

# GENDER DIFFERENTIALS IN ADOPTION OF CASSAVA VALUE ADDITION TECHNOLOGIES AMONG RURAL FARMERS IN IMO STATE, NIGERIA

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## Abstract

This study investigated adoption by gender of Cassava Value Addition Technologies (CVATs) in Imo State. It identified CVATs disseminated to farmers among other issues. Multi-stage random sampling technique was used in the selection of respondents. A sample size of 150 cassava farmers comprising of 75 male and 75 female who have benefited from training in value addition to cassava roots organized by either government or private organizations in the state were involved in this study. Instrument for data collection was a set of structured and pre-tested questionnaire. Results obtained indicate that eight major types of CVATs were disseminated which include those for making Garri, Cassava fufu flour, High quality cassava flour, Cassava chin chin, Cassava starch, Cassava cake, Cassava chips and Cassava bread. Adoption of CVAT by gender shows that the most adopted CVATs among the male cassava farmers in the study area were those for garri, with a mean adoption score value of 3.68, followed by cassava chips (mean = 3.37) and High quality cassava flour (mean = 3.34). Also, CVATs for garri and cassava fufu flour, with a mean adoption score value of 4.05 and 3.18 respectively were the most adopted by the women farmers in the study area. The result of the paired Z-test for difference in income level of the male cassava farmers before and after adoption of CVAT shows that the farm income increased ( $P \leq 0.01$ ) by 30.7% with adoption of CVATs but their monthly food expenditures did not. Farm income and monthly food expenditure levels of the female cassava farmers increased ( $P \leq 0.01$ ) by 68% and 13.8% with their adoption of CVATs. Hence, farmers should be empowered through provision of incentives such as credits as well as massive training among others while taking cognizance of gender issues.

**Keywords:** Farm income, Food expenditure, Garri, Cassava fufu flour and High quality cassava flour

## Introduction

Gender refers to social constructed role difference between men and women for the purpose of allocating powers, duties, status, responsibilities and roles in any given social milieu or context (USAID, 2005). Gender applies to one sex or the other, and relates to the way each behaves in a given situation (Ekenta *et al.*, 2013). Cassava (*Manihot esculenta* Crantz) is one of the world's most important food crops grown principally for its roots (Allem, 2002). Unfortunately, these roots are notorious for their short shelf-life due to post-harvest physiological deterioration (Yimala *et al.*, 2008; Njoku, *et al.*, 2014); hence they have to be processed into more stable value added products in order to minimize post-harvest losses. Value addition of cassava makes it possible for the availability of food in different forms appealing to the eyes of the consumers, gives good taste of the product and also ensures that consumers are left with choices to make (Puja, 2008). Value added products that can be made from cassava roots include gari, fufu, tapioca, chips, pellets, flour, alcohol, starch, high quality cassava flour (HQCF) and others (Adebayo, 2009).

Many improved cassava value addition technologies and products have been developed by both national and international research centres (Nwakor *et al.*, 2007, Nwakor *et al.*, 2011, Aniedu *et al.*,

2012). These innovations have been extended to rural cassava farmers through direct training by specialists from research centres or through extension agents that have been trained by research centres. Aniedu, (2006), reported that such trainings have been conducted in Imo State since 2005, while Women in Agriculture (WIA) Unit of Imo State ADP have been conducting such training since 1991 (Odurukwe *et al.*, 2006). Aniedu *et al.*, (2012), reported a near average adoption of cassava value addition technologies disseminated by NRCRI Umudike in Imo State and that lack of funds, equipment and markets were the major challenges to adoption. Anyiro and Onyemachi (2014) reported a 41% adoption rate for cassava value added products in Abia State.

Many extension and research programs which disseminate cassava value addition technologies focus more on the women. The presumption is that men are less economically efficient than women in post-harvest activities. Men's contributions are usually under estimated and not accorded proper recognition because of women dominance in cassava processing and value addition (PIND, 2011). There have been studies on awareness and adoption of cassava value addition technologies and products in Imo State (Odurukwe, *et al.*, 2006, Aniedu *et al.*, 2012,) but none have looked at gender issues involved in these adoptions. Consequently there is a paucity of empirical data to support policy formulations on the subject under study. This paucity of empirical data necessitated this study with the following objectives: to identify CVATs disseminated to farmers, determined their level of adoption and effect of adoption on the incomes and expenditures of male and female cassava farmers.

### **Methodology**

The study was carried out in Imo state. The choice of the state is purposive in the sense that it is among the states in Nigeria that benefited from the massive training and extension of technologies for the production of new and improved food forms of root and tuber crops extended to rural farmers and women groups from 2005 to date by the National Root Crops Research Institute (NRCRI), Umudike, and Imo State Agricultural Development Project (IMADP). The study adopted a multistage random sampling technique in the selection of farmers. In the first stage, two blocks were selected randomly from each of the three agricultural zones of the state, followed by a random selection of two circles from each block. From each of the circles, 14 cassava farmers were chosen randomly from each community such that 7 were male, and the other 7 were female. This gave a total of one hundred and sixty eight (168) cassava farmers consisting of eighty four (84) female and eighty four (84) male cassava farmers sampled for the study. However, 150 respondents' questionnaires were found usable for analysis.

The study employed primary data obtained by the use of pre-tested and structured questionnaire. The data of interest included socio economic profiles of the respondents, CVATs disseminated and level of adoption of cassava value addition technologies. Descriptive statistics such as frequencies, means, tables and percentages was used to analyze cassava value addition technologies disseminated to both groups of farmers, while the level of adoption of selected CVAT by gender was realized using a 5 point adoption scale analysis and Paired Z-test was carried out to determine the effect of adoption of CVAT on the income and expenditure of respondents by gender.

### **Results and Discussion**

Table 1 shows that various types of cassava value added innovations whose technologies were introduced to both the male and women cassava farmers in the study area. Eight major types were identified which include; Garri, cassava fufu flour, high quality cassava flour, cassava chin chin, cassava starch, cassava cake, cassava chips and cassava bread. Sequentially, garri (82.7%) and high quality cassava flour (73.0%) were the most disseminated amongst male farmers while cassava chin-chin (33.3%), cassava cake (38.7%) bring up the rear. Similarly, the most highly disseminated CVATs among the women farmers were those for making Garri (92%) and cassava fufu flour

(80%), while cassava chi-chin (41.3%) and cake (33.3%) were the least. This result confirms the reports of Nwakor *et al.*, (2007) and Aniedu *et al.*, (2012) that these technologies developed by both local and international Research centres have been disseminated in the area due to the active promotion of such products by NRCRI Umudike and ADP in the State and in alignment with major diets of the respondents.

**Table 1: Cassava value added innovations disseminated to male and women cassava farmers in Imo State, Nigeria**

Cassava value added innovations	Male farmers		Female farmers	
	Frequency*	Percentage	Frequency*	Percentage
Garri	62	82.7	69	92.0
Cassava fufu flour	53	70.7	60	80.0
High quality cassava flour	55	73.3	47	62.7
Cassava chin chin	25	33.3	31	41.3
Cassava starch	47	62.7	42	56.0
Cassava cake	29	38.67	25	33.3
Cassava chips	51	68.0	47	62.7
Cassava bread	37	49.3	32	42.7

\* Multiple responses recorded: n=75

Source: Field Survey, 2014

The extent of adoption of selected CVATs by male and female cassava farmers in Imo State, Nigeria is presented in Table 2.

**Table 2: Level of Adoption of CVATs/ Product by Male and Female Cassava Farmers in Imo State, Nigeria**

CVATs/P	Aware	Interest	Trial	Evaluation	Accept	Total	Mean score
CFF	6(6)	42(84)	2(6)	1(4)	24(120)	220	2.99
HQCF	1(1)	5(10)	48(144)	9(36)	12(60)	251	3.34
Cassava Chips	5(5)	6(12)	39(117)	68(24)	19(95)	253	3.37
Cassava starch	36(36)	8(16)	8(24)	2(8)	21(105)	189	2.5
Garri	8(8)	12(24)	14(42)	3(12)	38(190)	267	3.68
Mean adoption Male							3.18
CFF	4(4)	28(56)	10(30)	16(64)	17(85)	239	3.18
HQCF	9(9)	37(74)	5(115)	9(36)	15(75)	209	2.79
Cassava Chips	7(7)	40(80)	4(12)	14(56)	10(50)	205	2.73
Cassava starch	4(4)	41(82)	5(15)	11(44)	14(70)	215	2.87
Garri	10(10)	7(14)	5(15)	-(-)	53(265)	304	4.05
Mean adoption Females							3.12

Cut-off score = > 3.0 = adopted; < 3.0 = did not adopt. Figures in parenthesis are the likert scale value

Accept 5; Evaluation 4; Trial 3, Interest 2; Awareness 1, CFF (Cassava fufu flour), HQCF (High quality cassava flour)

Adoption scores for different CVATs ranged from 2.52 to 3.68, with an overall mean cut off score of 3.18 thus indicating their high adoption level among male cassava farmers in the study area. The mean cut off of 3.12 among female farmers is also indicative of a high level of adoption of CVATs. Specifically, CVATs for garri (mean = 3.68), cassava chips (mean = 3.37) and high quality cassava flour (mean 3.34) were the most adopted among the male cassava farmers in the study area. Although cassava starch had an appreciable awareness score value, it had a low level of adoption (mean = 2.52) which was below the critical mean cut off score of 3.0. The high level of adoption of garri, cassava chips and high quality cassava flour among the male farmers may be due to the need

to earn cash in order to supplement households' major food diet, and also due to the active promotion of such products by NRCRI and ADP in the State (Ezeh *et al.*, 2014). Female farmers adopted mostly CVATs for garri (mean = 4.02), Cassava fufu flour (mean = 3.18) in alignment with their major diet. However, High quality cassava flour (mean = 2.79), cassava chips (mean = 2.73) and cassava starch (mean = 2.87) had low adoption score value of below the critical mean cut off score of 3.0. This is probably as a result of the complexity of these CVATs compared to those for gari and fufu flour. Many other reports (Reid, 2001; Wakefield *et al.*, 2005; Garrett *et al.*, 2006; Akpabio *et al.*, 2012) also cited complexity as a major constraint to adoption of innovation.

The result of the paired Z-test for difference in income and expenditure level of the male and female cassava farmers before and after adoption of CVATs is presented in Table 3.

**Table 3: Paired t-test for difference in the income level and Expenditures of male and female cassava farmers before and after adoption of cassava -value -added innovation in Imo State, Nigeria**

Variables	Mean After	Mean Before	Mean difference	Standard error	T-value
<b>Male Cassava Farmers</b>					
Monthly incomes (₦)	34,029.47	25,895.03	8134.44	5912.04	3.7***
Monthly Expenditures (₦)	23793.33	22613.33	1180	1004.119	1.2
<b>Female Cassava Farmers</b>					
Monthly incomes (₦)	37099.4	22405.57	14693.83	2354.342	6.2***
Monthly Expenditures (₦)	28791.67	25308.33	3483.333	631.8932	5.5***

**Source: Calculations from field survey data. \*\*\* = Variable significant at 1.0% level**

The mean difference between the farm income after and before adoption of CVATs was ₦8134.44 for male farmers and ₦14693.83 for female farmers. Both of these were significant at 1.0% risk level.

The mean difference between monthly food expenditures before and after adoption of CVATs were ₦1180.0 for male farmers and ₦3,483.33 for female farmers. The mean difference was significant for females but was not for male farmers implying that monthly food expenditure of male farmers was unaffected by adoption of CVATs while female monthly food expenditure increased after adoption of CVATs. It could be that men expended their increased income in non-food items while women spent more on buying other food items to supplement the one they processed.

## Conclusion

The study analyzed the influence of gender in the adoption of cassava value addition technologies and the impact of this adoption on the income and expenditure of the respondents in Imo state, Nigeria. Findings from the study show that the most widely disseminated cassava value addition technology to both male (82.7%) and female (92%) farmers was that for making of garri while the least was cassava chin chin (33.3%) for males and cassava cake (33.3%) for females. The most widely adopted cassava value addition technology among the male cassava farmers in the study area was the technology for making garri, with a mean adoption score value of 3.68, which was followed by cassava chips (3.37) and High quality cassava flour (3.34). Garri and cassava fufu flour making technologies with a mean adoption score values of 4.05 and 3.18 respectively were the most adopted by the women farmers in the study area. Adoption of cassava addition technologies increased significantly ( $P \leq 0.01$ ) by 36% the income of male cassava farmers but their expenditure on food was not significantly affected. The income and food expenditure of female farmers after adoption of cassava value addition technologies was increased significantly ( $P \leq 0.01$ ) by 68% and

12% respectively. Since the adoption of cassava value added technologies had significant impact on the income level and expenditures of both the male and female cassava farmers, it is recommended that governments should empower farmers through provision of incentives such as credits as well as massive training and extension of technologies of new and improved food forms of Cassava. This will help in poverty alleviation.

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