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FARMERS' KNOWLEDGE OF HEALTH AND SOCIO-ECONOMIC BENEFITS OF ORANGE FLESHED SWEET POTATO IN KWARA STATE, NIGERIA.

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ABSTRACT

The socio-economic and health benefits of Orange Flesh Sweet Potato (OFSP) were the foremost and scientifically proven advantages of cultivation and consumption OFSP respectively. The present study seeks to understand farmers' knowledge of health and socio-economic benefits of orange fleshed sweet potato in Kwara State, Nigeria. A total of 139 sweet potato farmers were sampled. A structured questionnaire was used to collect primary data. Data collected were analyzed with frequency count, percentages, mean, standard deviation and Pearson Product Moment Correlation (PPMC). Findings showed that majority (87.1%) had knowledge of socio-economic benefits of growing OFSP. Most of the respondents (63.3%) had moderate knowledge of the socio-economic benefits of growing OFSP. The respondents agreed that consumption of OFSP improve digestion (46.8%), boost immune system (31.7%) and improve vision (12.2%). Respondents additionally agreed that growing OFSP had mainly increased household income (34.5%), improved food security (47.5%) and increased participation in social activities (33.1%). Inadequate access to planting materials (79.1%) was the leading challenges to growing OFSP. PPMC analysis indicated that household size, family members involved in farming, years of experience, number of plots, income and knowledge of OFSP were the factors that influence farmers' perception on health/socioeconomic benefits of OFSP at $p \leq 0.05$ level of significance. This study concluded that farmers had moderate knowledge level on health and socio-economic benefits of cultivating and consumption of OFSP. Therefore, agricultural extension agents should intensify efforts in the supply of planting materials and enlightenment of health benefits for improved vision.

Keywords: Orange Flesh Sweet Potato, digestion, vision, immune system, and income.

INTRODUCTION

Agriculture is important to Nigeria's economy and most practiced economic activity by households in Nigeria. According to World Bank (2013) report, agricultural sector provides employment to over 65% of the nation's workforce. The contribution of agriculture to the nation's Gross Domestic Product (GDP) was 31% in 2011, 33.1% in 2012 and 34.7% in 2012, 21.43% and 26.13% in 2017 (Central Bank of Nigeria, 2017). In Nigeria particularly, about 6% of the citizens are undernourished especially in the rural areas where poverty incidence seems to be relatively higher than in the urban centers (Sertoğlu et al., 2017).

Globally, sweet potato (*Ipomoea batatas (L) Lam*) is the sixth most important food crop after rice, wheat, potatoes, maize and cassava, while in the developing nations it is the fifth most important food crop (Adugna et al., 2018). Sweet potato is an herbaceous, warm-weather creeping plant belonging to the family *Convolvulaceae* and genus *Ipomoea*. The family is made up of 45 genera and 1,000 species, out of which only *Ipomoea batatas* is of economic importance to man and animals (Adeola et al., 2019). International Potato Centre claimed that sweet potato is among the world's most important, versatile and under-exploited food crops (Adeyonu et al., 2019). Sweet potato is vital to small scale farmers with limited land, Labour and capital. One of its greatest values is its ability to be harvested piecemeal for home consumption or income generation. Presently, the predominant sweet potato cultivars in eastern and Southern Africa are white fleshed varieties that contain negligible amounts of beta carotene, a micronutrient that the body uses to produce vitamin A (Jenkins et al., 2018; Adewumi & Mahmud, 2023).

Orange fleshed sweet potato (OFSP) in Nigeria also known as "Solo Gold is a variety of sweet potato with high dry matter and a lot of nutrients (Girard et al., 2017). This variety of sweet potato is tolerant to sweet potato weevil and also resistant to sweet potato viral disease, it matures in three to four months. Orange Fleshed sweet potato also has powerful antioxidants that help prevent cancers (Babatunde et al., 2019).

Orange fleshed sweet potato is a staple food for the populace in Nigeria because it is affordable and also contain sustainable source of Vitamin A. Orange fleshed sweet potato can be consumed as a vegetable (boiled, fried, raw or roasted) as well as in different products through processing and value addition for improved household food intake (Alalade et al., 2019; Mohammed, 2023). Also, different varieties of food/snacks can be made from OFSP when processed into flour this includes Amala, Puff-puff, chips, cake, porridge, bread, juice, and Kunu. These products can be commercialized for income generation, job, and wealth creation for all, especially women and youth (Bose et al., 2020). Orange-Fleshed Sweet Potato has

enormous health benefits recommended for domestic consumption. This variety of sweet potatoes is versatile. It can contribute to food security and improvement in the health of Nigerians (Bose et al., 2020).

Despite the health benefit of OFSP, the orange fleshed sweet potato is not commonly consumed as the white fleshed sweet potato. Orange-fleshed sweet potatoes (OFSP) have been recognized as an important crop for addressing malnutrition and improving household income among smallholder farmers in many developing countries. Despite these potential benefits, the adoption and utilization of OFSP among smallholder farmers has been slow in some areas. This study seeks to understand farmers' perception of the health and socioeconomic benefits of OFSP in order to identify factors that influence the adoption and utilization of OFSP among smallholder farmers.

The main objective of the study was to investigate farmers' perception on health and socio-economic benefits of orange fleshed sweet potato in Kwara state Nigeria. Specific objectives of the study were to: (i) describe the socio-economic characteristics of the sweet potato farmers, (ii) ascertain farmers' knowledge of health and socioeconomic benefits of orange fleshed sweet potato, and (iii) examine the factors influencing the farmers' adoption of orange fleshed sweet potato.

METHODOLOGY

The study was carried out in Kwara state Nigeria. Kwara is a western State in Nigeria. Kwara comprises of 16 local governments areas (LGAs) with a population estimate of about 3.6million (2022 population estimate). It has a total land size of 3682500 hectares (FOS, 1995). It is located between Latitudes 70 45N and 90 30N and longitude 20 300 and 60 250E. The topography is mainly plain to slightly gentle. Agriculture is the major occupation in the state with over 70% of the population being farmers (Ayinde et al., 2008).

Population for this study target all registered sweet potato farmers in Kwara state. A multistage cluster sampling technique was used to select the sweet potato farmers that were used as respondents for the study. Multistage sampling was used to select respondents. The first sampling stage involved the selection 25% of 16 Local Government Areas (LGAs). This is as a result of unknown population of the farmers in the LGAs. Thereafter, randomly selection of ten (10) communities from each of the selected local government areas in the study area was carried out. In the last stage ten (10) respondents was randomly selected from each community to make up a sample size of 140 respondents. Only one hundred and thirty-nine (139) questionnaires were retrieved from respondents and analysed.

Knowledge level of socio-economic and health benefits of growing OFSP were measured using a 5-point likert-type scale as: no knowledge = 0, slight knowledge = 1, moderate knowledge = 2, high knowledge = 3 and extreme knowledge = 4. Socio-economic and health benefits of growing OFSP and consuming OFSP were measured on two point scale as: yes =1 and no=0. Challenges of growing OFSP were measured on two point scale as: yes =1 and no=0. Objectives of the study were analysed with frequency counts, percentages, mean, and standard deviation while hypothesis of the study was analysed with Pearson Product Moment Correlation (PPMC) model. The model was adopted and expressed as follows:

$$\mathbf{r_{xr}}=\frac{n\sum xy-(\sum x)(\sum y)}{\sqrt{\{n\sum x^2-(\sum x)^2\}\{n\sum y^2-(\sum y)^2\}}}\ldots\ldots\ldots\ldots\ldots(1)$$

where;

r = correlation coefficient

y = dependent variable (Socioeconomic and health benefits of OFSP)

x =independent variables

X_1 = Household size (persons)

X_2 = Family members involved in farming (persons)

X_3 = Education (years of schooling)

X_4= Plot size (numbers)

X_5 = Purpose of cultivation = (socioeconomic and health benefits=1, otherwise 0)

X_6= Annual income (Naira)

n = total number of observation

$\sum$ =summation

RESULTS AND DISCUSSION

Sweet potato production enterprise of the respondents

Information on sweet potato production enterprise of the respondents is presented in Table 3. On years of planting sweet potato , 35.3% of the respondents had 10 years and below, 31.7% had 30 years and above while the average years of experience was 22 years. This implies that sweet potato farmers in the study area had long years of experience in planting sweet potato. The size of plot cultivated were between 11 to 15 plots (28.8%), 5 to 10 plots (54.7%) while 16.5% cultivate less than 5 plots. The purpose of cultivating sweet potato among majority was for business (63.3%) while other cultivate for self-sustenance (26.6%) and ceremonial activities (10.1%). Majority of the farmers cultivate OFSP for business purpose. This may be attributed to the market value of the variety. According to Bose et al. (2020), orange fleshed sweet potatoes are now sell at higher prices than white fleshed because of its nutritional value. The importance of sweet potato is increasing in Nigeria's farming and food systems because its production has recorded good profit margin and is

suitable for income generation (Sunusi and Adesogan, 2014). Regarding monthly income earned from sweet potato, majority (79.1%) earned maximum of ₦100,000. The average income was ₦75,541.50. This confirm that sweet potato production is profitable as reported by previous studies (Alalade et al., 2019; Adewumi and Mahmud, 2023).

Table 1: Sweet potato production enterprise of the respondents (n=139)

Variables	Frequency	Percentage	Mean ±SD
Years of planting sweet potato			
≤ 10	49	35.3	
11 – 20	36	25.9	22.2±15.39
21 – 30	10	7.2	
Above 30	44	31.7	
Number of plots			
Less than 5	23	16.5	
5-10	76	54.7	
11-15	40	28.8	
Purposes of planting sweet potato			
Self-sustenance	37	26.6	
Business	88	63.3	
Ceremonial activities	14	10.1	
Income from planting sweet potato			
≤ 100,000	110	79.1	
100,001 – 200,000	24	17.3	75541.50±
200,001 - 300,000	2	1.4	83096.65
Above 300,000	3	2.2	

Source: Field survey, 2023

Socio-Economic Benefits of Growing Orange Fleshed Sweet Potato

Information in Table 5 illustrated farmers' perception on the socio-economic benefits of growing Orange Fleshed Sweet Potato. The table showed that majority of the respondents (63.3%) had moderate knowledge while none indicated excellent knowledge of OFSP possible contribution socio-economic status. This may be attributed to earlier reports in previous tables about small portion of land cultivated for sweet potato and low income earned by the farmers from sweet potato cultivation. Relevant to this perspective were majority indication of improve food security (47.5%) and income (34.5%) as socio-economic benefits of growing Orange Fleshed Sweet Potato among the respondents. Findings support studies that earlier found that cultivation of OFSP improved socio-economic wellbeing of farmers and ensure food security in Africa (Okello et al., 2017; Girard et al., 2021).

Table 2: Socioeconomic benefits of growing orange fleshed sweet potato

Variables	Frequency	Percentage
Knowledge level of socioeconomic benefits of growing OFSP		
No knowledge	14	10.1
Slight knowledge	9	6.5
Moderate knowledge	88	63.3
High knowledge	28	20.1
Extremely high knowledge	0	0.0
Socio-economic benefits of growing OFSP		
Increase household income	48	34.5
Improve food security	66	47.5
Reduced risk of crop failure	25	18.0
Improved self-sustenance	37	26.6
Increase participation in social group activities	46	33.1
Used for ceremonial activities	14	10.1

Source: Field survey, 2023

Health Benefits of Consuming Orange Fleshed Sweet Potato

Regarding the perception of farmers on the health benefits of consuming OFSP, Table 6 indicates that about halve (50.4%) of the respondents consume OFSP occasionally while few (22.3%) rarely consume it. Furthermore, most (43.2% and 33.1%) had moderate and high knowledge about the health benefits of Orange Fleshed Sweet Potato respectively. By implication, consumption of OFSP is moderate, thus the larger population of the farmers have moderate knowledge of the health benefits. The moderate knowledge of health benefits may be attributed to moderate level of consumption of OFSP. The moderate level of health benefits knowledge areas were to improve digestion (46.8%), boost immune system (31.7%), improve vision (12.2%), and the least was to lowered blood pressure (9.4%). This indicated that appreciable population of sweet potato farmers in the study area understands the efficacy of OFSP consumption to improve digestion and boost their immune system. Finding confirmed report by Adebisi et al. (2020) that most people in Kwara State were aware of health benefits of OFSP and were willing to consume it. Studies have earlier confirmed that Orange-fleshed sweet potato is a good source of non-digestible dietary fiber, specific minerals, different vitamins, and antioxidants (Rodrigues et al., 2016; Neela and Fanta, 2019). OFSP is rich in vitamin-A and immune system booster, to fight against viruses and pathogenic bacteria.

Table 3: Health benefits of consuming orange fleshed sweet potato

Variables	Frequency	Percentage
Frequency of consuming orange fleshed sweet potato		
Never	4	2.9
Rarely	31	22.3
Occasionally	70	50.4
Frequently	24	17.3
Always	10	7.2
Knowledge level of health benefits of Orange Fleshed Sweet Potato		
No knowledge	11	7.9
Slight knowledge	22	15.8
Moderate knowledge	60	43.2
High knowledge	46	33.1
Extremely high knowledge	0	0.0
Health benefits of consuming Orange Fleshed Sweet Potato		
Improved vision	17	12.2
Boost immune system	44	31.7
Improved digestion	65	46.8
Lowered blood pressure	13	9.4

Source: Field survey, 2023

Challenges of growing and marketing Orange Fleshed Sweet Potato

On the challenges related to growing and consumption of OFSP, majority (79.1%) indicated inadequate access to planting materials. Numbers of studies across countries have similarly indicated scarcity of clean planting materials (vines) as impediment to commercial production of OFSP (Mwiti et al., 2020; Jogo et al., 2021; Kaphaika et al., 2023). Additionally, Significant number of the respondents in Table 4 indicated difficulty in processing and storage (39.6%), pest and disease management (29.5%) and lack of market demand (16.5%). These findings agree with who opined that the challenges hindering sweet potato production are instability in market price and demand, pest and diseases as well as poor/inadequate storage facilities, among others (Sanusi et al., 2016; Bose et al. 2020; Mohammed, 2023).

Table 4: Challenges of growing and marketing Orange Fleshed Sweet Potato

Challenges	Frequency	Percentage
Inadequate access to planting materials	110	79.1
Lack of market demand	44	31.7
Pest and disease management	41	29.5
Difficulty in processing and storage	55	39.6
Lack of information and training	19	13.7
Inadequate government support	68	48.9

Source: Field survey, 2023

Table 5: Relationship between farmers' socio-economic characteristics and perception on health/socioeconomic benefits of orange fleshed sweet potato

Factors	Socioeconomic benefits of cultivating OFSP		Health benefits of consuming OFSP	
	r-value	p-value	r-value()	p-value
Household size	0.228**	0.007	0.358**	0.000
Family members involved in farming	0.269**	0.001	0.311**	0.000
Years of schooling	-0.125	0.143	-0.130	0.126
Years of experience	0.006	0.948	0.556**	0.000
Number of plots	0.136	0.111	0.276**	0.001
Purpose of cultivation	-0.084	0.034	0.018	0.831
Income	0.180*	0.034	0.207*	0.015
Knowledge of OFSP	-0.400	0.637	0.290**	0.001

** Correlation is significant at 0.01 level, * Correlation is significant at 0.05 level

Result of PPMC analysis in Table 9 indicated that household size (r = 0.228), number of family members involved in farming (r = 0.269) and income (r = 0.180) showed positive significant correlation with the perception of farmers on socioeconomic benefits of cultivating OFSP while household size (r = 0.358), family members involved in farming (r = 0.311), years of experience (r = 0.556), number of plots (r = 0.276), income (r = 0.207), and knowledge of OFSP (r = 0.290) indicated positive significant correlation with the perception of farmers on health benefits of consuming OFSP at p <0.05 level of significant. This finding indicate that increase in number of household members (persons), number of family members involved in farming (persons) and income (Naira) will bring about positive perception of the farmers on the socioeconomic benefits of cultivating OFSP while increase in age (years), number of household members (persons), number of family members involved in farming (persons), years of experience, number of plots (ha), and income (Naira) will bring about positive perception of the farmers on health benefits of consuming OFSP in the study area. This finding contradicts Babatunde et al. (2019) that found negative and significant coefficient of the age of the smallholders indicating older the smallholder the lesser the proportion of farmland cultivated to OFSP in Kwara State.

CONCLUSION AND RECOMMENDATIONS

Based on major findings, this study concluded that sweet potato farmers in the study area are smallholders who are aged with long year of experience in the cultivation of sweet potato mainly for business purpose. The farmers are aware, knowledgeable and tried/adopted the cultivation of orange fleshed sweet potato variety. The farmers can describe and identify the OFSP among other varieties. The farmers have moderate perception of knowledge level on socioeconomic benefits of cultivating OFSP, most especially towards improving food security. The farmers occasionally consume OFSP. Thus, have moderate perception of knowledge level on health benefits of consuming OFSP. Increase in number of household members (persons), number of family members involved in farming (persons) and income (Naira) will bring about positive perception of the farmers on the socioeconomic benefits of cultivating OFSP while increase in age (years), number of household members (persons), number of family members involved in farming (persons), years of experience, number of plots (ha), and income (Naira) will bring about positive perception of the farmers on health benefits of consuming OFSP in the study area.

Based on conclusions drawn, the following recommendations were made: (i) Extension agents need to encourage farmers to increase land area use to cultivate OFSP. Large scale production of OFSP production is the only way to earn higher income as a business, thereby increasing their socioeconomic status. (ii) Human nutrition related organizations in Kwara state should organize awareness campaign on the health benefits (richness in Vitamin A) of consuming OFSP among farm families and the general populate. Emphasis should be laid on frequent consumption and its importance to improved vision that few were aware of. This is expected to increase market demand for OFSP variety and farmers will be encouraged to produce more. (iii) In addition, increase market demand, extension agents should provide market information and linkage for the sales of OFSP in large quantity. Such information should be disseminated through farmers group. (iv) Government at all levels (Federal, State and Local) should initiate programmes and policies that will encourage farmers to cultivate OFSP and the enabling environment for easy access to agrochemicals to control pest and

disease, processing and storage equipment and planting materials.

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