Journal of Community & Communication Research
ISSN: 2635-3318
Volume 5, Number 2, December 2020
Pp. 281-288

Comparative Analysis of Adoption of Pro Vitamin A Cassava Improved Farming Practices among Farmers in South-East and South-South Nigeria

Accessible at: https://jccr.sccdr.org.ng

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Review Process: Received: 15/05/20 Reviewed: 26/05/20 Accepted: 12/11/20

ABSTRACT
The study comparatively analyzed the adoption level of pro vitamin A cassava among farmers in south-east and south-south Nigeria. Multistage random sampling was adopted in the selection of the sample size of 480 pro-vitamin A cassava farmers cumulatively chosen from Imo, Anambra, Delta and Akwa Ibom States. Firstly, two agricultural zones were randomly selected from each State, giving a total of eight agricultural zones. Secondly, three blocks were randomly selected from each of the zones, giving a total of twenty-four blocks. Thirdly, two circles were also randomly selected from each block, giving a total of forty-eight circles. Fourthly, ten respondents were randomly selected from the circles giving a total of one hundred and twenty respondents from each state, giving a total of four hundred and eighty respondents for the study. Focus Group Discussion and well-structured questionnaire were used to elicit information from the respondents while descriptive (standard deviation, tables, mean) and inferential statistics (Duncan multiple range test) were used to analyze the data collected. Results emerging from analysis showed that ANOVA result detected differences in the level of adoption of pro vitamin A cassava across the States, indicating mean scores in Imo as (3.7583), Delta (3.6583), Anambra (3.9417) and Akwa Ibom (4.125) and significant at 1% level of probability. The study concluded that there were high levels of adoption of pro-vitamin A cassava but in varying degrees across the states. Therefore, promotional activities, such as field days and nutritional information campaigns to boost adoption of pro vitamin A cassava improved farming practices and achieve the focus on eradicating vitamin A deficiency (VAD) through a cheaper cost-effective sustainable means accessible to even the rural poorer farmers in Nigeria is recommended.
Keywords: Pro vitamin A cassava, Farmers, Adoption

INTRODUCTION

The adoption of pro vitamin A cassava improves farming and agronomic practices followed through the plan made at its introduction in Nigeria in 2011 (National Root Crop Research Institute NRCRI, 2014). Improving Cassava production with Pro Vitamin A (Biofortification) could significantly enhance nutrition and overall health, especially among poor communities and populations (www.harvestplus, 2013). Genetic improvement of cassava by natural selective breeding is a very promising first line intervention; newly improved pro vitamin A Cassava varieties with yellow roots have been released by the Nigerian government, stepping up efforts to tackle the problem of vitamin A deficiency especially in children (National Root Crop Research Institute NRCRI, 2011; Chiedozie, 2011; Effiong and Asikong 2013). Pro vitamin A Cassava varieties help to reduce the incidence of vitamin A deficiency in the rural communities (Etuk and Umoh, 2014). According to NRCRI (2013), Pro-vitamin A can repair immune system and vision that could cause blindness. Progressively, IITA, Ibadan in partnership with NRCRI, Umudike, Nigeria, developed these pro vitamin A cassava varieties using traditional breeding methods in a Harvest-Plus-funded project. The first three pro vitamin A cassava varieties were released in 2011 by the National Variety Release Committee of Nigeria as UMUCASS 36, UMUCASS 37, and UMUCASS 38; and are recognized as IITA genotypes TMS 01/1368, TMS 01/1412, and TMS 01/1371 while the last three varieties released later were UMUCASS 44, UMUCASS 45 and UMUCASS 46 (NRCRI, 2014). The project works with national partners and the private sector to ensure that the pro-vitamin A-rich varieties reach resource-poor farmers in Nigeria (Abdoulaye *et al,* 2015).

More importantly is the extension of adoption of these varieties alongside the improved farming and agronomic practices of the varieties to boost growth and achieve better yield as well. Starting from selection, preparation and treatment of pro vitamin A cassava stem, cultivation, weed control in the field, fertilizer application to the harvesting stage. Farmer's preference for good agronomic traits (drought and pest resistance, ease of propagation, etc.) is a crucial factor in adoption especially during initial crop demonstration trials (Tanumihardjo, 2010). An important property of bio-fortified crops is its mineral content which bestows the potentials for agronomic benefits, contributing to higher crop yields even in mineral deficient soils (Khoshgoftarmanesh *et al.*, 2010). Bansode and Kumar (2015) mentioned that the vitamin A bio-fortified cassava varieties introduced in Nigeria are suitable to African environment and resistant to cassava mosaic virus (CMV) and so is cultivated by over 500,000 farmers.

These varieties are expected to be adopted by farmers alongside the improved farming practices to improve their uptake of vitamin A. Pro vitamin A cassava has the potential to contribute to improved nutritional status among Nigerian rural poor households, and to boost improved pest- and disease-resistance traits (Egesi, *et al*, 2014). Adoption of pro vitamin A cassava is an important route to improve health and nutritional status of poor cassava farmers by enhancing pro vitamin A cassava productivity. The degree of adoption of pro vitamin A cassava improved farming practices in south-east and south-south Nigeria is subject to degree of risk associated with it, capital requirements to purchase herbicides and pay for labour, agricultural policies and socio-economic attributes

The broad objective of the study was on adoption of pro vitamin A cassava improve farming practices among farmers in south-east and south-south Nigeria.
The specific objectives of the study are:

(i) describe the selected socio-economic characteristics of respondents; and
(ii) determine the level of adoption of farming practices of pro-vitamin A cassava.

Hypotheses

There is no significant difference in the farmers' level of adoption of improved farming practices of Pro-vitamin A cassava across the states.

METHODOLOGY

The study was conducted in south-east and south-south Nigeria. The population of the study consisted of cassava farmers in the study area purposively selected from Imo and Anambra States representing south east and Akwa Ibom and Delta states representing south-south Nigeria. This was because pro vitamin A cassava had been massively disseminated in those areas. Multistage sampling technique was used in selecting the sample size of 480 respondents cumulatively chosen from the four states. The first and second stages involve purposive selection of eight (8) agricultural zones and twenty-four (24) blocks from the four states. In the third stage, forty-eight (48) circles were randomly selected from the blocks. Finally, ten (10) pro vitamin A cassava farmers were randomly selected from the circles, giving one hundred and twenty (120) respondents from each state and a total of 480 respondents across the states. Focus Group Discussion and interview schedule with well-structured questionnaire were used to elicit information from the respondents to achieve the study objectives which were in sub-sections. Objectives 1 and 2were analyzed using descriptive statistics such as percentage, standard deviation, mean and tables while objective 3 was analyzed using the Duncan multiple range test to estimate different response for adoption of pro vitamin A cassava improved farming practice. The model is specified as follows:

$$DMRP = QP\sqrt{MSE}/r$$

Where,
DMRP = Duncan Multiple Range
QP = Shortest Significant Range
√MSE = Mean Square Error
r = Number of states

The levels of adoption of pro vitamin A cassava improved farming practices among farmers was achieved using three (3) point Likert-type of Never adopt = 1, Adopt and stopped = 2, Adopt and still using = 3. Based on three-point, mid- point of 2.00 will be established thus: 3+2+1 = 6/3=2.0. Any mean response of 2.00 and below is low and any mean of above 2.0 is moderate and high adoption.

RESULTS AND DISCUSSION

The selected socio-economic characteristics of the respondents

Table 1 reveals that moderate proportion (51.5%) of the respondents in the study area had spent 12-18 years acquiring one form of education or the other. This implied that they are literate. Truly, education exposes farmers to new development in agriculture and empowers them to adopt desirable technologies. This finding agrees with Tokula and Nwachukwu (2004); Egwu, *et al*., (2013), Ezeh (2013) and, Aphunu and Atoma (2011) who reported that 50%-95% of farmers studied had obtained one form of formal education or the other and that higher literacy level increases the chances of adoption of a technology. Majority (66.5%) of the respondents in the study area had household size of 5-8 persons. The size of the household is attributable to the need for cheap and dependable labour derivable for involvement in pro vitamin A cassava production. This is in line with the findings of Abdoulaye *et al, (*2015) that large households are better adopters of improved cassava varieties in Nigeria. The result also showed that majority (56.9%) of the respondents in the two zones had 4-6 years of experience in farming pro vitamin A cassava. The findings show that farmers were made up of people who were both fairly experienced and also relatively new in pro vitamin A cassava farming. The report of Harvestplus, (2014) agrees in part with these findings when it stated that technical skill and experience are determinant factor of farmers' involvement in pro vitamin A cassava farming. Majority (73.2%) of the respondents had farm size of between 0.1-0.99 hectares with a mean farm size of (0.64 hectare). These predominant small sizes at least gave credence to previous studies on pro vitamin A cassava farms which have always been reported as being characteristically small-scale production. Majority (77.7%) of the respondents have extension contact. This factor proved essential in the dissemination and adoption of pro-vitamin A cassava improved farming practices. According to Bouis and Saltzman (2017), extension was provided to farmers along with promotional free stem bundle packs for (low-risk) field trials and it prove successful because farmers who found it desirable further made commercial purchases to increase the use of this yellow cassava variety and distribute to other farmers. Majority (65.9%) of the respondents have belonged to group membership for few years. This implies that the respondents are still young in years as group members in the study area particularly in Imo and Anambra states. Group membership ensure collective production, marketing, training, pooling of resources together and reduction of information asymmetry thus reducing transaction costs and ensuring economies of scale.

Table 1a: Distribution of respondents based on their selected socio-economic characteristics

Variables	Imo		Anambra		Delta		Akwa Ibom		Pooled
	F	%	F	%	F	%	F	%	%
Years spent in Education									
0 year	8	6.7	2	1.7	0	0	0	0	21
6 – 12 years	62	51.7	38	31.7	41	34.2	20	16.7	33.6
12 -18 years	41	34.2	66	55.0	74	61.7	66	55.0	51.5
18 years and above	9	7.5	14	11.7	5	4.2	34	28.3	12.9
Mean		**13.7**		**10.4**		**11.2**		**12.8**	**12.0**
Household size									
1-4	13	10.8	43	35.8	7	5.83	29	24.2	17.9
5-8	65	54.2	72	52.5	113	94.2	78	65.0	66.5
9-12	42	35.0	5	4.1	0	0	23	19.2	14.6
Mean		**6.0**		**6.0**		**6.0**		**6.0**	**6.0**
Farming experience									
1-3	45	37.5	47	40.2	69	57.5	46	38.3	43.4
4-6	75	62.5	73	60.8	51	42.5	74	61.7	56.9
Mean		**3.7**		**3.7**		**3.4**		**3.7**	**3.6**
Farm size									
0.1-0.99	95	79.2	81	67.5	92	76.7	83	69.2	73.2
1.0-1.99	24	19.9	39	32.5	27	22.5	35	29.2	26.0
2.0 and above	1	0.8	0	0	1	0.8	2	1.7	0.8
Mean		**0.60**		**0.64**		**0.60**		**0.7**	**0.64**
Extension contact									
Yes	79	65.8	87	72.5	105	87.5	102	85	77.7
No	41	34.2	33	27.5	15	12.5	18	15	22.3
Group Membership									
1-10	85	70.83	93	77.5	52	42.2	50	41.7	65.9
11-20	35	29.17	27	22.5	55	43.8	58	48.3	32.0
21 and above	0	0	0	0	18	14.0	12	10.0	3.1
Total	**120**		**120**		**120**		**120**		**480**

Source: field survey, 2018

Level of Adoption of improved farming practices of Pro Vitamin A Cassava by Farmers

Table 2 shows that the improved farming practices of pro vitamin A cassava introduced to the farmers in the study area were adopted in varying degrees. The individual mean scores of adoption of improved farming pro vitamin A cassava among farmers were Imo ($\bar{x}$ =2.48), Anambra ($\bar{x}$ =2.59), Delta ($\bar{x}$ =2.59) and AkwaIbom ($\bar{x}$ =2.54). The pooled mean score was high with a grand mean of ($\bar{x}$ =2.53) which is greater than the decision mean cut-off of 2.05. Using the adoption indicator, the level of adoption in all the four states were high and it implies that the respondents adopted almost all the knowledge of improved farming practices of pro vitamin A cassava introduced to them in the study area through HarvestPlus project encompassing IITA, Ibadan, NRCRI, Umudike and other partners in 2012 and 2014. It is also expected that high adoption of improved farming practices would bring about improvement in the health and economic condition of this poor farmers and reduce the level of vitamin A deficiency as they have high yield in the study area. This finding agrees with the report of Tanumihardjo, (2010) which states that farmer's preference for good agronomic practices is a crucial factor in adoption especially during initial crop demonstration trials. This is also in line with Anyanwu (2015) who reported that there is positive correlation between adoption of new technologies by farmers and crop practices and yield which translate into increased income and improved quality of life of farmers. Furthermore, farmers have demands for innovations and therefore, the extent to which the farmer can practice, shift and accommodate the demand determines the level of its adoption.

Table 2: Mean score responses of the levels of adoption of improved farming practices by farmers

Farming Practices	Imo (n=120)		Anambra (n=120)		Delta(n=120)		Akwalbom (n=120)		Pooled (n=480)	
	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD
Site selection/land clearing	3.00	.0000	2.69	.4637	3.00	.0000	2.98	.2587	2.92	.2955
Measurement of site	2.02	.2587	2.03	.2739	2.05	.2544	2.33	.5371	2.10	.3734
Ridging (1mx1m)	2.06	.5695	2.00	.2593	2.38	.4862	2.23	.4976	2.17	.4893
Stems cutting of 25-30 lengths with 5-7 nodes	2.76	.4311	3.00	.0000	2.90	.3013	2.78	.4757	2.86	.3669
Cassava spacing of 1m x 1m at angle 45^{o})	2.26	.6011	2.03	.2220	2.55	.4996	2.36	.5768	2.30	.5305
Use of herbicide	2.03	.5788	1.98	.3171	2.13	.4839	2.08	.7624	2.06	.5603
1st weeding and 2nd weeding	2.83	.3816	2.99	.0913	2.99	.0913	2.75	.7247	2.89	.4265
Fertilizer application at 8-10 weeks	2.34	.4763	2.99	.0913	2.98	.1286	2.56	.5621	2.72	.4683
Time of harvest of pro vitamin A cassava (10-12 months)	2.83	.3742	3.00	.0000	2.32	.4671	2.83	.4613	2.75	.4557
Grand mean	**2.46**		**2.52**		**2.59**		**2.54**		**2.53**	

Source: field survey, (2018)

Duncan Multiple Range Test of the level of adoption of improved farming practices of pro vitamin A cassava across the states.

Table 3 shows the ANOVA result of the test of difference in the mean rating of the respondents in Imo, Anambra, Delta and Akwa Ibom States on their level of adoption of improved farming practices of pro vitamin A cassava across the states. The result on Table 3 shows that the Duncan Multiple Range Test result detected differences in the level of adoption of improved farming practices of pro vitamin A cassava across the states with F-value of 34.76 and significant at 1% level of probability. The result reveals that there was a close but statistical difference across the states at 1% alpha level. Furthermore, a close look at the result reveals that there was no significant difference in the level of adoption of improved farming practices of pro vitamin A cassava in Akwa Ibom (3.0000^{ab}), Imo (3.7583^{ab}), and Anambra (3.6583^{ab}) but the three states significantly differed with Delta (2.9417^{a}) at 1% alpha level. Imo state had the highest level of adoption of improved farming practices, followed by Anambra and Akwa Ibom States. This implies that farmers in Imo, Anambra and Akwa Ibom employed the improved farming practices of pro vitamin A cassava introduced to them than their counterparts in Delta. This definitely will result to high yield and bomber harvest of pro vitamin A cassava which in returns improve the farmers' nutritional status and standard of living. This result is in tandem with the findings of Ilona *etal* (2015) who stated that farmer's preference and adoption of good agronomic practices (spacing, use of herbicide, fertilizer application) is a crucial factor in increasing productivity of pro vitamin A cassava. Similarly, Khoshgoftarmanesh *et al;* (2010) reported that an important property of bio-fortified crops is its mineral content which bestows the potentials for agronomic benefits, contributing to higher crop yields even in mineral deficient soils.

Table 3 Result of Duncan's multiple range test for level of adoption of improved farming practices of pro vitamin A cassava across the states

States	N	Mean	Std. Dev.	Std.Error	F-value	Sig.
Imo	120	3.7583	1.15951	.10585		
Anambra	120	3.6583	1.06507	.09723		
Delta	120	2.9417	.23536	.02148		
Akwa Ibom	120	3.0000	.00000	.00000		
Total	**480**	**3.3396**	**.87609**	**.03999**	**34.763**	**.000*** **

Source: fieldsurvey,2018, ***Duncan multiple range test estimated significant at 1 % level of probability

CONCLUSION

The study concluded that pro vitamin A cassava improved farming practices introduced alongside the varieties have been highly adopted by farmers in the four states. The respondents identified inadequate fund, high cost of labour, lack of farm credit, inadequate fertilizer, unavailability of cassava flour processing machine, high cost of pro vitamin A cassava stem, government policies, literacy level of farmers, inadequate information, herdsmen/cattle menace and poor extension contact as major factors affecting adoption of pro-vitamin A cassava in the study area. Majority of the factors affected adoption of pro vitamin A cassava in the south-east than in south-south Nigeria. The Duncan multiple range test showed that there were differences in the level of adoption of pro vitamin A cassava across the states, with higher levels of adoption in south-south than in south-east Nigeria. This paper therefore recommends that promotional activities, such as field days and nutritional information awareness campaigns should be carried out across the states to boost adoption and consumption of the products in order to achieve the focus on eradicating VAD through a cheaper cost-effective sustainable means accessible to even the rural poorer farmers in Nigeria.

REFERENCES

Abdoulaye, Abass, Maziya-Dixon, Tarawali, Okechukwu, Rusike, Alene, Manyong and Ayedun (2014). Awareness and adoption of improved cassava varieties and processing technologies in Nigeria. *International Institute of Tropical Agriculture (IITA), Ibadan, Nigeria.*

Abdoulaye T, Bamire,S. Adewale, O and Akinola, A (2015). Determinants of Adoption of Improved Cassava Varieties among Farming Households in Oyo, Benue, and Akwa Ibom States of Nigeria, *HarvestPlus working Paper. No 20*.

Agbarevo, M.N. B and Okeke-Sam, O (2014). The effect of adoption of cassava value added technologies on farmers' production in Abia state, Nigeria.

Akinola, A. Alene, R. Adeyemo, D. Sanogo, A. S. Olanrewaju, C. Nwoke, G. Nziguheba, and Diels. (2010). Determinants of Adoption and Intensity of Use of Balanced Nutrient Management Systems Technology in the Northern Guinea Savanna of Nigeria." *Quarterly Journal of International Agriculture 49 (1): 25–45.*

Alene, A., Abdoukye, T., Kulakow, P. and Manyong, V. (2012). Adoption of improved cassava varietiesin South West Nigeria. Diffusion and Impact of improved varieties in Africa (DIIVA) Objective 2technical report.International Institute of Tropical Agriculture, Malawi, Oct 2012.

Egesi, C.N, Olojede, A.O, Okogbenin, E, Parkes, E and Kulakow, P (2014) Naming, Registration and Official Release of three new pro-vitamin A cassava varieties in Nigeria. *NRCRI 2015 Annual Report.*

Clair, A. W and Etukudo, O. (2000). "Food Security and Nigeria Agriculture." *Paper presented at a food security conference in Lokoja, Nigeria.*

HarvestPlus Bio-fortification Progress Brief (2014). Available online at www.harvestplus.org.

Ilona, P. (2012). Delivery of Vitamin A Cassava in Nigeria. CIAT-HarvestPlus Survey. *The 2nd Global Conference on Biofortification: Getting Nutritious foods to people. Conference Brief #23a, IITA.*

Nwachukwu, I. (2014). From Drumbeats to Gigabytes: Communicating Agricultural Technologies Effectively to farmers in Nigeria. *Inaugural Lecture, Michael Okpara University, Umudike. Pp.51.*

Olatade, K.O., Olugbire, O.O., Adepoju, A.A., Aremu, F.J., and Oyedele, P.B. (2016). How Does Farmers' Characteristics Affect Their Willingness to Adopt Agricultural Innovation? The Case of Biofortified Cassava in Oyo State, Nigeria. Bahir-Dar Ethiopia. *International Journal of Science and Technology,*5(2): 59-75.

Onyeneke, R.U; Amadi, M.U and Anosike. F.C (2018) Bio-fortification in Nigeria: A Systematic Review of Published Studies. Department of Agriculture, Federal University Ndufu Alike Ikwo, Ebonyi State, Nigeria.

Oparinde, A.A., Banerji, E.B. and IIona, P. (2014). Information and consumer willingness to pay for bio-fortified yellow cassava evidence from experimental auctions in Nigeria. HarvestPlus working Paper No 13 Washington DC, USA: International Food Policy Research Institute.

Oparinde, A., Banerji, A., Birol, E. and IIona, P. (2016). Information and consumer willingness to pay for bio-fortified yellow cassava. Evidence from experimental auctions in Nigeria *Journal of Agricultural Economics*, 47(2): 215-233.

Rogers, E.M. (2003). Diffusion of Innovation-5th edition. *The Free Press, New York.*