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EFFECT OF FARMERS' SOCIOECONOMIC FACTORS ON ADOPTION OF ORANGE FLESHED SWEET POTATO VARIETIES IN EBONYI STATE, NIGERIA

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ABSTRACT

This study assessed the effect of farmers' socioeconomic factors on the adoption of orange fleshed sweet potatoes in Ebonyi State. Multi-stage sampling method was used to collect data for the study. Two agricultural Zones were purposively selected because of their activeness in sweet potato farming in the State. Two blocks from each of the Zones were purposively selected for the same reason; two circles from each of the four blocks were purposively selected. Finally, 15 sweet potato farmers were randomly selected from each of the circles, in all, 120 sweet potato farmers made up the sample size. A structured questionnaire was used to interview the farmers. Primary data were used and data were analyzed using descriptive and inferential statistics. The result showed that 40.8% of the farmers fell between the ages of 30-39years, the majority of the farmers (69.2%) were females, 45.9% of the farmers had farming experience between 6-10years and the majority of the farmers (81.7%) had farm size between 0.5-0.9ha. The grand mean of adoption level was 2.30. The regression analysis result showed that sex, age, marital status, farm size, and occupation were significant at 5% and 10% levels respectively. The study concluded that socioeconomic factors had a great effect on farmers' adoption of orange fleshed sweet potato varieties in the study area. The study, therefore, recommended that more awareness should be made concerning OFSP for increased adoption of the varieties. Also, sweet potato breeders should improve the quality of Mother's delight variety to enable farmers to accept and adopt it.

Keywords: *Farmers, Socioeconomic Factors, Adoption, Orange Fleshed Sweet potato*

INTRODUCTION

Nigeria is an agricultural country that is endowed with enormous food and agricultural resources such as sweet potato, yam, cassava, and other crops. The adoption of innovation means that a person does something different than what they had previously. That is the acceptance and use of new ideas or technology. The key to adoption is that the person must perceive the idea. Agbarevo (2011) reported that the adoption of agricultural extension recommendations by farmers is a necessary condition for improved food production, an increase in farmers' income, and consequently an improved standard of living of the farmers. Adoption of a new idea, behavior, or technique 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.

Orange Fleshed Sweet potato (OFSP) is a special type of bio-fortified sweet potato that contains high levels of Beta-Carotene. Beta-Carotene is an organic pigment abundant in plants and fruits and it is converted to Vitamin A in the body after consumption to provide nutritional benefits. Vitamin A deficiency is a serious component of a larger and growing problem of malnutrition in sub-Saharan Africa, particularly among children. The International Potato Centre worked together with partner organizations in agriculture, nutrition, and health to fight vitamin A deficiency through the promotion of orange flesh sweet potato varieties as a dietary source of B-carotene, from which the human body synthesizes the vitamin. This approach complements the supplementation and fortification of food that cannot reach many people, particularly in rural areas, and will be sustainable as the new varieties, new uses, and new markets for orange fleshed varieties become established. OFSP is a staple food in Nigeria and can serve as a cheap and sustainable source of Vitamin A for children and pregnant women in rural areas especially (Ibe *et al.*, 2018). It has been used in Africa to combat a widespread vitamin A deficiency that results in blindness and even death for 25,000-500,000 children a year (CIP, 2012). The OFSP was primarily introduced in Nigeria as part of an integrated approach to mitigate Vitamin A deficiency, which affects about 70% of children under age 5, and 11% of women living in rural areas (IITA, 2016). The sweet potato has been utilized in so many ways such as a substitute for wheat in the making of flour for bread, cake, and other confectionery products (Henok, 2015).

Despite the importance of orange fleshed sweet potato in the provision of Vitamin A and fighting against blindness and malnutrition especially recommended for children and pregnant women in society, there is still a dearth of information on the effect of farmers' socioeconomic factors on the adoption of orange fleshed sweet potato varieties in Ebonyi State.

Hence, the study assessed the effect of socioeconomic factors on the adoption of orange fleshed sweet potato varieties in Ebonyi State, Nigeria. Specifically, the objectives of this study were to: describe the socio-economic characteristics of the respondents; ascertain the farmers' level of adoption of orange fleshed sweet potato varieties; and ascertain the factors that militate against farmers' adoption of OFSP varieties.

METHODOLOGY

Multi-stage sampling method was used to collect data for the study. In the first stage, the two agricultural zones of the state namely: Ebonyi North and Ebonyi Central Zones were purposively selected because of their activeness in sweet potato farming in the State. Two blocks from each of the agricultural Zones were purposively selected, giving a total of four blocks, for the same reason. Furthermore, two circles from each of the four blocks were purposively selected making it eight circles that were selected for the same reason. Finally, 15 farmers who are sweet potato farmers were randomly selected from each of the circles. A structured questionnaire was used to interview the farmers, in all 120 respondents made up the sample size for the survey. The list of sweet potato farmers collected from the Igbariam outstation served as the sample frame. Primary data was used for the study and data were analyzed using descriptive and inferential statistics. The descriptive statistic includes frequency, percentages, and mean presented in tables and bar charts. To determine the level of farmers' adoption of orange fleshed sweet potato varieties, the objective was realized using mean scores of a three-point rating scale (Never adopt =1, Adopt and stopped using =2, and adopt and still using = 3). In order to make decisions from the results obtained, the mean responses were computed as thus: 3+2+1 = 6/3 = 2.0. The mean decision was taken thus; a mean score of less than 2.00 was not adopted, and a mean score greater than 2.00 was adopted. The inferential statistic involved the use of the Ordinary Least Square regression model. The model is implicitly stated as;

Linear form: $Yd=a+b_1x_1+b_2X_2+b_3X_3+b_4X_4+b_5X_5+b_6X_6+b_7X_7+ei$

Semi-log form: $Yd=a+b_1logX_1+b_2logX_2+b_3logX_3+b_4logX_4+b_5logX_5+b_6logX_6+b_7logX_7+ei$

Double log form:

$LogYd=a+b_1logX_1+b_2logX_2+b_3logX_3+b_4logX_4+b_5logX_5+b_6logX_6+b_7logX_7+ei$

Exponential form:

$LogYd= a+b_1x_1+b_2X_2+b_3X_3+b_4X_4+b_5X_5+b_6X_6+b_7X_7+ei$ Where:

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

Where

Y = Level of farmers' adoption (mean)

X_1 = Sex (male = 1, female = 0)

X_2 = Age (years)

X_3 = Marital status (married = 1, single = 0))

X_4 = Farming experience (years)

X_5 = Farm size (ha)

X_6 = Household size (numbers)

X_7 = Extension visit (very regular = 3, regular = 2, not regular = 1)

U = error term

RESULTS AND DISCUSSION

Socioeconomic characteristics of the farmers

Table 1. The result shows that 40.8% of farmers fell between the ages of 30-39 years and 33.3% of them fell between 40-49 years. The result shows that the farmers were young and in their active age. This agrees with the findings of Nze and Azubuike (2016) who stated that most farmers in the Zone were in their active ages. The majority of the farmers (69.2%) were females while (30.8%) were males. It implies that female farmers cultivate orange fleshed sweet potatoes more than the males. The majority of the farmers (84.2%) were married. It indicates that married farmers engaged themselves in sweet potato farming. This finding is in agreement with Emaziye (2015) who observed that most of the farmers were married. About 45.9% of the farmers had farming experience of 6-10 years while 42.8% of the farmers had farming experience of 11-16 years. The result indicated that the farmers had many years of experience in sweet potato farming. The majority (81.7%) of the respondents had farm sizes that fell between 0.5ha and 0.9ha. The result shows that the farmers are smallholder farmers. Nwakor *et al.* (2016) observed that the problem of land inheritance and fragmentation in rural communities may be the cause of small farm size in the Zone. Most of the respondents (50.0%) had a household size that falls between 1-5 persons while (45.0%) had a household size between 6-10 persons. It reveals that the farmers had enough helping hands in the cultivation of OFSP. This is advantageous to farming since it will enable the farmer to use family labour and thereby reduce the cost of hiring labour for OFSP production (Mbanaso *et al.,* 2012). The result reveals that 65.8% of the respondents indicated that they do not have any extension visits. Ekwe *et al*. (2017) opined that the low level of extension contact was due to the dwindling situation of extension services delivery in Nigeria.

Table 1: Socioeconomic characteristics of the farmers

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		
Married	101	84.2
Single	19	15.8
Farming experience		
1-5yrs	6	5.0
6-10yrs	55	45.9
11-15yrs	51	42.5
16-20yrs	4	3.3
Above 20yrs	4	3.3
Farm size		
0-0.9ha	98	81.7
1-1.9ha	22	18.3
Household size		
1-5	60	50.0
6-10	54	45.0
Above 10	6	5.0
Extension visit		
Very Regular	17	14.2
Regular	24	20.0
Not regular	**79**	**65.8**
Total	**120**	**100**

Source: Field Survey, 2021

Level of Farmers' Adoption of Orange Fleshed Sweet Potato in Ebonyi State

Table 2 shows the three varieties of orange fleshed sweet potatoes that were disseminated to the farmers in Ebonyi State. They were; *Mother's Delight* (UMUSPO 1), *King J* (UMUSPO 3), and *Solo Gold* (UMUSPO 4). The result showed that the mother's delight (UMUSPO 1) variety had $\bar{x} = 1.86$, this result indicated that the *mother's delight* variety was not adopted by the farmers in the study area. *King J* (UMUSPO 3) variety was ($\bar{x} = 2.36$) and *Solo gold* (UMUSPO 4) was ($\bar{x} = 2.67$), indicating that these varieties were adopted. The grand mean of adoption of OFSP varieties showed 2.30, indicating that generally OFSP varieties were adopted.

Table 2: Mean rating of farmers' level of adoption of orange fleshed sweet potato varieties

Technologies	Never adopt	Adopt and stopped	Adopt and still using	Total	Mean	Decision
Mothers Delight (UMUSPO 1)	59(59)	19(38)	42(126)	223	1.86	Not adopted
King J (UMUSPO 3)	31(31)	15(30)	74(222)	283	2.36	Adopted
Solo Gold (UMUSPO 4)	15(15)	10(20)	95(285)	320	2.67	Adopted
Grand mean					**2.30**	

Source: Field Survey, 2021

Note: ≤ 2.00 Not adopted, Adopted ≥ 2.00 and above. Benchmark mean score= 2.00.

Analysis of relationship between level of adoption OFSP and socioeconomic factors

Table 3 shows a regression analysis of the relationship between farmers' adoption and selected socioeconomic characteristics. Among the four functional forms, Semi log was selected as the lead equation because of a number of significant variables and conformity to a *priori* expectation. The R^2 value (0.720) which implies that about 72.0% of the variation in socioeconomic factors on farmers' adoption of orange fleshed sweet potato varieties was explained by independent variables. F ratio (10.615) *** was also highly significant at 1%, indicating goodness of fit.

Variables such as sex, age, marital status, farming experience, and farm size were found to be significant to farmers' adoption of OFSP. Table 3 result reveals that sex was significant at a 5% level but negative. This result implies that the more females, the higher the adoption of OFSP varieties in the study area. This finding is in agreement with the findings of Anozie *et al.* (2015), who reported that women in sub-Saharan Africa perform over 60% of farming and adoption of improved technologies. Age was significant at a 5% level but negative. This result shows that the younger the farmer, the higher the adoption of OFSP varieties disseminated to the farmers. This finding is in conformity with *a priori* expectation and agrees with Hartley (2003), who says that respondents within productive age are likely to adopt innovations better because they are still active and dynamic than the ones who are of age. Marital status was significant and positively related to adoption at a 5% level. This implies that farmers who are married adopted the OFSP varieties more than unmarried ones. Married farmers are always more eager to adopt agricultural technologies than unmarried ones. This conforms to *a priori* expectation and agrees with Verter and Becvarova (2014) married families are more engaged in agriculture than unmarried people. Farm size was found significant at a 5% level and positively related to the adoption of OFSP in the study area. This result implies that the larger the farm size, the more involved the farmers will be and this will lead to more adoption of orange fleshed sweet potato varieties. Therefore, since the variables were significant at 5% and 1% levels, the null hypothesis was rejected.

Table: 3. Analysis of the relationship between the level of adoption OFSP and socioeconomic factors

Variables	Linear	+Semi-log	Exponential	Double log
Constant	0.032	0.000	2.167	0.082
	(2.391)**	(4.819)***	(1.317)	(1.609)*
Sex X_1	0.026	0.014	0.020	0.022
	(2.025)**	(2.509)**	(2.404)**	(2.322)**
Age X_2	-0.017	-0.019	-0.131	-0.127
	(-2.523)**	(-2.482)**	(-1.193)	(1.158)
Marital status X_3	0.022	0.031	1.188	1.388
	(2.197)**	(2.295)**	(0.855)	(0.866)
Farming experience X_4	0.012	0.021	0.000	0.000
	(2.619)**	(2.340)**	(3.804)***	(3.948)***
Farm size X_5	0.070	0.023	0.000	0.000
	(1.920)*	(2.308)**	(3.387)***	(3.466)***
Household size X_6	0.000	0.337	1.886	1.759
	(0.368)	(0.342)	(0.652)	(0.892)
Extension contact X_7	1.220	0.153	2.216	2.036
	(0.227)	(0.601)	(0.022)	(0.405)
R^2	0.699	0.720	0.546	0.552
R adjusted	0.649	0.750	0.538	0.530
F Statistics	9.604***	10.615***	6.478***	5.636***

Source: Field Survey, 2021

Note: Figures in parenthesis represent t-ratios; *** = at 1% and ** = at 5% significant levels, + = Lead Equation. Null Ho rejected.

CONCLUSION AND RECOMMENDATIONS

The study concluded that socioeconomic factors had a great effect on farmers' adoption of orange fleshed sweet potato varieties in the study area, since age, sex, marital status, farming experience, and farm size were significant to the adoption of OFSP varieties at 5% and 1% levels. Also, the study showed that King J and Solo gold varieties were adopted by the farmers. The study, therefore, recommended that more awareness should be made concerning OFSP for increased adoption of the varieties. Also, sweet potato breeders should improve the quality of Mother's Delight variety to enable farmers to accept and adopt it.

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