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Effects of NRCRI Training Programmes on the Farmers Utilization of Improved Cassava Technologies in the Host Communities in Abia State, Nigeria

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ABSTRACT

The National Root Crops Research Institute (NRCRI), Umudike, despite her commitments on research and development activities, has been training and empowering farmers in Nigeria on improved root and tuber crops technologies for food security and poverty alleviation in the country. Many States in Nigeria have been trained and empowered on improved cassava technologies, including Abia State. The study was conducted to assess the effects of the training programmes conducted by NRCRI, Umudike to farmers in Abia State Nigeria. Multi stage sampling technique was used in the study. Two Local government Areas, Ikwuano and Umuahia South, were purposively selected for the study because they were trained and empowered as the host of NRCRI, Umudike. About 120 farmers were randomly selected and interviewed with a structured questionnaire, the data collected were analyzed by means of descriptive statistics The result showed that majority of the farmers were between the age of 31-50 years and majority are female and married. The level of utilization of NRCRI improved Cassava production technologies was low (X 2.09), also the level of improved cassava value addition technologies was not high (X2.04). with the mean of 2.50. The result showed a significant and positive effect of the training on the welfare status of the farmers in food and education with the mean (3.0 and 2.64). The coefficient of Education, Age, income and farm size were the major determinants of utilization of improved cassava technologies in the study area. The level of utilization of the technologies was low. It was recommended that the trainers should follow up or revisit the farmers to find out why the utilization was low.

INTRODUCTION

Nigeria is one of the most blessed nations in Africa in Agriculture, though she has not been able to completely solved, the problems of food insecurity, despite the strategies adopted by various governments in Nigeria to address agriculture and rural underdevelopment problems. There are still inequality and poverty particularly in the rural areas (Udemezue, 2020**)**. Rural empowerment is a necessary means to address food insecurity among the rural and semi urban areas in Nigeria.

Cassava is one of the major food crops grown in Nigeria with annual production output of over 45 million metric tons, the production has continued to increase in the phase of climate change. the growing importance of cassava as a source of cash income and hence the growing demand for cassava roots and processed product as purchase food in Sub Saharan Africa, were very high since the late 70s and early 80s. Cassava owes part of its popularity to its high rate of conversion by solar energy into starch per unit area, as compared to other starchy staple crops. Due to the importance of cassava as a food security

crop, a lot of improved varieties have been developed by Research Institutes for the farmers to adopt in order to boost yield and achieve food security, among the developed technologies are improved cassava production and processing/value addition techniques (Nwakor and Amadi, 2020). The agricultural sector has been directing efforts toward improving productivity of farmers in the country through technology development on cassava, this is with the view to ensure steady supply of food, increase income and foreign exchange earning capacity, provide employment and improve living standard. Also demand-driven research conducted by scientists at National Root Crops Research Institute (NRCRI) Umudike, Nigeria has led to the development of many improved technologies in cassava which have been transferred to farmers in the host communities through different training methods with the hope to give the farmers a stable market system, Are the farmers making use of the knowledge and empowerment acquired from NRCRI, Umudike, Did the trainings have any effect a on their lives

Objectives of the Study

Objectives of the study were to

1. describe the Socioeconomic characteristics of the respondents

2. ascertain the level of utilization of improved cassava technologies among the respondents

3. assess the effect of NRCRI trainings on the welfare status of participants

4. identify local markets where they sell their products on cassava technologies

5 determinants of farmers utilization of NRCRI Technologies

6. analyze the factors affecting farmer's training on improved cassava technologies

METHODOLOGY

Study area

This study was carried out in Abia State, located in South-East, Nigeria.

Sampling Techniques

The study population constitutes the host communities of NRCRI Umudike, Abia State Nigeria and the sampling size of the study was one hundred and twenty (120) respondents. In order to obtain a representative sample, the study made use of a multistage sampling technique to select respondents. In the first stage, two states (Ikwuano and Umuahia South) were selected purposively out of three LGA in Umuahia Zone. This was because these areas have been trained on improved cassava technologies by NRCRI. In the second stage, two communities were purposively selected in each of the local government Areas namely: Umugbalu and Ariam Osaka in Ikwuano, and Olokoro and Ubakala in Umuahia South because they have received training on improved technologies from NRCRI, Umudike. In the third stage, thirty farmers were randomly selected among those people trained in each of the four communities. This gave a total of one hundred and twenty (120) respondents for the study.

Data Collection

Primary data were collected using a questionnaire. The questionnaire was designed to elicit information from the respondents. The questionnaires were administered to the trained farmers only.

Data Analysis

In pursuance of the objectives of the study, various econometric and statistical tools were applied as deemed suitable for the study. Objectives one was realized using descriptive statistics such as frequencies,

means, percentages. Objective two, three and four were realized with four-point Likert type and were analyzed with mean rating, with 4-point Likert type

Where Strongly Agree (SA) = 4, Agree (A) = 3, Disagree (D) = 2 and Strongly Disagree (SD) =1

Therefore, the Likert mean $=\frac{4+3+2+1}{4}= 2.5$

Objective 6 was analyzed with a binary logistics regression model

The model was specified as follows

$Y_{i= 0 \text{ and } 1}= \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + ei$

Where:

Y = Utilization of technologies (utilized= 1, not utilized = 0)
X1= Age (Years)
X2= Sex (Male=1, Female=0)
X3= Education (Number of years)
X4= Experience (years)
X5= Income (Naira)
X6= Farm size (ha)
X7= Farm asset (Depreciation value in naira)
X8= Extension contact (Yes =1, No =0)
β0 = Intercept
β1- β = Parameter estimate
ei = Stochastic variables or error term

RESULTS AND DISCUSSION

The socioeconomic characteristics of the respondents are presented in table 1

Table 1: Distribution of respondents according to socio economic characteristics

Variables	Frequency	Percentage
Age		
20-30	3	2.50
31-40	30	25.00
41-50	39	32.50
51-60	16	13.33
61-70	27	22.50
71 and above	5	4.17
Total	**120**	**100**
Mean	**49.73**	
Marital status		
Single	0	00.00
Married	120	100.00
Widowed	0	0.00
Divorced	0	0.00
Total	**120**	**100**

Education		
No School	15	12.50
Primary	22	18.30
Secondary	41	43.20
Tertiary	42	35.00
Total	**120**	**100**
Farm size		
< 1	16	13.33
1-2	43	35.84
3-4	27	22.50
Above 4	34	28.33
Total	**120**	**0.00**
Mean	**3.26**	

Source; Field Survey, 2022

The result in table 1 shows that majority (32.50%) of the respondents were within the age bracket of 41-50 years while the least proportion (2.50%) of the respondents was within the age bracket of 20-30 years. The mean age of the respondent was 49.73 years. From the distribution, it could be inferred that most of the respondents were still in their active stage in life, a pointer to the fact that middle aged farmers participated in improved cassava production and value addition training in the study area. This finding is in tandem with Anyiro and Onyemachi (2022) who reported that farmers who adopted cassava value added technologies in Abia State, Nigeria were mostly middle aged that were within the active productive work force. The result shows that majority (100%) of the respondents were married. This connotes that married individual participated in the improved cassava production and value addition training in the study area. The table also shows that majority (43.30%) of the respondents had secondary education as their highest level of educational Qualification while the least proportion of them (12.50%) had no formal education. This presents that majority of the respondents are literates. This is impressive since education helps one to have good understanding and perception about innovation. The finding agreed with Awoyemi *et al.,* (2020) who noted that most farmers who participated in cassava technologies training in Kwara State, Nigeria was literate.

The result further shows that majority (38.33%) of the respondents had farming experience of between 11-20 years while the least proportion (10.00%) had farming experience of 40 years and above. The mean years of farming experience of the respondents in the study area was 24.47 years. This explains the fact that respondents have been into cassava production and value addition for a good number of years and may be considered quite experienced. This finding also emphasized the fact that the respondents had adequate farming experience which is one of the important factors in technology utilization. The table also shows that majority (45.83%) of the respondents had a household size of between 3-6 persons while the least proportion (0.83%) had between less than 10 persons. The mean household size of the respondents was 7.04 persons, implying that the household size of the respondents was fairly large. Large household size may have positive implications for farmers since it has been found that most farmers depend on their family members to provide labour on the farms. This finding is in tandem with Margaret and Samuel (2019) whose findings revealed that large household size is simply used as a measure of labour

availability. Majority (35.84%) of the respondents had a farm size ranging from 1-2 hectares while the least proportion (13.33%) of the respondents had farm size of less than one hectare. This connotes that most of the respondents in the study area are subsistence farmers.

Table 2: Mean rating of the level of utilization of improved cassava production technologies

Variable	VHL	HL	LL	VLL	TOTAL	MEAN	DECISION
Improve plant spacing	(36) 9	(78) 26	(56) 28	(57) 57	227	1.89	Rejected
Use of fertilizers	(4) 1	(57) 19	(72) 36	(64) 64	197	1.64	Rejected
Use of organic manure	(56) 14	(120) 40	(68) 34	(32) 32	276	2.30	Rejected
Improved varieties	(136) 34	(96) 32	(34) 17	(37) 37	303	2.53	Accepted
Planting on ridge or mounds	(172) 43	(24)	(36) 19	(50) 50	282	2.35	Rejected
Use of herbicides	(4) 1	(12) 4	(18) 9	(106) 106	140	1.17	Rejected
Use of improved disease control measure	(4) 1	(30) 10	(8) 4	(105) 105	147	1.23	Rejected
Weeding twice	(148) 37	(156) 52	(14) 7	(24) 24	342	2.85	Accepted
Recommended time of harvest	(188) 47	(117) 39	(6) 3	(31) 31	342	2.85	Accepted
Grand Mean						**2.09**	**Rejected**

Source: Field Survey, 2022. *VHL=Very high level, HL=High level, LL=Low level and VLL=Very low level. Critical mean score = 2.50. Decision rule:Mean ≥ 2.50 = Accepted while Mean < 2.50 = Rejected.*

Table 2 Presents the mean rating of the level of utilization of improved cassava production technologies in the study area .. It was observed from Table 2 that out of the nine (9) variables (Improved cassava varieties, use of fertilizers, use of organic manure, plant spacing, planting on ridge and mounds, use of herbicides, use of improved disease control measures, weeding twice and recommended time of harvest) considered in the study, only three (3) (improved crop varieties (2.53), weeding twice (2.85) and recommended time of harvest (2.85)) were significant, implying that the respondents utilized improved cassava varieties, weeding twice and recommended time of harvest to a very high extent in the study area. This finding is contradicting to the findings of Oyen and Morgan (2020) who reported low utilization of improved cassava production technologies in Bayelsa State, Nigeria.

Table 3: Mean rating of the level of utilization of value addition technologies

Variable	VHL	HL	LL	VLL	TOTAL	MEAN	DECISION
Cassava Biscuit Package	(8) 2	(6) 2	(16) 8	(108) 108	138	1.15	Rejected
Processing into chin-Chin	(8) 2	(12) 4	(4) 2	(112) 112	136	1.13	Rejected
Processing into cakes	(8) 2	(6) 2	(22) 11	(105) 105	141	1.78	Rejected
Bread technology Package	(8) 2	(6) 2	(14) 7	(109) 109	137	1.14	Rejected
Doughnut making	(172) 43	(84) 28	(40) 20	(29) 29	325	2.70	Accepted
Cassava chips	(240) 60	(96) 32	(20) 10	(18) 18	374	3.12	Accepted
Processing into flour	(172) 43	(105) 35	(56) 28	(24) 24	357	2.98	Accepted
Processing into starch	(28) 7	(27) 9	(16) 8	(96) 96	167	1.39	Rejected
Cassava odorless fufu Production	(200) 50	(120) 40	(22) 11	(19) 19	361	3.01	Accepted
Grand Mean						**2.04**	**Rejected**

Source: Field Survey, 2022. VHL=Very high level, HL=High level, LL=Low level and VLL=Very low level. Critical mean score = 2.50. Decision rule: Mean ≥ 2.50 = Accepted while Mean < 2.50 = Rejected.

Table 3 presents the mean rating of the level of utilization of value addition technologies in the study area. The critical mean score was 2.5 and any mean score that is greater than or equal to 2.5 was significant, implying very high level of utilization of improved cassava production technologies and otherwise, if less than 2,5. The result showed a grand mean score of 2.04, indicating a low level of utilization of value addition technologies in the study area. It was observed from table that, nine (9) variables (cassava Biscuit package (1.15), cassava chin-chin (1.13), cassava cake making (1.78), bread technology package (1.14), doughnut making (2.70), cassava chips (3.12), cassava flour (2.98), processing into starch (1.39) and cassava odorless fufu production (3.01) were considered in the study. However, only four (4) variables (doughnut making (2.70), processing into cassava chips (3.12), processing into flour (2.98) and cassava odorless fufu production (3.01) were significant, implying that the respondents utilized doughnut making, processing into cassava chips, processing into flour and

cassava odorless fufu production to a very high extent in the study area. This finding is in tandem with Anyiro and Onyemachi (2015) who reported that the level of adoption of cassava value added products like garri (χ=11.53), cassava odourless fufu (χ=9.08) and High-quality cassava flour (χ=5.81) was very high in Abia State, Nigeria.

Table 4: Mean rating of the effect of training on the welfare status of Farmers

Variable	VS	MS	MD	VD	TOTAL	MEAN	DECISION
Food	(196) 49	(114) 38	(36) 18	(15) 15	361	3.01	Accepted
Health	(116) 29	(42) 14	(60) 30	(47) 47	265	2.21	Rejected
Education	(176) 44	(60) 20	(60) 30	(26) 26	322	2.68	Accepted
Clothing	(56) 14	(36) 12	(80) 40	(54) 54	226	1.88	Rejected
Farm input	(120) 30	(90) 30	(36) 18	(42) 42	288	2.40	Rejected
Utility bills	(52) 13	(24) 8	(138) 69	(30) 30	244	2.03	Rejected
Social networks	(20) 5	(60) 20	(100) 50	(45) 45	225	1.88	Rejected
Grand Mean						2.30	Rejected

Source: Field Survey, 2022. VS=Very satisfied, MD=moderately satisfied, MD=moderately dissatisfied and VD=Very dissatisfied. Critical mean score = 2.50. Decision rule: Mean ≥ 2.50 = Accepted while Mean < 2.50 = Rejected.

Table 4 presents the mean rating of the effect of training on the welfare status of participants in the study area. The critical mean score was 2.5 and any mean score that is greater than or equal to 2.5 was significant. The result showed a grand mean score of 2.30, indicating that the training did not has any significant effect on the welfare status of the respondents in the study area. It was observed that seven (7) variables (Food (3.01), health (2.21), education (2.68), clothing (1.88), fam input (2.40), utility bills (2.03) and social networks (1.88) were considered in the study.

However, only two (2) variables namely: Food (3.01) and education (2.68) were significant, implying that training on improve cassava production and cassava value addition technologies exerted significant effect on food and education of the respondents in the study area. This finding is in tandem with Onuekwusiet al., (2017) who reported that value addition technology has significant effect on income and household expenditure of farmers in Abia State, Nigeria.

Table 5. The identified markets by the respondents in the order of their magnitude include: Ntigha market (96.67%), Ndoro market (93.33%), Ubakala market (85.00%), Olokoro market (83.33%), Ariam market (80.00%), Apumiri market (75.00%), Omuosu market (65.00%), Ebo (57.50) and farm gate (45.83%). Result in table 5 shows that Ntigha market was ranked first in array of the markets for the respondent's products, implying that it is the most commonly used market by the respondents among others in the study area. This finding is in tandem with Onya (2016) who reported that farm gateis a marketing output of rural farmers in Abia State.

Table 5: Distribution of the respondents according to the host markets where products are sold

Variables	Frequency*	Percentage	Rank
Ubakala market	102	85.00	3rd
Apumiri	90	75.00	6th
Ntigha market	92	96.67	1st
Olokoro market	100	83.33	4th
Omuosu market	78	65.00	7th
Ndoro market	112	93.33	2nd
Ariam market	96	80.00	5th
Farm gate	55	45.83	9th
Ebo	69	57.50	8th

Source: Field survey, 2022; Note: asterisks (*) indicates multiple responses in the frequency

Table 6: The determinants of farmer's utilization of improved cassava technologies

VARIABLE	Parameters	Coefficient	t-ratio
Production factors			
Intercepts	β0	-1.318	3.433***
Age	β1	1.104	4.026***
Sex	β2	-2.001	1.730*
Education	β3	0.386	2.220**
Farming experience	β4	0.190	0.875
Income	β5	-2.305	8.113***
Farm size	β6	-0.721	5.908***
Farm asset	β7	0.106	0.617
Extension contact	β8	-0.860	0.561
Log Likelihood	-218.210		
Prob> Chi^2	0.000		
Wald Chi^2	0.743		
Pseudo R^2	0.611		

*Sources: Field Survey, 2022; ***, **, * represents significance level of 1%, 5% and 10% respectively*

The result of the Logit regression analysis shows pseudo-R^2 of 0.611, which imply that 61.1% of the variation in the respondent's utilization of improved cassava production and value addition technologies in the study area were explained by the independent variables in the Logit regression model. From the T–ratio of the Logit regression analysis, five (5) independent variables (age, sex, education, income and farm size) were found to be significant. The coefficient of age (0.104***) had a significant and positive relationship with utilization of improved cassava production and value addition technologies among the respondents at 1%. This implies that as the farmers get older, the probability of farmers utilization of improved cassava production and value addition technologies increases. Also, the coefficient of sex (-2.001*) had a significant and positive relationship with utilization of improved cassava production and value addition technologies among the respondents at 10%. The coefficient of years of education (0.386**) had a significant and positive relationship with the training and utilization of improved cassava production and value addition technologies among the respondents at 5%, This shows the positive contribution of education attainment on utilization of improved cassava production and value addition technologies. This finding is in tandem with Anyiro and Onyemachi (2020) who reported that education is an important determinant of farmer's utilization of improved cassava

production in Abia State, Nigeria. The coefficient of income (-2.305***) had a significant and negative relationship with utilization of improved cassava production and value addition technologies among the respondents at 1%, implying that the lower the income of the respondents, the higher the probability of participating in training on improved cassava production and value addition technologies in the study. The coefficient of farm size (-0.721***) had a significant and negative relationship with utilization of improved cassava production and value addition technologies among the respondents at 1%, This finding corroborates the finding of Uzochukwu*et al.,* (2021) who reported that farm size has a negative relationship with farmers participation. In improved cassava production in Anambra state, Nigeria.

CONCLUSION

This study concluded as follows:

The improved production technologies utilized by the respondents were improved plant spacing, weeding and recommended time of harvest. The improved value addition technologies utilized by the respondents were doughnut making, processing into cassava chips, processing into flour and cassava odorless fufu production. Training on improved cassava production technologies and value added technologies did not have significant effect on the welfare of the respondents in term of access to health care, purchase of clothing, purchase of farm input, payment of utility bills and social networks The markets where improved cassava products were sold by the respondents were Ntigha market, Ndoro market, Ubakala market, Olokoro market, Ariam market, Apumiri market, Omuosu market, Ebo and farm gate. Age, education, Income and farm sizehad a significant relationship with the utilization of improved cassava production and value addition technologies among the respondents.

RECOMMENDATIONS

Based on the findings, the following recommendatons were made:

1. The levels of utilization of improved cassava production technologies like use of fertilizer, herbicides, disease control measures, and cassava value addition like, biscuit, chin-chin and bread were low in the study area. Therefore, there is need to re visit the farmers and encourage them to use these technologies to enhance their welfare status
2. NRCRI should direct her effort towards encouraging the youth and men to partake in subsequent training on improved cassava production and value added technologies as this will enhance their welfare status which was also low
3. There is serious need to conduct more trainings on cassava value addition in the host communities. This will improve the welfare status of the farmers.

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