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Perception and Adoption Level of Orange Fleshed Sweetpotato by Farmers in Anambra State, Nigeria

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ABSTRACT
*This study was carried out to analyze the performance of Orange Fleshed Sweetpotato (OFSP) with respect to farmers' perception and adoption in Anambra State, Nigeria. A multi stage sampling technique was used to elicit data for the study. Two agricultural zones of the state namely Anambra and Awka were purposively selected because of their nearness to the sub - station of National Root Crops Research Institute, Igbariam, Anambra state and intensity of sweetpotato production in the area. Structured questionnaire was used to interview the farmers. A total of 120 respondents made up the sample size for the survey. List of sweetpotato farmers collected from Igbariam sub -station served as the sample frame. Primary data used for the study were analyzed using frequency, percentages, mean, likert scale and Pearson's Product Moment Correlation Coefficient model. The results showed that 40.83% of the farmers fall between the ages of 30-39years and majority of the farmers (69.16%) were females. Greater percentage of the farmers (84.17%) were married, and 52.5% of the farmers had year of schooling between 7-12 year while majority (46.1%) of the farmers had farming experience between 6-10 years. Some of the farmers (60.8%) borrowed capital for cultivation of OFSP in the area and 81.7% of the farmers cultivate on land area between 1.0ha and 1.9ha. Perception of farmers on OFSP had mean score of 3.0 and grand mean of 3.9, implying that the farmers had positive perception about OFSP while the mean score and grand mean of Level of adoption of OFSP were 2.0 and 2.56 respectively which indicated that OFSP varieties disseminated in Anambra State were adopted. The t-value of the correlation between perception and adoption of OFSP by the respondents was1.8553** and significant at 5% level. It is concluded that OFSP is performing well in the study area with indications that farmers' had positive perception about OFSP and moderately level of adoption. It is therefore recommended that farmers should be encouraged to intensify efforts in the production of Orange fleshed Sweetpotato considering the benefits it offers to the consumers.*

Keywords: Perception, Adoption, Orange Sweetpotato and Farmers

INTRODUCTION

Sweetpotato (*Ipomoea batatas (L*) Lam) is one of the most important staple carbohydrate foods in sub-Saharan Africa. Growing sweetpotato requires some space where they can spread. The propagation is through the vine cutting using about 4-6 nodes that is 30 cm in length with spacing of 30cm within the rows and 100cm between rows (Nwaigwe, 2011). It is a drought resistant crop that provides good ground cover and also grows on soils with limited fertility (Echendu, 2011). It has high energy fixing efficiency, produces much dry matter at a short period of time and contains high levels of vitamins A and C. It can be grown in all parts of the country in diverse agro-ecological zones, from tropical rainforest to semi-arid and arid zones. Sweetpotatoes are often intercropped as the secondary crop. In the south and central parts of the country, sweetpotatoes are intercropped with other root and tuber crops (yams, cassava and cocoyam) and in the north they are intercropped with cereals like maize and millet. Sweetpotato crop provide soil cover and leave vegetative residue that can be incorporated into the soil after harvest, which also contributes to the primary crop's production (Echendu, 2011).

The roots and leaves are sources of carbohydrates, proteins and minerals. It is eaten as a substitute for yam as a result of its lower cost of production (Odebode, *et al.* 2008). OFSP leaves were found to improve daily weight gain in cattle, result to better broiler carcass colour and egg yolk colour in layers (Gad and George, 2009). It can be eaten boiled, baked or fried and can be sliced, sun-dried, used for the production of chips which are sometimes ground into flour (Echendu, 2011). It contains important mineral and vitamins which include B carotene, vitamin B12, and Vitamin C. Drink from the beta carotene rich Orange Fleshed Sweetpotato has been developed and compared by panelists with commercially available orange drink at the NRCRI Umudike (Afuape, *et al.* 2011). The suitability of sweetpotato roots for the production of sugar syrup and dextrose has been noted (Tewe, *et al.* 2003). Also the sustainability of sweetpotato roots for the production of bio-ethanol in the USA has been reported (Ziska, *et al.* 2009).

The realization of importance of sweetpotato as a poverty alleviation crop has led to an appreciable increase in production over the past decade and as a food security crop in Nigeria (Echendu, 2011). In 2001, annual production of sweetpotato was estimated at 2.47 million metric tonnes, while area under cultivation was about 824,000 ha. Toward the end of 2008/2009, its production was about 3.46million metric tonnes, area under cultivation was 956,792 ha (FAO, 2010).Among the current goals in sweetpotato breeding is the development of Orange Fleshed Sweetpotato varieties to combat vitamin A deficiency, the clamour for the Orange Fleshed Sweetpotato varieties is due mainly to the health advantages over the white fleshed cultivars, this will ultimately translate to reduction in expenditure on hospital bills, provision of sound body to engage in productive activities (Echendu, 2011).OFSP varieties have high pro vitamin A which helps the body to produce enough vitamin A, which has been known to prevent night blindness, enhance the immune system and help the body fight diseases better (Odebode *et al* recommendations by farmers is a necessary condition for improved food production, increase in farmer's income and consequently *al.* 2008).

Adoption means that a person does something differently than what they had previously. The key to adoption is that the person must perceive the idea. It is through this that diffusion is possible. Adoption of agricultural extension recommended that technologies improve standard of living of the farmers. Adoption of a new idea, behaviour or techniques (i.e. innovation) does not occur at the same time in a social system, rather it is a process

whereby some people are more apt to accept the innovation than others (Agbaraevo, 2011). Orange fleshed sweetpotato has been disseminated in Anambra state by National Root Crops Research Institute but there is dearth of information on its perception and adoption level in the State. Specifically, the objectives of this study are to:

1. describe the socio-economic characteristics of the respondents;
2. ascertain the farmers' perception on Orange Fleshed Sweetpotato and;
3. ascertain the farmers' level of adoption of Orange Fleshed Sweetpotato varieties

Hypothesis

H_o = There is no significant relationship between farmers' perception about Orange Fleshed Sweetpotato and level of Adoption of the technology.

METHODOLOGY

A multi stage sampling technique was used to elicit data for the study. In the first stage, two out of four agricultural zones in the state namely Anambra and Awka were purposively selected because of their nearness to the sub -station of National Root Crops Research Institute (NRCRI) Igbariam, Anambra state and intensity of sweetpotato production in the area. Two blocks from each of the agricultural zones were also purposively selected; they are Ayamelum, Anambra east, Awka north and Awka south giving a total of four blocks because of intensity of sweetpotato production Furthermore, two circles from each of the four blocks were purposively selected making it eight circles. These include; Umumbo, Omor, Igbariam, Anam, Achalla, Urum, Nibo and Okpuno. Finally, 15 sweetpotato farmers were randomly selected from each of the circles. Structured questionnaire was used to interview the farmers. A total of 120 respondents made up the sample size for the survey. List of sweetpotato farmers collected from Igbariam sub -station and Anambra State ADP served as the sample frame. Primary data were used for the study and data were analyzed using descriptive and inferential statistics. Descriptive statistics include frequency percentages and mean scale while inferential statistics was Pearson's Product Moment Correlation Coefficient (PPMCC) model. To ascertain level of farmers' perception about Orange Fleshed Sweetpotato in the study area, a five-point Likert scale of excellent =5, very good =4, good = 3, fair = 2 and bad =1, was used. In order to make decisions from result obtained, the mean responses were computed as thus: 5+4+3+2+1 = 15/5 =3.0 The mean decision was taken, thus any mean score less than 3.0 was negative and any mean score greater than or equal to 3.0 was positive respectively. To determine level of farmers' adoption of Orange Fleshed Sweetpotato in the study area, this was realized using mean scores of three-point Likert-type of Never adopt = 1, Adopt and stopped using = 2 and Adopt and still using = 3. In order to make decisions from result obtained, the mean responses were computed as thus: 3+2+1 = 6/3 = 2.0. The mean decision was taken thus any mean score less than 2.0 was low and any mean score greater than or equal to 2.0 was high and moderate respectively.

Likert scale model is stated thus:

$$\bar{X}s = \frac{\Sigma FN}{Nr} \quad (1)$$

Where,

$\bar{X}s$ = mean score
Σ = summation sign
F = frequency
N = Likert nominal value
Nr = number of respondents

While inferential statistics involved the use of Pearson's Product Moment Correlation (PPMC) model. The model is implicitly stated as:

$$\text{PPMCC } (r) = \frac{n\Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{(n\Sigma x)^2 - (\Sigma x^2)(n\Sigma y^2) - (n\Sigma y)^2}} \quad (2)$$

Where.

r = correlation coefficient
Y = perception (mean)
X = adoption (mean)
n = sample size

Test of significance on the correlation coefficient

$$t = \frac{r \times \sqrt{n-2}}{1-r^2} \quad (3)$$

Where,

t = test of significance
r = correlation coefficient
n = sample size

RESULTS AND DISCUSSION

Socioeconomic Characteristics of the Respondents

Table 1 shows that majority of the farmers 40.8 % fall between the age bracket 30 -39 years. This implies that the farmers are young and active. This finding agrees with the findings of Ekwe, *et al.* (2006) which indicated that most farmers are in their middle age and are still vibrant in agricultural production. Majority of the farmers (69.2%) were females. It implies that female farmers cultivate orange fleshed sweetpotato more than their male counterparts. The finding is in consonance with Ironkwe, *et al.* (2007). Majority of the farmers (84.2%) were married. It indicates that married farmers are mostly engaged in farming activities. This report is in line with Nwokocha, *et al.* (2016) that stated that farming is a necessary condition for the married farmers to lift their households out of poverty and ensure hunger free situation in their homes. The results also depict that greater percentage of farmers (52.5%) had year of schooling between 7-12 years. This implies that majority of them attended secondary school. Education has always been known to play a positive role in the adoption of improved technologies among farmers (Sheikh,et al. 2006). About 46.1% of the farmers had farming experience of 6-10 year. The result indicates that the farmers had many years of experience in OFSP farming considering the fact that OFSP is a recent variety. This finding gave credence to Omonoma et al. (2010) who reported that farmers' level of experience in the production of a particular commodity is one of the determinants of their ability to maximize output. About 60.8% of the respondents borrowed capital for cultivation of OFSP in the area. This result reveals the level of poverty of the people in the study area. According to Njoku (2000), poverty refers to persons whose resources are so limited to enable them embark on an enterprise.

Table 1: Socio-economic characteristics of the respondents (N = 120)

Variables	Frequency	Percentages
Age		
20-29	28	23.3
30-39	49	**40.8**
40-49	40	33.3
50-59	3	2.5
Sex		
Male	37	30.8
Female	83	**69.2**
Marital status		
Single	19	15.8
Married	101	**84.2**
Year of schooling		
1-6	33	27.5
7-12	63	**52.5**
13-18	24	20.0
Farming experience		
1-5yrs	6	5.0
6-10yrs	55	**46.1**
11-15yrs	51	42.5
16-20yrs	4	3.3
Above 20yrs	4	3.3
Source of capital		
Personal	47	39.2
Borrowed	73	**60.8**
Farm size		
0-0.9ha	22	18.3
1-1.9ha	98	**81.7**
Above 2ha	0	0.00
Household size		
1-5	60	**50.0**
6-10	54	45.0
Above 10	6	5.0
Extension contact		
Yes	27	22.5
No	94	**77.5**

Source: Field Survey, 2018.

Majority of the respondents (81.7%) cultivate on land between 1.0ha and 1.9ha. The result shows that the farmers are small holder farmers. This finding agrees with the findings of studies by Aniedu (2006) which found small-scale farmers predominating in the zone. Most of the respondents (50.0%) had household size that falls between 1-5 persons it reveals that the farmers may have enough helping hands in the cultivation of OFSP depending on the ages of the household members. Household labour is advantageous to farming since it is a cheap source of labour and thereby reduces the cost of hiring labour for OFSP production (Mbanaso, *et al.* 2012). The result reveals that 77.5% of the respondents indicated that they were not visited by the extension agent during the period under review. The extension agents are very important personnel because they supply information on the mode of application or use of recommended technologies to the farmers (Ekpe and Obeten, 2002).

Farmers' Perception about Orange Fleshed Sweetpotato in Anambra State

Table 2 shows the mean rating of farmers' perception about orange fleshed sweetpotato in the study area. Does OFSP meet your taste requirement? ($\bar{x}$ =4.43). Does the colour of OFSP attract your consumption?($\bar{x}$ = 4.13). Does it meet your food security requirement ($\bar{x}$ = 3.90).Is the yield of OFSP in your locality encouraging ($\bar{x}$ = 3.55). DO you enjoy eating OFSP raw? ($\bar{x}$ = 3.83).Do you like the texture of OFSP after cooking? ($\bar{x}$ = 3.75). Does OFSP thrive in your locality? ($\bar{x}$ = 3.50). Are you aware of the nutritive benefit (vitamin A) ? ($\bar{x}$ = 4.65). The grand mean was 3.9. This result implies that the farmers had positive perception about orange fleshed sweetpotato in Anambra State. Ikpi *et al.* (1986), Indicated that perception benefits are not only based on superior yield of fresh tuber, but also on harvest duration, quality of processed products for food and general economics of the improved varieties within the local situations.

Table 2: Mean rating of farmers' perception about Orange Fleshed Sweetpotato

Options	Bad	Fair	Good	Very Good	Excellent	Total	Mean
Does OFSP meet your taste requirement?	0 (0)	0 (0)	9 (27)	51(204)	60 (300)	531	**4.43**
Does the colour of OFSP attract your consumption?	0 (0)	0 (0)	6 (18)	93 (372)	21 (105)	495	**4.13**
Does OFSP meet your food security requirement?	0 (0)	0 (0)	27 (81)	78 (312)	15 (75)	468	**3.90**
Is the yield of OFSP in your locality encouraging?	0 (0)	6 (12)	48 (144)	60 (240)	6 (30)	426	**3.55**
Do you enjoy eating OFSP raw?	0 (0)	9 (18)	33 (99)	48 (192)	30 (150)	459	**3.83**
Do you like the texture of OFSP after cooking?	0 (0)	6 (12)	33 (99)	66 (264)	15 (75)	450	**3.75**
Does OFSP thrive in your locality?	0 (0)	0 (0)	66 (198)	48 (192)	6 (30)	420	**3.50**
Are you aware of the nutritive benefit (vitamin A)	0 (0)	0 (0)	6 (18)	30 (120)	84 (420)	558	**4.65**
Grand mean							**3.97**

Source: Field Survey, 2018. Positive perception ≥ 3.00. Negative perception ≤ 3.00. Bench mark mean score 3.00

Level of Farmers' Adoption of Orange Fleshed Sweetpotato in Anambra State

Table 3 shows that the two varieties of orange fleshed sweetpotato disseminated to the farmers were UMUSPO 1 and UMUSPO 3. The adoption of UMUSPO 1 shows ($\bar{x}$ = 2.65) while the adoption of UMUSPO 3 indicates ($\bar{x}$ = 2.48). The grand mean is 2.56. The results indicated that the OFSP varieties disseminated in Anambra State were adopted. This agrees with Nwosu (2010) who stated that acceptance of new technologies by farmers is a necessary precondition for agricultural development.

Table 3: Mean Rating of Farmers' Level of Adoption of OFSP n = 120

Technologies	Never adopted	Adopted and stopped	Adopted and still using	Total	Mean
UMUSPO 1	19(19)	4(8)	97(291)	318	**2.65****
UMUSPO 3	31(31)	0(0)	89(267)	298	**2.48****
Grand mean					**2.56****

Source: Field Survey, 2018. ** High level of adoption. Bench mark mean score 2.00.

The result of Pearson's Product Moment Correlation (PPMC) analysis in Table 4, shows a significant relationship between farmers' perception about OFSP and adoption of OFSP in the study area at 5% level. Correlation coefficient of 0.199** was computed and the t-value of 1.8553** obtained. This result shows that positive perception about OFSP varieties, leads to adoption of the orange fleshed sweetpotato by the farmers. This is because positive perception about OFSP will prompt farmers to get involved in the cultivation of the varieties in the study area. This finding agrees with Oladeji (2011) that farmers' attitude to innovation adoption rests on its perceived benefits. Therefore, the null hypothesis which states that there is no significant relationship between farmers' perception about OFSP and their level of adoption was rejected. The study concluded that there is significant relationship between farmers' perception about OFSP and their level of adoption in the study area.

Table 4: Analysis of relationship between perception and adoption of OFSP n=120

Variables	Correlation Coefficient	t–value
Perception and Adoption	0.199**	**1.8553****
P–value	0.015	

Source: Field survey, 2018. ** Correlation significant at 5% level (1 tailed).

CONCLUSION

The study concluded that OFSP is performing well in the study area with indications that farmers' had positive perception about OFSP and moderate level of adoption. It is therefore recommended that farmers should be encouraged to intensify efforts in the production of Orange fleshed Sweetpotato considering the benefits it offers to the consumers and also more extension personnel should be deployed to Anambra state to enable farmers get appropriate information that will help them increase the production of OFSP since greater percentage of the respondents indicated that they were not visited by the extension agents during the period under review

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