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AWARENESS LEVEL, PERCEPTION AND UTILIZATION OF ORANGE FLESHED SWEET POTATOES AMONG HOUSEHOLDS IN NASARAWA SOUTHERN AGRICULTURAL ZONE, NIGERIA

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ABSTRACT

The study was conducted in the southern agricultural zone of Nasarawa state, Nigeria. The aim of the study was to assess the level of awareness and utilization of Orange-Flesh Sweet Potatoes (OFSP) among households in the study area. Goal 2 of the SDGs is to end hunger, achieve food security and improved nutrition and promote sustainable agriculture in the world. One way to achieve this is through the initiative to encourage the production and consumption of orange-fleshed sweet potato varieties that are rich in beta-carotene. A sample of ninety (90) households were randomly selected from the six villages within the zone that benefited from the OFSP training in 2015 for the study. Data collection was by the use of a structured interview schedule. Data were analyzed using both descriptive and inferential statistics, such as frequency counts, percentages, mean and linear regression. The results show that all (100%) of the respondents were aware of OFSP and they all consumed it. Majority (93%) of the respondents knew that OFSP is rich in vitamin A. Majority (94%) used OFSP for chips. Constraints faced in the effective utilization of OFSP by the respondents were lack of storage facilities, lack of modern processing equipments and scarcity of OFSP vines for production. It was recommended that the state ADP should urgently undertake massive multiplication and distribution of OFSP vines to all farmers in the state and that Home economics extension workers should organize more training workshops for rural women on the modern processing and utilization of OFSP.

Keywords: Awareness, Perception, Utilization, Orange, Fleshed, Potatoes, Households, Nasarawa State.

INTRODUCTION

Sweet potato (*Ipomea batatas*) is an important root crop in Nigeria, not just because of its ability to thrive in marginal soil, but also its broad agro ecological adaptability as it can be grown in all of Nigerian 36 states. Sweet potato has a short production cycle (3-4 months) while its roots and vines can be exploited for both human and animal consumption. All sweet potato varieties are good sources of vitamin C, E and K, several B vitamins and the key minerals of magnesium and potassium. The leaves have appreciable levels of proteins, and are widely used in the dairy industry in East Africa. However, its relatively low yield in Nigeria (6-7 tons/ha), compared to countries like China and South Africa (21 and 50 tons/ha) respectively limits the realization of its potential contribution to health and wealth ((Raw Material Research and Development Council, RMRDC, 2014).

Goal 2 of the Sustainable Development Goals (SDGs) is to end hunger, achieve food security and improved nutrition and promote sustainable agriculture in the world. One way to achieve this through the initiative to encourage the production and consumption of orange-fleshed sweet potato varieties that are rich in beta-carotene (a carotenoid or plant pigment responsible for the yellow and orange coloration of some tuber varieties) which will help to fight vitamin A deficiencies. Vitamin A is one of the critical micronutrients needed by all human beings. Vitamin A deficiency limits the ability of the body to defend itself against diseases in about 40 percent of children under five years of age in the developing world (Low, *et.al.* 2007). The consumption of this essential nutrient is extremely low in many parts of Sub-Saharan Africa. This is being tackled in many different ways. Most strategies focus on young children, because achieving adequate vitamin A status has been shown to reduce child mortality. The three most common methods are, according to Low *et al*. (2007), administering vitamin A capsules every 6 months (supplementation), adding vitamin A to another food such as sugar (fortification), and increasing the consumption of vitamin A-rich foods (food-based approaches). Poor people in rural areas often have limited access to health services and limited amounts of money to spend on food. Hence, promoting the production and consumption of orange fleshed sweet potato is considered as a more affordable and sustainable way of curbing vitamin A deficiency and achieving food security and improved nutrition among low income rural and urban populations in Nigeria.

Easy to produce vitamin A rich foods could therefore have an important role in improving human health in such settings. In the past 15 years, the potential of "bio fortified" staple crops – varieties bred for increased vitamin or mineral content – has been increasingly recognized. According to Chowdhury, *et al*. (2011), orange-fleshed sweet potato (OFSP) is particularly promising because its levels of provitamin A and carotenoids are high and can easily be absorbed by the body. Sweet potato is considered an excellent food security crop in sub-Saharan Africa because it often survives when other crops (for example, maize) fail. It is also less labour intensive than most other staple crops; it is produced using vines instead of seeds, and can be planted over a broad range of time without considerable yield loss. But most varieties in Africa are white fleshed, lacking in beta-carotene, the precursor of vitamin A. Orange-fleshed sweet potato has emerged as one of the most promising plant sources of β-carotene, the pro-vitamin A (Hagenimana and Low, 2000). A 100- 150 g serving of boiled tubers of orange-fleshed sweet

potato can supply the daily requirement of vitamin A for young children which can protect them from blindness (Tsou and Hong, 1992). Along with the β-carotene, the pro-vitamin A, the young children and adults can also get adequate amount of calories, vitamin C and other micronutrients through increased consumption orange-fleshed sweet potato.

The introduction of OFSP is simplified as knowledge of sweet potato production already exists in Africa. The interest in OFSP in addition, is considered as it would be better to address the underlying cause of inadequate food intake (both in terms of quality and quantity), rather than contemplate distributing capsules every 6 months for the indefinite future. Adoption of a new technology by farmers is usually driven by a combination of many factors. One of such factors is farmers' level of awareness, knowledge and perception of the technology which affects how the technology is be utilized on adoption. There exists a huge research gap as work on OFSP in Nasarawa State is very scanty. Also, with the high cost of access to health care facilities which are nonfunctional and not affordable, awareness of the medicinal value of OFSP will help in augmenting vitamin A deficiency in children.

OBJECTIVES OF THE STUDY

The broad objective of the study is to assess the level of awareness and utilization of Orange-Flesh Sweet Potatoes (OFSP) among households in Nasarawa Southern Agricultural Zone. The specific objectives are to:

i. describe the socio-economic characteristics of household heads in the study area;
ii. determine the perceived nutritional importance of OFSP by the respondents;
iii. ascertain the level of awareness and utilization of OFSP by respondents in the study area;
iv. determine the effects of some selected socio-economic characteristics of the respondents on their level of utilization of OFSP, and;
v. identify constraints to effective utilization of OFSP among the respondents.

METHODOLOGY

The study was conducted in the southern agricultural zone of Nasarawa state, Nigeria. The zone comprises of five Local Government Areas which are Awe, Doma, Keana, Lafia and Obi LGAs. Household heads in the zone were the target population for the study. A multistage sampling technique was used to select respondents for this study. In stage 1, two (2) LGAs out of the five (5) LGAs in the study area were purposively selected based on their involvement in the OFSP promotional programme. They are Doma and Lafia LGAs. In stage 2, three communities were purposively selected from each of the two selected LGAs, based on their participation in OFSP programmes, to give a total of six (6) communities. In Lafia LGA, the selected communities were Bukan Sidi, Shabu and Lafia town. In Doma LGA, the selected communities were Awonge, Doma town

and Alagye. Stage 3, involved the random selection of fifteen households from each of the six villages which gave a sample size of ninety (90) households for the study.

Primary data for this study were collected through the use of structured interview schedule. The interview schedule contained questions covering all the objectives of the study. Data were analyzed using both descriptive and inferential statistics, such as frequency counts, percentages, mean and linear regression. Specifically, objectives 1,2, 3 and 5 were analyzed using descriptive statistics while objective iv was achieved using a linear regression model. The regression model is specified as follows:

$$Yi= a+\beta_1X_1+\beta_2X_2+\beta_3X_3+\beta_4X_4+\beta_5X_5+\beta_6X_6+\beta_7X_7+u$$

Where:

Yi= Level of OFSP utilization (in percentage)
β_1-β_7= Coefficients of the independent variable
a= Constant
U= Error term.
X_1= Age of respondent in years
X_2=Marital status
X_3= Educational level (Years of formal schooling)
X_4= Household size
X_5= Extension contact (Number of extension visits per year)
X_6= Number of social organizations involved.
X_7= Annual income level in naira

RESULTS AND DISCUSSION

Socio-economic characteristics of respondents

Table 1 shows that a greater proportion (35. 4%) of the respondents were within the age range of 20-30 years followed by 28.7% of the respondents who were within the age range of 31-40 year. However the mean age was 38 years. This result implies that farmers in the study area were in their prime ages. This trend has significant implication for innovativeness as elderly people might be less interested in the use of OFSP and adoption of new potato varieties other than the ones they are used to. Agbamu (2006) reported that age is usually considered to be a primary latent characteristic in adoption decisions.

Majority of the respondents (55%) were males and 45% were females. This means that both males and females are actively involved in orange fleshed sweet potatoes activities in the study area. The greater number of male farmers in the area may be attributed to the culture, traditions and belief of the people in the study area that farming activities involved hard task and that it is not proper for women to be involved in farming activities. A greater proportion (57.5%) of the respondents was married. This indicates that farmers had families that could be used for labour and most likely needed to be aware of OFSP nutrients which are a vital source of vitamin A for children and adults.

The result further shows that greater proportion 25.0% and 21.2% of the respondents had secondary school certificate and HND respectively whereas only 17.5% of the respondents had B.Sc. as their highest qualifications. In the overall, all the respondents had one educational qualification or the other with the exception of 12.5% that had non-formal education. This implies that most of them were literates and should be able to appreciate the importance of the nutritional values attached to OFSP. This agrees with the findings of Adedoyin *et al*. (1999) who identified education as a springboard for agricultural product utilization by farmers. It is widely believed that education creates a favourable mental attitude for the acceptance of new ideas and practices. It enables a farmer to seek for and utilize useful information from both print and electronic media, thereby accelerating the rate of adoption of technologies (Ozor and Madukwe, 2005)

All (100%) of the respondents belong to at least one social organization. According to Wabbi, (2002), membership of social organizations accelerates the adoption of improved technologies.

Majority (53.75%) of the respondents had about 1-20 years of farming experience. The mean years of farming experience was 16 years. This implies that the respondents are well experienced in their farming activities.

Table1: Distribution of respondents according to their socio-economic characteristics (n=80)

Variable	Percentage	Mean
Age		
20-30	35.4	
31-40	28.7	38
41-50	18.6	
51-60	13.6	
>60	3.6	
Sex		
Male	55.0	
Female	45.0	
Marital Status		
Single	35.0	
Married	57.5	
Farm size		
1-5	40.00	
6-10	32.50	3
11-15	15.00	
16-20	12.05	
Household size		
1-10	58.8	
11-20	31.2	9
21-30	10	
Total annual income		
100,000-200,000	43.8	
200,001-400,000	27.5	
400,001-600,000	10.0	345000
600,001-800,000	11.2	
800.001-1000,000	7.5	
Farm experience		
1-20	53.75	
21-40	25.0	16
41-50	16.25	
>50	5.0	
Educational level		
Non-formal education	12.5	
Primary certificate	11.2	
Secondary certificate	25.0	
Tertiary	51.2	
Membership of social group		
Yes	100	
No	0	
Farming experience (Yrs)		
1-20	53.75	
21-40	25.0	
41-50	16.25	
>50	5.0	
No. of Extension. Visits/yr		
Nil	76.3	
1-10	17.5	
11-20	6.2	

Source: *Field survey, 2016*

Perceived Nutritional Importance of OFSP

Table 2 shows the perceived nutritional importance of OFSP among farmers in the study area. Majority (93%) of the respondents agreed that OFSP is rich in vitamin A, followed by 44% who agreed that it is rich in vitamin C, 43% also agreed that it is highly nutritious, however 18% agreed that OFSP does not cause constipation. Thus, the results show that the respondents were well informed about the nutritional importance of OFSP and tend to debunk other beliefs and perception about the nutritional status of the crop, therefore, increasing usage.

Table 2: Perceived Nutritional Importance of OFSP (n=80)

Variable	Percentage
Rich in vitamin A	93
Rich in vitamin C	44
Good for diabetic patients	10
Reduces high blood pressure	16
Ease digestion	15
Sweet	33
Tasty	36
Nourishes the body	29
Maximum satisfaction	23
Highly nutritious	43
Attractive colour	35
Uniqueness	8
Palatable	23
Soft	19
Doesn't cause constipation	18

Source: *Field Survey, 2016*

Level of Awareness and Utilization of OFSP

The result in Table 3.1 shows that all (100%) of the respondents were aware or had knowledge of OFSP and its nutritional importance and they also consumed it. A greater proportion (58%) of the respondents had access to OFSP from the market, while 42% of the respondents produced OFSP on their own farms for consumption. This implies that a greater proportion of the respondents only had access to OFSP from the market and just few produced it on their farms. There is a need to encourage mass production of OFSP as a garden or backyard crop by all citizens due to its nutritional value.

Table3.2 shows that majority (94%) of the respondents used OFSP for chips and 78% used it for porridge while 41% and 38% utilize it for juice and flour respectively. According to Ukpabi and Ekeledo (2009), Sweet potato chips, which are similar to

Irish potato chips, are some of the food forms that can be prepared with the edible roots of sweet potato. Results in table 3.2 show that the respondents utilized OFSP in one form or the other such as cake, chinchin, soup, ketchup, cookies, buns, doughnuts and noodles among others. More education and awareness is required to improve the level of utilization of OFSP by farmers.

Table 3.1: Awareness of and Source of Getting OFSP (n=80)

Variable	Percentage
Aware of existence of OFSP	100
Consumption of OFSP	100
Access OFSP from Own farm	42
Access OFSP from Market	58

Table 3.2: Utilization of OFSP (n=80)

Variable	**Percentage**
Flour	38
Cake	13
Chinchin	13
Buns	5
Doughnuts	5
Juice	41
Soup	23
Syrup	6
Porridge	78
Chips	94
Ketchup	3
Jam	1
Cookies	5
Noodles	5

Source: *Field Survey, 2016*

Effect of socioeconomic characteristics on the level of OFSP utilization

Table 4 shows that farm size was significant at 1% level of significance while sex and age were significant at 10% level of significance. The result implies that farm size, sex and age affect the level of OFSP utilization in the study area. This result agrees with the findings of Okello *et al*. (2015) that OFSP in Kagera region is gender specific with 56% and 41% of male respondents disagreed and strongly disagreed, respectively, that orange fleshed sweet potato is not food for men with only 3% male respondents agreeing with the statement that Sweet potato is food for women and children only.

The R-squared value (R^2=0.271) shows that 27% of the variability in the dependent variable (Level of OFSP utilization) was due to the farmers' socioeconomic characteristics (independent variable).

Table 4: Regression analysis of the Effect of Socioeconomic Characteristics on the Level of OFSP utilization (n=80)

Model	**Unstandardized coefficient**		**Standardized Coefficient**	**T – Value**	**Sig**
	B	**Std. Error**	**Beta**		
Constant	19.429	11.481	-	1.692	0.093**
Sex	5.323	3.015	0.215	1.766	0.082**
Age	-0.142	0.209	-0.139	-0.680	0.499
Marital status	-0.425	2.219	-0.024	-0.191	0.849
Level of qualification	0.771	1.958	0.102	0.394	0.695
Years of formal education	-0.038	0.579	-0.017	-0.066	0.947
Farming experience	-0.199	0.187	-0.200	-1.062	0.292
Farm size	1.368	0.376	0.453	3.636	0.001*
Extension visit	-3.585	3.838	-0.141	-0.934	0.354
Times of Extension visit	0.976	0.765	0.195	1.275	0.207
Household size	0.486	0.331	0.202	1.467	0.147
Number of social organization	0.059	0.735	0.009	0.080	0.937
Major occupation	-0.930	1.197	-0.088	-0.777	0.440
Total annual income	3.402E.6	0.000	0.075	0.666	0.508

R^2 = 0.271, R^{-2} = 0.128

** = significant at 5% level; * = Significant at 1% level

Source: *Field Survey, 2016.*

Constraints to the Effective Utilization of OFSP among the Respondents

Table 5 shows the mean distribution of the respondents according to constraints faced with the effective utilization of OFSP. Only three factors out of the eleven presented were rated as very serious constraints. These were: Lack of storage facilities (M=2.68); Lack of modern processing equipment (M=2.73) and scarcity of OFSP vines (M=2.68). This means that lack of storage facilities, lack of modern processing equipment and scarcity of OFSP vines had a great effect on its utilization. Hence,

provision of storage facilities, modern processing equipments and provision of OFSP vines should be made available to farmers by the government.

Table 5: Mean distribution of respondents according to constraints faced (n=80)

Constraints	Mean score
Low income level	1.55
Lack of storage facilities	**2.68***
Lack of modern processing equipment	**2.73***
Inadequate knowledge	1.33
Too sweet for consumption	1.19
Orange fleshed colour	1.19
Difficult to mix with other flour	1.05
Difficult to process	1.15
Scarcity/high cost of OFSP vines	**2.68***
Poor acceptance	1.84
Lack of training	1.89

Source: *Field Survey, 2016*

CONCLUSION AND RECOMMENDATIONS

From the major findings of this study it was concluded there was a very high level of awareness of OFSP and its nutritional importance among rural households in the southern agricultural zone of Nasarawa state. Most of the farmers in the area produced and consumed this variety of sweet potato in various forms. This will ensure an affordable and sustainable way of curbing vitamin A deficiency and achieving food security and improved nutrition among low income rural and urban populations in Nigeria.

However, certain factors such as lack of storage facilities, lack of modern processing equipment and scarcity of OFSP vines were serious constraints faced in the effective utilization of OFSP among the respondents. In view of these findings the following recommendations are made:

1. The Nasarawa Agricultural Development Programme (NADP) should urgently undertake massive propagation/multiplication and distribution of OFSP vines to all farmers in the state while demonstration plots should be established across the state to teach farmers the improved production technologies of this all important root crop.
2. Home economics extension workers should organize more training workshops for rural women on the modern processing and utilization of OFSP to ensure sustainability of the programme.
3. The state government should facilitate the provision of modern processing and storage facilities for effective utilization of OFSP on commercial basis.

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