 0$ if $Y1^* = 0$

$Y1 = 1$ if $Y1^* = 0$

Where

Y_1^* = an underlying latent variable that indexes the levels of women participation in cassava post harvest technologies.

$Y=f(X_1,X_2\ X_3\ X_4\ X_5\ X_6\ X_7\ X_8+ei)$

Y= probability of women participating in cassava post harvest technologies ranges from 1 - 0.

X_1=marital status (married = 1, otherwise = 0)

X_2=age of the respondent (years)

X_3=level of education (years)

X_4=processing experience (years)

X_5= occupation (farming = 1, otherwise = 0)

X_6= processing income (Naira)

X_7= non-processing income (Naira)

X_8 = membership of cooperative society (member = I, otherwise =0)

ei = error term.

Distribution of Socio economic Characteristics of Respondents

The socio-economic characteristics of respondents are shown in table I. The result reveals that 63.33% of the women were married. This implies that cassava processing was dominated by married women in the study area. The mean age of the respondents was 49.5 years. The implication of this finding is that the women are still strong and capable of handling rigorous cassava processing activities in the study area. This result is in tandem with the research findings of Seha *et al*., (2008) as they affirmed that greater number of young people dominate membership of women groups in Nigeria. The result also indicates that a fairly good proportion (48.89%) of the women acquired secondary education. The results suggest that the respondents were literate enough to understand and put to practice technologies transferred in cassava post harvest technologies. This result agrees with the findings of Jamilu *et al.,* (2014) who asserted that education enhances farmers' ability to seek innovation and make good use of information about production technologies disseminated by extension. The table also reveals that the respondents had a mean processing experience of 4.5 years. This implies that most women involved in the activity were not full time processors, but had other means of livelihood. The mean annual processing income of the women was ₦226, 500.00, while a good proportion (55.56%) of the respondents belonged to different cooperative societies. Membership of Cooperative Societies provides better and reliable access to credit facilities. Farmers come together in cooperative societies to pool their resources together so as to meet individual needs that could not be resolved by individual limited financial capacity, funds availability determines the extent of production capacity. Thus, it could influence participation and disposition of the farmers to new ideas or innovations (Alufohai and Ilavbarhe, 2008).

Table I: Distribution of Selected Socio-economic Characteristics of Cassava Women Processors in Abia State, Nigeria (n = 90)

Variables	Indices
Married	63.33 (%)
Age	49.50 (years)
Secondary Education	48.89 (%)
Processing Experience	4.50 (years)
Annual Processing income	₦ 226,500.00
Cooperative Membership	55.56 (%)

Source*: Field Survey Data, 2014*

Levels of Women participation in Cassava Post Harvest Technologies in Abia State, Nigeria

The distribution of respondents according to levels of participation of women in various trainings on cassava post harvest products is shown in Table II. The Table revealed that women highly participated in cassava odourless fufu and cassava cake technologies with mean ratings of 2.2. However, they were also actively involved in cassava flour, cassava flakes and cassava biscuit with mean ratings of 2.0. The total mean participation score of the respondents was 1.97 with a participation index 66% indicating that the women participated moderately in the cassava processing technologies or products. This result suggests that those cassava post harvest technologies participated by women in the study area were of great need and interest to them .This result is in contrast with Nwaobiala *et al.,* (2009) as they found a high rate of participation in all the packages disseminated to women farmers in Ivo LGA of Ebonyi State, Nigeria.

Table 2: Distribution of Respondents According to levels of Participation in trainings on Various Cassava Post Harvest Technologies in the Study Area

Cassava value added Products	High participation	Moderate participation	Low participation	Total
Cassava odourless fufu	43(129)	13(36)	34(34)	198
Cassava flour	31(93)	35(70)	24(24)	187
Cassava cake	44(132)	25(50)	19(19)	201
Cassava chin-chin	24(72)	39(78)	27(27)	177
Cassava chips	19(57)	40(80)	31(31)	168
Cassava flakes	31(93)	31(62)	28(28)	183
Cassava doughnut	22(66)	32(64)	36(36)	166
Cassava biscuit	34(102)	27(54)	29(29)	185
Cassava starch	29(87)	22(44)	39(39)	170
Cassava pellet	36(108)	11(22)	43(43)	173
Grand mean				
Total mean				
Participation Index				

Source: *Field Survey, 2014*

*participated

Figures in parenthesis are frequencies multiplied by nominal Likert values.

Hypothesis Testing

There is no significant difference between socio economic characteristics of women and their participation of cassava post harvest technologies in the study area.

The results in Table III shows the Probit regression estimates of the determinants participation of women in cassava post harvest technologies in the study area. The chi^2 (X^2) value of 14.16 was significant at 5% level indicating `that the probit regression was a good fit. The pseudo R^2 of 0.610 indicate 60.10% variability in participation of cassava post harvest technologies as explained by the independent factors.

The coefficient for age was positive and significant at 1.0 % level of probability. This implies that any increase in age is expected to lead to increase in participation of women processors in cassava post harvest technologies in the study area. This is expected because the older respondents having being in processing activities tend to be willing to bear risk involved in the business, thus increase in participation these technologies This result agrees with *a priori* expectation and conforms to the findings of Nwakor *et al*., (2007) as they found a positive relationship between age and participation of cassava value added technologies among women farmers in Ohafia

agricultural zone of Abia State Nigeria. In the same vein, Muhammad *et al*., (2011) affirmed that age of women farmers involved in Fadama III Project processing components had influence in their participation.

The coefficient for education was positive and significant at 5% level of probability. This implies that any increase in level of education will lead to increase in participation among processors in the study area. This is in conformity with the *a priori* expectation, probably because farmers' literacy levels has influence in the decision – making and encourages participation of farmers in technology dissemination (Nwaobiala, 2013).

The coefficient of processing experience is positive and significant at 1% level of probability. This is in line with *a priori* expectation. This implies an increase in processing experience will lead to a corresponding increase in participation of cassava post harvest technologies in the study area. This is in tandem with the findings of Okoroafor and Nwaobiala (2014) that more knowledge on improved technologies through training in cassava post harvest technologies facilitates participation and utilization of technologies.

The coefficient of processing income is positive and highly significant at 1% level of probability and is agreement with *a priori* expectation. This implies an increase in processing income will probably lead to increase in participation of women in these technologies. Incomes from processing activities have shown to supplement other sources of income of rural households in order to augment family needs (Ezedinma, 2007).

The coefficient for cooperative membership is also positive and significant at 5.0% level of probability. This implies that any increase in cooperative membership would probably lead to increase in participation in cassava post harvest technologies among women processors in the study area. This result is in tandem with the findings of Oke *et al*., (2007) as they found that cooperative societies stimulate and encourage group participation in any technology delivery.

Table 3: Probit Regression Estimates of the Factors Influencing Participation of Women Processors in Cassava Post Harvest Technologies in the Study Area

Variables	Coefficient	Standard error	T- value
Constant	31.0029	3.5576	7.72***
Marital status	1.2537	0.2194	0.23
Age	0.1225	0.0549	3.10***
Education	0.2350	0.2332	2.14**
Processing Experience	2.1220	0.8061	2.60**
Occupation	0.3263	0.6422	0.02
Processing income	0.8764	0.0034	3.51***
Non processing income	0.0102	0.0031	0.35
Cooperative membership	0.52187	1.6453	5.53***
Chi^2 (χ^2)			11.13***
Pseudo R^2			0.6010
Log likelihood			232.321

Source: STATA 8A, Results 2014

*,** and *** significant at 10%,5% and1% level of probability.

Problems Encountered by Women in Cassava Post Harvest Technologies in Abia State, Nigeria

The result in Table IV show the distribution of respondents according to problems encountered in participation in cassava post harvest technologies. The results showed that 68.89% of the respondents claimed that problem of processed product drying was a major problem; this was followed by distance to training centres (65.55%), inadequacy of processing facilities (61.11%) and type of cassava varieties used during processing (60.00%).

Table 4: Distribution of Respondents According to Problems Encountered in Participating in Cassava Post Harvest Technologies in Abia State, Nigeria

Category of problems	Frequency	Percentage*
Low quantity of cassava roots	33	36.67
Cassava varieties used	54	60.00
Problem of drying of products	62	68.89
Labour intensive of technologies	26	28.89
Poor marketing of processed products	23	25.56
Inadequacy of processing facilities	55	61.11
Communication problem	22	24.44
Distance to training centres	59	65.55

Source: *Field Survey, 2014*

*Multiple responses recorded

Conclusion and Recommendations

The study has revealed that the women participated moderately on the various cassava post harvest products in the study area. They participated in cassava odourless fufu, cassava cake, cassava flour, cassava flakes and cassava biscuit technologies. The factors influencing participation of women in cassava post harvest technologies were age, education, processing income and cooperative membership. Problem of drying of processed product, distance to training centres, inadequacy of processing facilities and type of cassava varieties used in processing were identified problems encountered by the processors.

This study recommends that;

1. Women should be trained and re-trained on cassava post harvest technologies by relevant agencies to encourage participation.
2. Formation of cooperatives was advocated to facilitate easy access to procuring processing facilities.
3. Since age has positive influence in participation, there is need to involve both the young and old in these technologies. This will encourage entrepreneurship skills and other means of income generating activity for them.

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