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PERCEPTION AND UTILIZATION OF SWEET POTATO IMPROVED PRODUCTION TECHNOLOGY IN SOUTH-EAST, NIGERIA

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ABSTRACT

This study assessed the perception and utilization of sweetpotato improved production technologies disseminated in South-East Nigeria. A multi-stage stratified and proportionate sampling techniques were used to elicit data for the study. Three States, Abia, Anambra, and Ebonyi were purposively selected, and two agricultural zones were randomly selected from each of the States to give a total of six zones. Two blocks were randomly selected from each of the Zones to give a total of twelve blocks, Finally, a proportionate sampling technique was used to select farmers from the circles to give a sample size of 364 respondents. Data were analyzed using descriptive and inferential statistics. The results showed that the majority of the farmers (72.25%) were females, the mean age was 37.3 years and the majority of the respondents (96.70%) were married. The grand mean of perception was 2.60 and the grand mean of utilization was 2.61 on a three-point rating scale, indicating that the farmers had a positive perception of the improved sweetpotato production technologies disseminated to them and they had high utilization levels. The result of regression analysis showed significant and positive 1% and 5% levels. The study concluded that sweetpotato farmers in the Zone had a positive perception and utilized the improved production technologies disseminated to them. It was therefore recommended that men should be cultivating and utilizing the improved production technologies disseminated for increased productivity since the result from the study showed that women cultivate and utilized the production technologies more than the men in the Zone. Also, the farmers are encouraged to utilize the production technologies effectively since they had a positive perception of it for increased productivity.

Keywords: *Sweetpotato, Farmers, Perception, Utilization, and Technologies.*

INTRODUCTION

In Nigeria, agriculture is still the mainstay of the economy as the majority of the rural dwellers are into farming (NBS), 2018). Food and Agricultural Organization (FAO, 2014) posited that Nigeria's agriculture has a high potential for employment generation, food security, poverty reduction, and industrialization. The need to produce enough food crops to meet the ever-growing population demands has necessitated research for improved varieties of various crops including root and tuber crops.

Sweetpotato (*Ipomoea batata (L) Lam*) is an important tropical staple food crop, belonging to the morning-glory family known as *convolulaceae*. Nigeria is the third largest producer of sweetpotato in the world, with China leading, followed by Uganda (FAO, 2015). Sweetpotato is regarded as an early maturing crop, has relatively little labour requirement, and the ability to thrive under Sub-Saharan Africa's climate (Uzoigwe *et al*., 2019). It offers particularly significant potential for increasing food production and income in Nigeria like other crops (Udemezue, 2019). Its ease of cultivation and ability to thrive even under harsh conditions promote its spread in Africa. It is an attractive cash crop because of its low input requirement (Mbanaso, 2012). Ojeniyi and Tewe (2013) indicated that IITA, Ibadan, and the National Root Crops Research Institute (NRCRI), Umudike had reported high agronomic yield potential of sweetpotato as a food security crop in Nigeria.

The crop is grown for multipurpose, its roots and vines are used both for human food and for animal feed. Sweetpotato is used in a variety of ways for food, feed, and processed products such as bread, ready-to-eat breakfast, French fries, syrup, starch, and beverages (Walker *et al.,* 2014). Sweetpotato consumption has increased its role in the nutritional status of the average Nigerian. Sweetpotato production technologies have been developed and disseminated in South-East, Nigeria by NRCRI. The specific objectives of this study were to: describe some selected socio-economic characteristics of the farmers; ascertain the farmers' perception of improved sweetpotato production technologies disseminated; determine the farmers' utilization level of improved sweetpotato production technologies.

Hypothesis (Ho): There is no significant relationship between farmers' perception and utilization of disseminated improved sweetpotato production technologies.

METHODOLOGY

The study was conducted in South-East, Nigeria. The Zone is made up of five States, namely: Abia, Anambra, Ebonyi, Enugu, and Imo States. A multi-stage stratified and proportionate sampling technique was used to elicit data for the study. Three States, namely Abia, Anambra, and Ebonyi, were purposively selected, two agricultural zones were randomly selected from each of the States to give a total of six (6) zones, two (2) blocks were randomly selected from each of the zones to give a total of twelve (12) blocks, Finally, proportionate sampling technique was used to select farmers from the circles to give a sample size of 364 sweetpotato farmers. A list of sweetpotato farmers from sweetpotato farmers' association, Abia State, the Extension Services Programme office of NRCRI Igbariam outstation, Anambra State, and the Sweetpotato farmers' association, Ebonyi State served as the sampling frame. Data for this study were collected from primary sources using a structured questionnaire. Data were analyzed through descriptive and inferential statistics such as frequency, percentages, and mean. To ascertain the level of perception of the farmers on improved sweetpotato technologies disseminated, it was realized using the mean. To measure this, a three-point rating scale was used. The points in the scale were very beneficial = 3, beneficial = 2, and not beneficial =1. Based on the three points, a mid-point of 2.00 was established. Thus 3+2+1= 6/3 = 2.0. A decision was thus, a mean response of 2.05 (upper limit of the mean) and above is a positive perception, and a mean score of less than 2.05 is a negative perception. To ascertain the farmers' level of utilization of improved sweetpotato production technologies, it was realized using the mean. To measure this, a three-point rating scale was used. The points in the scale were Never =1, Sometimes = 2, and Always = 3. Based on three points, a mid-point of 2.00 was established thus: 3+2+1 = 6/3= 2.0. Any mean response less than 2.05 is a low level of utilization, a mean score from 2.05 to 2.50 is a moderate level of utilization while a mean score greater than 2.50 is a high level of utilization. The inferential statistic used was Linear Regression Analysis. The variables were measured with a three-point rating scale (Very beneficial, Beneficial, and Not beneficial. 3, 2, and 1 respectively). This was tested using a simple linear regression model.

The implicit form of the model is specified as:

$Y= f (X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, X_{11}, X_{12}+u)$……..1

Y= Utilization of improved sweetpotato production technologies (Mean)

X = Improved sweetpotato production technologies

X_1 = Improved sweetpotato varieties

X_2 = Sweetpotato intercropping

X_3 = Land preparation

X_4 = Vine cutting (3 and 4 nodes)

X_5 = Planting space (30cmx30cm)

X_6 = Planting pattern (slanting)

X_7 = Herbicide application

X_8 = Weeding (1^{st} and 2^{nd})

X_9 = Fertilizer application

X_{10} = Earthing-up

X_{11} = Pest control management

X_{12} = Harvesting time

U = error term

RESULTS AND DISCUSSION

Socio-economic Characteristics of the respondents

Table 1 shows that majority of the farmers (72.25%) were females. This result implies that female folks were involved in sweetpotato farming more than their male counterparts in the area of study. The finding is in agreement with Anyaegbunam, Nwokocha, and Uwandu (2019), who reported in their study that sweetpotato is traditionally viewed as a women's crop, grown predominantly by women farmers. The result shows that 45.88 % of the farmers fell between the age bracket of 30-39 years and also 29.94% fell between 40-49years. The mean age was 37.3 years. The mean education level was 3.2, indicating that a greater number of them had a secondary education level and are considered literate farmers. Tijani and Sanusi (2019) stated that education is an important socioeconomic factor that influences farmers' awareness, perception, reception, and transfer of innovations that can bring about an increase in production. On marital status, the result shows that the majority of the respondents (96.70%) were married. This implies that married people were mostly involved in the utilization of sweetpotato production technology. This finding is also in line with Emaziye (2015). The result also revealed that most of the respondents (30.76%) earn an annual income of between ₦610,000-800,000 and 24.45% of the respondents earn an annual income of between ₦410,000-600,000. The mean annual income was ₦579,395.6. The value of the dollar during this study in August 2021 was fixed at an average of ₦500.00 per dollar. The implication of this finding was that majority of the respondent earned lower than I.9 dollars per person per

day which is the World Bank rate for the poverty line. This result implies that they are resource-poor farmers. This finding is in agreement with Gate (2014) who submit that poverty and lack have been on the increase in society.

Table 1: Distribution of Socio-economic characteristics of the respondents

Options	Frequency	Percentages	Mean
Sex			
Male	101	27.75	
Female	263	72.25	
Age			
20-29	64	17.58	
30-39	167	45.88	**37.3 years**
40-49	109	29.94	
50-59	24	6.59	
Education level			
Non formal education	5	1.37	
Primary	9	2.47	
Secondary	224	61.54	**3.2**
Tertiary	126	34.62	
Marital Status			
Single	12	3.30	
Married	352	96.70	
Annual income			
₦10,000-200,000	31	8.52	
₦210,000-400,000	80	21.98	
₦410,000-600,000	89	24.45	**₦579,395.6**
₦610,000-800,000	112	30.76	
₦810,000-1,000,000	52	14.29	
Total	**364**	**100**	

Source: Field Survey, 2021.

Farmers' perception of improved sweetpotato production technologies

The result from Table 2 revealed that farmers with a positive perception of improved sweetpotato production technologies for increasing productivity had the following means: the farmers' perception of weeding was ($\bar{x}$ =2.83), harvesting time was ($\bar{x}$ =2.81), planting pattern (slanting) was ($\bar{x}$ =2.76), improved sweetpotato varieties was ($\bar{x}$ =2.68), vine cutting 3 and 4 nodes were $\bar{x}$ =2.62), land preparation was ($\bar{x}$ =2.61), planting spacing 30 x 30 cm had ($\bar{x}$ = 2.58), earthing-up was ($\bar{x}$ = 2.57), fertilizer application was ($\bar{x}$ = 2.45), herbicide application was ($\bar{x}$ =2.42), pest control management was ($\bar{x}$ =2.41) and intercropping was ($\bar{x}$ =2.27). Grand mean of perception was 2.60 on a three-point rating scale, indicating that the farmers had a positive perception of the sweetpotato production technologies disseminated to them. This finding agrees with Oladeji (2011), who stated that farmers' attitude to innovation use, rests on its perceived benefits. According to Ekwe and Osuagwu (2016), farmers' perceptions of technologies provide a better understanding of their technology acceptance since

they are the ones that use them and probably perceive the technologies differently from researchers and extension agents.

Table 2: Farmers' perception of improved sweetpotato production technologies (n= 364)

Perception of technologies	Very beneficial	Beneficial	Not beneficial	Total	Mean	Decision
Improved sweetpotato varieties	250(750)	114(228)	0(0)	978	2.68	Positive
Sweetpotato intercropping	185(555)	168(336)	11(11)	902	2.47	Positive
Land preparation	224(672)	140(280)	0(0)	952	2.61	Positive
Vine cutting (3 and 4 nodes)	231(693)	129(258)	4(4)	955	2.62	Positive
Planting space(30cmx30cm)	212(636)	152(304)	0(0)	940	2.58	Positive
Planting pattern (slanting)	294(882)	55(110)	15(15)	1007	2.76	Positive
Herbicide application	184(552)	148(296)	32(32)	880	2.42	Positive
Weeding (1st and 2nd)	305(915)	59(118)	0(0)	1033	2.83	Positive
Fertilizer application	191(573)	147(294)	26(26)	893	2.45	Positive
Earthing-up	210(630)	154(308)	0(0)	938	2.57	Positive
Pest control management	184(552)	146(292)	34(34)	878	2.41	Positive
Harvesting time	296(888)	68(136)	0(0)	1024	2.81	Positive
Grand mean					**2.60**	

Source: Field Survey, 2021.

Positive perception ≥ 2.05, Negative perception ≤ 2.05. Benchmark mean score = 2.05.

Farmers' utilization level of improved sweetpotato production technologies

Result from Table 3 shows that farmers' utilization level of improved sweetpotato production technologies on a three-point rating scale had the following means: planting spacing 30 x 30 cm was ($\bar{x}$ =2.91), 1st and 2nd weeding was($\bar{x}$ =2.90), harvesting time was ($\bar{x}$ =2.90), planting pattern (slanting) had ($\bar{x}$ =2.87), improved sweetpotato varieties had ($\bar{x}$ 2.82), land preparation technology had ($\bar{x}$ =2.79), earthing-up had ($\bar{x}$ =2.79), vine cutting 3 and 4 nodes was ($\bar{x}$ =2.58), sweetpotato intercropping technology was ($\bar{x}$ =2.32), utilization of fertilizer was ($\bar{x}$ =2.23), utilization of herbicide had ($\bar{x}$ =2.20), utilization of pest control management (insecticide) had ($\bar{x}$ =2.05). Grand mean of utilization was 2.61 on a three-point rating scale, indicating high level of utilization of sweetpotato production technologies by the farmers. This finding is also in line with Odoemelam *et al.* (2016), who opined that farmers can only utilize technologies when they are aware of such technologies.

Table 3: Farmers' utilization level of improved sweetpotato production technologies (n= 364)

Technologies	Always	Sometimes	Never	Total	Mean	Decision
Improved sweetpotato varieties	302(906)	62(124)	0(0)	1030	2.82	H. Utilized
Sweetpotato intercropping	179(537)	121(242)	64 (64)	843	2.32	M. Utilized
Land preparation	287(861)	77(154)	0(0)	1015	2.79	H. Utilized
Vine cutting (3 and 4 nodes)	218(654)	138(276)	8(8)	938	2.58	H. Utilized
Planting space(30cmx30cm)	332(996)	32(64)	0(0)	1060	2.91	H. Utilized
Planting pattern (slanting)	318(954)	46(92)	0(0)	1046	2.87	H. Utilized
Herbicide application	241(723)	55(110)	68(68)	801	2.20	M. Utilized
Weeding (1^{st} and 2^{nd})	329(987)	35(70)	0(0)	1057	2.90	H. Utilized
Fertilizer application	194(582)	63(126)	107(107)	815	2.23	M. Utilized
Earthing-up	288(864)	76(152)	0(0)	1016	2.79	H. Utilized
Pest control management	114(342)	156(312)	94(94)	748	2.05	L. Utilized
Harvesting time	328(984)	36(72)	0(0)	1056	2.90	H. Utilized
Grand mean					**2.61**	

Source: Field Survey, 2021.

Note: ≤ 2.05 None or Low utilization, Moderate utilization ≥ 2.06 to 2.49, High utilization ≥ 2.50 and above. Benchmark means score= 2.05.

Table 4 is the regression analysis of the relationship between farmers' perception of improved sweetpotato production technologies and utilization. A linear regression model was used to analyze the data. The R^2 value of 0.672 implies that about 67.2% of the variation in utilization of improved sweetpotato production technologies by the respondents was explained by independent variables. The f-ratio of 59.793*** was also highly significant at 1%, indicating goodness of fit.

Variables such as improved varieties, sweetpotato intercropping, vine cutting, planting space (30cm x 30cm), planting pattern (slanting), herbicide application, earthing-up, pest control management, and harvesting time were significant and positive. The result shows that improved sweetpotato varieties were significant and positive at a 1% level. This implies that the more positive perception of the technology by the farmers, the more the utilization of improved sweetpotato varieties in sweetpotato cultivation. It was revealed that sweetpotato intercropping was significant and positive at a 5% level. This means that the more farmer had a positive perception of sweetpotato intercropping as a technology, the more the farmers would utilize it. The result of Table 4 also, shows that vine cutting (3 and 4 nodes) was significant and positive at a 5% level. This result shows that a positive perception of vine cutting (3 and 4 nodes), increases the utilization by farmers in sweetpotato cultivation. The result also, revealed

that the planting pattern (slanting) was significant and positive at a 1% level. This indicates that a positive perception of the planting pattern increases the utilization of improved sweetpotato production technologies by the farmers. Also, other variables such as earthing-up, pest control management, and harvesting time were significant and positive at 1% level respectively. This shows that a positive perception of the technologies leads to a corresponding increase in the utilization of each of the technologies. Therefore, a null hypothesis which stated that there is no significant relationship between farmers' perception of improved sweetpotato production technologies and utilization was rejected.

Table 4: Relationship between farmers' perception of improved sweetpotato production technologies and the utilization

Technologies	Coefficients	Standard Error	t-Value	Significant
Constant	1.696	1.201	1.412	0.159
Improved sweetpotato varieties	0.093	0.007	13.954***	0.000
Sweetpotato intercropping	1.209	0.499	2.422**	0.016
Land preparation	0.008	0.068	0.114	0.909
Vine cutting (3 and 4 nodes)	-0.104	0.051	2.045**	0.042
Planting space(30cmx30cm)	0.098	0.007	14.607***	0.000
Planting pattern (slanting)	0.961	0.095	10.088***	0.000
Herbicide application	0.183	0.488	0.375	0.708
Weeding (1^{st} and 2^{nd})	1.639E-005	0.001	0.025	0.980
Fertilizer application	-0.175	0.483	-0.363	0.717
Earthing-up	0.989	0.068	14.485***	0.000
Pest control management	0.457	0.048	9.480***	0.000
Harvesting time	0.935	0.116	8.032***	0.000
R Adjusted	0.660			
R^2	0.672			
F-Statistics	59.793***			

Source: Field Survey, 2021.

Note: t-values; *** = at 1% and ** = at 5% significant levels. Null Ho rejected.

CONCLUSION AND RECOMMENDATION

The study concluded that sweetpotato farmers in the Zone had a positive perception and utilized the improved production technologies disseminated to them. It is therefore recommended that men should be involved in the cultivation of sweetpotato, so as to utilize the improved production technologies disseminated to them for increased productivity. Also, the farmers are encouraged to utilize the production technologies effectively since they had positive perception of it for increased productivity.

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