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Assessment of Awareness and Use of Improved Cassava Technologies among Agricultural Field Staff in Umuahia Agricultural Zone, Abia State, Nigeria

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Abstract
The study assessed the level of awareness and use of improved cassava technologies among agricultural field staff in Umuahia Zone, Abia State, Nigeria. Specifically, described the socio-economic characteristics of the respondents, ascertained the level of awareness and use of cassava technologies, among the respondents in the study area. Multistage random sampling technique was used in sampling 80 respondents. Data for the study were collected with the use of questionnaire, analyzed with both descriptive and inferential statistics. The major findings showed the mean age of 38.21 years, and larger proportion (56.3%) of females. About 70.0% of the respondents had tertiary education, and married each, 36.3% civil servants, 32.5% farmers, 23.8% traders, while 7.5% engage in other activities. About 67.7% of the respondents had 1-10years of experience, and 85.8% were within the annual income rage of ≤ ₦ 500000. The result on awareness showed that 70.0% of the respondents were aware of Baba70 cassava variety, 52.5% aware of Obasanjo-2 variety, whereas 43.8 not aware of the variety, 63.8% were aware of game changer variety, and 77.5% Umucas 44. About 80.0% of the respondents were aware of Umucas 45, 67.5% Umucas 46, 86.3 TME 419, and 78.8% NR87184. The distribution of respondents based on their level of utilization showed a grand mean of 2.92 implying a fair general utilization of improved cassava technologies. The result showed OLS regression estimates of effect of socio-economic characteristics influencing the respondent's utilization of improved cassava technologies among the field staff, with results significant at various levels. The study concluded by providing empirical evidence that greater majority of the respondents was aware and responds positively to utilization of improved cassava technologies. The study recommends that, since these field staff are very strong agents of dissemination of improved cassava technologies, especially in their locality, concerted effort should be made by organizing workshops, seminars aimed at demonstrating the use of these improved cassava technologies and creating more awareness. Farmers on their own should make effort to access these technologies from Agricultural Institutions or their field staff.

Keywords: Cassava technologies, awareness

Introduction

Cassava is an important regional food source for 200 million people – nearly one-third of the population of sub-Saharan Africa (Abdouaye *et al*., 2013). In Nigeria, it is one of the most important food crops. It is the most widely cultivated crop that provides food and income to over 30 million farmers and large numbers of processors and traders (Nweke *et al*., 1999). Cassava over the years have been reported to have high income generation potentials and can enable resource poor small holder producer to improve livelihood once they adopt and use appropriate production and processing technologies and marketing opportunities (Abiodun, 2016). Atala (1990) inferred that the appropriateness of any technology depends on its acceptability by the people. Hence, if an innovation was not acceptable by the people, the time, money and efforts spent in developing the innovation and that spent in its dissemination must have been wasted. Adams (1985) noted that the appraisal of the impact and adoption rate of an innovation will help to establish strength and weakness of the extension activities in order to modify methodology for more effective extension activities in future, as well as determine the attributes of technologies recommended for adoption. To increase productivity, technology must be adopted in the production process and rate of

adoption of new technology is subjected to its profitability, degree of risk associated with it, capital requirement, agricultural policies and socioeconomic characteristics of the farmers (Howler, 2006). The adoption of innovation is the last step in a decision process to make full use of an innovation having considered that such will impact positively on the livelihood of the adopter. Aniedu (2006) indicated that eradication of poverty among the rural dwellers (such as umudike) especially in developing countries can be achieved through adoption of Agricultural innovations. Intensification of better agricultural production system is one of the ways of increasing the welfare of farmers, take advantage of improved crop variety such as cassava.

Agricultural technology development and transfer in Nigeria are combined responsibilities and efforts of research and extension agencies. The research agencies are involved in development of technologies, while the extension agencies disseminate the developed technologies to farmers for adoption to increase production. The concept of adoption of innovation is therefore central to understanding the processes of change in human societies, especially in the use of agricultural technologies by the farmers in our rural areas (Aniedu, 2006). National Root Crops Research Institute (NRCRI), Umudike is one of the agricultural research institutes in Nigeria. It has the national mandate to research on root and tuber crops of economic importance to improve productivity. The Institutes has developed and released different cassava technologies to farmers in Nigeria through ADPs, which ranges from new cassava variety such as Baba 70, Obasanjo-2, Hope, Game changer, Umucas series, TME419, and NR87184 etc. Planting technologies such as site selection, use of healthy and improved Cassava varieties, 3 node stem stem cutting, stake orientation (slanting), plant spacing, planting depth, place stakes with buds pointing upwards and harvesting technologies such as harvesting time and cutting the stem 20cm above the soil level to pullout the roots. However, there are agricultural field staff in NRCRI and Michael Okpara University of Agriculture whose role can aid the dissemination and utilization of these technologies, especially within the host communities. But, whether these field staff are aware and utilizing these technologies, as to enable them disseminate same is what the study sought to investigate.

Methodology

The study was conducted in Umuahia Agricultural Zone, Abia State. Abia Atate is one of the thirty-six states of the Federal Republic of Nigeria. The state is located in the South East agro-ecological zones of Nigeria, and lies between longitudes 7°00E and 8°00E and latitude 4°451N and 6°171N of the equator. The climate is tropical and humid all the year round, with rainy season ranging from March to October, and dry season from November to February. The mean annual rainfall ranges from 2000mm to 2500mm with the southern areas receiving more than the northern areas. The temperature ranges between 22°C to 31°C. The vegetation is predominantly lowland rainforest. The major crops grown are arable crops such as cassava, rice, yam etc., others include; banana, plantain, maize, and vegetables etc., with major cash crops such as, oil palm, kolanuts, cocoa, rubber and cashew nut. Other farming activities include; sheep and goat rearing, poultry and rabbit keeping and off-farm activities, especially processing and utilization. The population of the state was estimated at about 2.8 million in 1991 (NPC, 2006). The population density is about 364persons/km^2 with 63% in agricultural production, and average household size of about six persons per family (NBS, 2010). Multistage random sampling method (MRS) was used in selecting 80 respondents in this study. In the first stage, two (2) Agricultural Institutions, Michael Okpara University of Agriculture and National Root Crop Research Institute were selected by purposive sampling (PS) technique. This was because the study focused specifically in Agricultural field staff in the study area. In the second stage, eight (8) programs were selected from the two institutions using simple random sampling (SRS) technique. In the third stage, ten (10) respondents were randomly selected from each of the 8 programs, giving a total of 80 respondents for the study. Data were collected through primary sources, and data collected analyzed using descriptive and inferential statistics. The OLS regression was used in testing the hypothesis of the study and implicitly specified as;

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7) + e$$

Where;

Y= farmers use of improved cassava technology (mean score), X_1= Sex (male = 1, otherwise = 0), X_2= Age (years), X_3= Education (years of schooling), X_4= Primary occupation (farming = 1, otherwise = 0)

X_5= Farming Experience (years), X_6= Household Size (numbers), X_7= Annual income (Naira), and e_i= Error term

Results and Discussion

Socioeconomic Characteristics

The study investigated the personal characteristics of the respondents to assess use of improved technologies of cassava among agricultural field staff. Socio-economic characteristic are important human attributes that help to enhance the efficiency of the researchers in their research as well as shape their abilities in rational decision making (Onu *et al*., 2015). These socio-economic factors include: sex, age, household size, educational qualification, marital status, primary occupation, years of farming experience, annual income, etc. The distribution of the respondents according to sex is shown in Table 1. The Table shows that the larger proportion (56.3%) was female, and 43.7% male. This implies that majority of the people involved in cassava farming activities were mostly female, because they participate more in farming. This result disagrees with the findings of Agrawal and Gupta (2005), that men are readily accessible than women, and

agree with Ukonu (2018), that women are readily accessed. The Table revealed that a fair proportion (40.1%) and (26.0%) of the respondents were within the age ranges of 31-40years and 41-50 years respectively. The mean age of the respondents was 38.21 years, implying that the respondents were still young, socially active, productive, and also possess good knowledge of the phenomenon under study. The result corroborates with the findings of Unu, (2012), that the respondents were young, active and knowledgeable. Table equally showed that all the respondents were mostly educated at different levels. Large proportion (70.0%) of the respondents had tertiary education, 13.8% secondary, 2.5% primary and 11.3% had no formal education. The high level of literacy among the respondents is expected to have a positive influence on their level of awareness of improved technologies. Education reduces the level of ignorance and ignorance makes people not to know what to do in the midst of devastating hunger. Very large proportions (70.0%) of the respondents were married, 22.6% single, 3.8% widow, 2.5% widower, and 1.1% divorced/separated. This result indicates that married people usually participate more in cassava production than others. These results are in conformity with the research findings of Onu (2012), that greater proportions of respondents were married. The Table revealed that the majority (67.7%) of the respondents had 1-10years of experience, 22.2% had 11-20years of experience, and 10.1% had 21-30 years of experience, with mean years of 10.34 years of experience in farming. This results implies that large number of the respondents (67.7%) are new in farming business, with fresh ideas and zealous in knowledge acquisition on improved cassava technologies. According to the Table, a very large proportion (85.8%) were within the annual income rage of ≤ ₦500000, 7.9% had income range between ₦101000-₦200000, and 1.3% had income range between ₦ 1001000- ₦ 2000000, while 5.0% had annual income of ₦2001000- ₦3000000, with mean annual income of ₦144,912, implying that the respondents had relatively low income. The result disagrees with the findings of Ukonu (2018), and agrees with the findings of Ajaero and Onukala (2013), who in their work associated rural dwellers with low monthly income earners in South East Nigeria.

Levels of Awareness

The result on Table 2 showed the distribution of respondents based on their level of awareness of improved cassava varieties in the study area. The result revealed 70.0% of the respondents were aware of Baba 70 cassava variety, the result equally showed that about 52.5% for Obasanjo-2, 56.3% Hope variety, 63.8% game changer variety, 77.5% Umucas 44, 80.0% Umucas45, 67.5% Umucas46, 86.3 TME 419, and 78.8% aware of NR87184. The result generally showed that greater majority of the respondents were aware of improved cassava varieties. Table 2 equally showed the distribution of the respondents according to their level of awareness of improved planting technologies. The result showed 81% of the respondents were aware of site selection technology, 88.8% selection and use of healthy and improved cassava varieties, 85.0% Cut selected cassava stem into 3 node stakes, 75% plant spacing, 75% 1m×1m spacing, 73.8 1m×0.8m, 65% 1m×0.5m, 55% stake orientation (slanting), 73.8% plant depth (bury 2/3), 86.3% place stake with buds pointing upwards, 88.8% were aware of harvesting, 96.3% harvest @ 10-12months after planting, 85.0% harvesting when soil is not too dry to avoid root damage, and 67.5% of the respondents were aware of cutting stem 20cm above the soil level pull out the roots.

Level of Utilization of Improved Cassava Varieties

The result on Table 3 showed the distribution of respondents based on their level of utilization of improved cassava varieties in the study area. The result revealed a grand mean of 2.92, implying strong utilization. The mean of 2.55 for Baba70 implied utilization of the technology, and 2.36 showed a low utilization for Obasanjo-2, while 2.54 for Hope variety, 2.76 for game changer indicate utilization. Mean of 2.9 Umucas 44, showed a high level of utilization as well as for 3.48 Umucas46, 3.38 TME 419, 3.53 NR87184. The result generally showed that greater majority of the respondents utilized improved cassava varieties. Table equally showed the distribution of the respondents according to their level of utilization of improved planting technologies. The result showed a general very high grand mean of 3.25, 3.48 for site selection technology, 3.10 selection and use of healthy improved cassava technology, 3.10 cut selected cassava stem into 3 node stakes, all indicating high utilization of planting technology The table equally showed distribution of the respondents according to use of plant spacing , a high grand mean of 3.18 were generally recorded, for use of plant spacing, majority of the respondents (3.16) utilize 1m×1m spacing, 3.19 1m×0.8m, 2.98 1m×0.5m, 2.88 use stake orientation (slanting), 3.23 plant depth (bury 2/3), 3.64 place stake with buds pointing upwards. The grand mean of 3.18 generally show that the respondents utilized plant spacing technologies. For harvesting technologies, a grand mean of 3.36 show a high level of utilization of the harvesting technologies, 3.38 harvest @ 10-12months after planting, 3.36 harvest when soil is not too dry to avoid root damage and 3.34 cut stem 20cm above the soil level to pull out the roots.

Determinants of utilization of improved technologies

The result on Table 4 showed OLS regression estimate of effect of socioeconomic characteristics influencing the respondent's utilization of improved cassava technologies in the study area, tested at an alpha value of 0.05%. The four functional forms of multiple regression were tried and double log functional was chosen as the lead equation. The lead equation was chosen based on the magnitude of the R^2 value, number of significant variables and their conformity with *a prior* expectation. The R^2 (coefficient of multiple determination) value of 0.321, indicates that 32.1% of the variation was accounted for by the explanatory variable (Y). The F ratio value (4.329) was statistically significant at 1% indicating high goodness of fit of the model used for the analysis. The coefficient of sex, age, farming

experience, house hold size and annual income were statistically significant. The coefficient of income was statistically significant at 5% and positive. This positive relationship implies a unit increase income will result to corresponding increase in intensity of utilization of improved cassava technology in the study area. No matter their wealth or social status everybody utilizes improved cassava technology either directly or indirectly in utilization of improved cassava technology. The coefficient of sex was statistically significant at 5% and negatively related to the level of utilization of improved cassava technology. This positive relationship implies that with female respondents, more increase their level of utilization of improved cassava technology compared to their male counterparts. Expectedly women participate more than their male counterpart who believed in other means of survival other than farming or use of land. Men will normally participate more when the work becomes tedious that the women can handle. The coefficient of farming experience was statistically significant at 10% and positively related to the level of utilization of improved cassava technology. This positive relationship implies that with more farming experience of the respondents, more increase in their level of utilization of improved cassava technology. The coefficient of house hold size was statistically significant at 5% and negatively related to the level of utilization of improved cassava technology. This inverse relationship implies that the increase in house hold size of the respondents decreases their level of utilization of improved cassava technology. This might be as a result of increased household responsibilities leading to diversification on other livelihood activities other than farming. The coefficient of annual income was statistically significant at 5% and positively related to the level of utilization of improved cassava technology. This positive relationship implies that the annual income of the respondents increases their level of utilization of improved cassava technology. This might be because of the increased adoption of new innovations, which enhanced productivity, leading to more income. The coefficient of age was statistically significant at 10% and negatively related to the level of utilization of improved agricultural technology. This negative relationship implies that the age of respondents decrease their level of utilization of improved cassava technology. Expectedly aged people does not accept technology so easily, they tend to allow the young and active ones to utilize the technologies as their strength retrogresses with old age.

Conclusion

The study provided empirical evidence on the level of awareness of improved technologies of cassava among Agricultural field staff in Umuhia Zone. It could be emphatically inferred from the study that greater percentage of the respondents were aware and use improved cassava technologies. However, more awareness and utilization campaign should be carried out to ensure that the remaining percentage is aware of cassava innovations to facilitate utilization**.** Extension agents should be encouraged to come up with ideas that will create more awareness of improved cassava technologies among Agricultural field staff, Since most times, the technologies are with the technology developers, concerted effort should be made by the farmers to access these improved cassava technologies from technology developers or their field staff. Agricultural Institutions on their own should organize workshops, and seminars aimed at demonstrating use of improved cassava technologies among the field staff since they are strong agents of dissemination in their localities.

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Table1. Socioeconomic characteristics of the despondence

Variables	Categories	Frequency (n =80)	Percentage	Mean
Sex				
	Male	35	43.8	
	Female	45	56.3	
Age				
	≤30	32	40.1	38.21
	31 – 40	13	16.3	
	41 – 50	21	26.0	
	51 – 60	13	16.3	
	≥61	1	1.3	
Household				
	0-3	22	27.5	4.96
	4-6	44	51.4	
	7-9	10	15.6	
	≥10	5	5.5	
Educational level				
	No formal education	9	11.3	3.8
	Primary	2	2.5	
	Secondary	11	13.8	
	Tertiary	58	72.5	
Marital status				
	Single	18	22.6	2.14
	Married	56	70.0	
	Widow	3	3.8	
	Widower	2	2.5	
	Divorced	1	1.1	
Years of experience				
	≤10	54	67.7	10.34
	11-20	18	22.6	
	21-30	8	10.1	
Annual income				
	≤ ₦ 500000	69	85.8	144,912
	₦ 501000- ₦10000000	6	7.9	
	₦ 1001000- ₦ 2000000	1	1.3	
	₦ 2001000- ₦ 3000000	4	5.0	

Source: Field survey, 2021

Table 2: Level of awareness of improved cassava technologies

Variables	Not aware	Aware
Cassava varieties		
Baba 70	24(30.0)	56(70.0)
Obasanjo-2	30(37.5)	50(52.5)
Hope	35(43.8)	45(56.3)
Game changer	29(36.3)	51(63.8)
Umucas 44	18(22.5)	62(77.5)
Umucas 45	16(20.0)	64(80.0)2
Umucas 46	26(32.5)	54(67.5)
TME 419	11(13.8)	69(86.3)1
NR87184	17(21.3)	63(78.8)3
Planting		
Site selection technology	15(18.8)	65(81.3)
Selection and use of healthy and improved cassava varieties	9(11.3)	71(88.8)
Cut selected cassava stem into 3 node stakes	12(15.0)	68(85.0)
Plant spacing	20(25.0)	60(75.0)
(1m×1m)	20(25.0)	60(75.0)
(1m×0.8m)	21(26.3)	59(73.8)
(1m×0.5m) seed production	28(35.0)	52(65.0)
Stake orientation (slanting)	36(45.0)	44(55.0)
Planting depth (Bury 2/3 of the stem)	21(26.3)	59(73.8)
Place stakes with buds pointing upwards	11(13.8)	69(86.3)
Harvesting	9(11.3)	71(88.8)
Harvest @ 10-12months after planting	3(3.8)	77(96.3)
Harvest when soil is not too dry to avoid root damage	12(15.0)	68(85.0)
Cut stem 20cm above the soil level pull out the roots	26(32.5)	54(67.5)

Source: Field Survey, 2021

Table 3: Distribution of the respondents according to their level of utilization of cassava technologies

Tick as appropriate	Always	Sometimes	Seldomly	Not utilized	Mean	Decision
Cassava varieties						
Baba 70	20(25.0)	26(32.5)	13(16.3)	21(26.3)	2.55	Utilized
Obasanjo-2	12(15.0)	28(35.0)	18(22.5)	22(27.3)	2.36	Not utilized
Hope	22(27.5)	22(27.5)	13(16.3)	23(28.8)	2.54	Utilized
Game changer	18(22.6)	38(47.4)	12(15.0)	12(15.0)	2.76	Utilized
Umucas 44	27(33.8)	25(31.3)	12(15.0)	16(20.0)	2.79	Utilized
Umucas 45	28(35.0)	28(35.0)	12(15.0)	12(15.0)	2.90	Utilized
Umucas 46	59(73.8)	7(8.8)	7(8.8)	7(8.8)	3.48	Utilized
TME 419	50(62.5)	16(20.0)	8(10.0)	6(7.5)	3.38	Utilized
NR87184	58(72.5)	13(16.3)	2(2.5)	7(8.8)	3.53	Utilized
Grand mean	**2.92**					
Planting						
Site selection technology	45(56.3)	15(18.8)	3(3.8)	17(21.3)	3.48	Utilized
Selection and use of healthy and improved cassava varieties	45(56.3)	15(18.8)	3(3.8)	17(21.3)	3.10	Utilized
Cut selected cassava stem into 3 node stakes	42(52.5)	16(20.0)	10(12.5)	12(15.0)	3.10	Utilized
Means	3.23					
Plant spacing						
(1m×1m)	38(47.5)	26(32.5)	7(8.8)	9(11.3)	3.16	Utilized
(1m×0.8m)	39(48.8)	27(33.8)	4(5.0)	10(12.5)	3.19	Utilized
(1m×0.5m) seed production	37(46.3)	17(21.3)	13(16.3)	13(16.3)	2.98	Utilized
Stake orientation (slanting)	33(41.3)	20(25.0)	11(13.8)	16(20.0)	2.88	Utilized
Planting depth (Bury 2/3 of the stem)	40(50.0)	23(28.8)	12(15.0)	5(6.3)	3.23	Utilized
Place stakes with buds pointing upwards	57(71.3)	17(21.3)	6(7.5)	0(0.0)	3.64	Utilized
Grand mean	**3.18**					
Harvesting						
Harvest @ 10-12months after planting	42(52.5)	28(35.0)	8(10.0)	2(2.5)	3.38	Utilized
Harvest when soil is not too dry to avoid root damage	37(46.3)	35(43.7)	8(10.0)	0(0.0)	3.36	Utilized
Cut stem 20cm above the soil level pull out the roots	47(58.8)	20(25.0)	6(7.5)	7(8.8)	3.34	Utilized
Grand mean	**3.36**					

Source: Field survey, 2021. Key: always utilized (4), sometimes utilized (3), seldom utilized (2) not utilized (1)

Decision: $\bar{x}$ ***> 2.55 high and 2.55*** $\bar{x}$ ***< low***

Table 4: OLS regression estimate of selected socioeconomic characteristics influencing the respondents' utilization of improved cassava technologies in the study area

Variable	Linear	Exponential	Semi-log	Double log
Constant	4.490	1.629	6.974	2.551
	(10.764)***	(11.209)***	(5.674)***	(5.906)***
Sex	-0.147	-0.051	-0.358	-0.128
	(-1.319)	(-1.315)	(-2.126)**	(-2.166)**
Age	0.003	0.000	-0.317	-0.165
	(0.641)	(0.221)	(-1.098)	(-1.625)*
Years of education	-0.023	-0.008	-0.250	-0.083
	(-1.210)	(-1.140)	(-0.869)	(-0.825
Primary occupation	-0.115	-0.044	0.025	0.009
	(-1.842)*	(-2.012)**	(-0.177)	(0.183)
Farming experience	-0.007	-0.002	0.099	0.050
	(-0.785)	(-0.490)	(0.974)	(1.708)*
Household size	-0.118	-0.043	-0.393	-0.136
	(-4.457)***	(-4.667)***	(-2.717)**	(-2.686)**
Annual income	3.502	1.145	0.123	0.037
	(2.697)**	(2.531)**	(2.717)**	(2.344)**
R^2	0.294	0.309	0.312	0.321
R Adjusted	0.226	0.241	0.237	0.247
F – Ratio	4.291***	4.591***	4.149***	4.329***

****, ** and *** is significant at 10%, 5% and 1% level respectively***