

Perception of farmers towards orange fleshed sweet potato production among small-scale farmers in Edo state, Nigeria

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Abstract

The study examined farmers' perception towards orange fleshed sweet potato in Edo state, Nigeria. The specific objectives were to describe the socio-economic characteristics of the farmers, identify the farmers' perceived economic benefits and ascertain the farmers' perception towards orange fleshed sweet potato technologies to their livelihood. Multi-stage involving purposive and simple random sampling techniques were used in selecting 120 respondents for the study. Structured questionnaire were used in collecting relevant information. Statistical tools such as frequency, percentage, mean, mean score and factor analysis were used in the analysis of data collected. The results revealed that majority (73.33%) of the respondents were female. 88% were literate with a mean age of 42 years. The respondents had mean household size of 7 persons, mean farm size of 1.5 hectares of land, 11 years of farming experience and belonged to approximately 3 cooperative societies. The farmers had mean contact of 3 times with extension agent within a year, with an annual income of ₦241,291.67. The major perceived economic benefits derived from orange fleshed sweet potato production were increased income (m=4.83), increased health (m=4.67), increased yield (m=4.25) and effective marketing of the produce (m=4.18). The exploratory factor analysis of farmer perception towards orange fleshed sweet potato were based on yield, nutritional benefits, taste, more vitamin A, storability, sweetness and popularity for human consumption. The study suggest that there is the urgent need to sensitize the farmers more about the nutritional values of growing and consuming orange fleshed sweet potato which can greatly influence their perception of the product.

Introduction

Modern agriculture is dependent on the use of appropriate and improved technologies for production of crops for food and export. Also, the sustainable production of important crop is a pillar of food security. Orange fleshed sweet potato (OFSP) is an improved breed of sweet potato (*Ipomoea batata lam*). It is grown as one of the important crops in recent times and serves as food as well as a good source of income, especially among rural dwellers. (Babatunde et al, 2019). It is a dicotyledonous plant which produces roots that are edible (Yahaya et al, 2015). It has the ability to thrive in less fertile soils, and beyond this, the broad agro-ecological adaptability of the crop makes it a food security and staple crop as it can be grown in all the 36 states in Nigeria (Sugri et al, 2017). OFSP is easy to cultivate and is a crop with immense ability to grow in a marginal field (Afuape, 2021). It can be vegetatively propagated and has fairly drought resistant ability once established. In addition to being drought tolerant and adaptable to a wide range of ecology, sweet potato has a short maturity period of 3-4 months, compared to other root and tuber crops, which makes it suitable for multiple cropping that enhances continuous food availability and accessibility (Kolawole et al, 2017). These characteristics, makes OFSP an excellent food security crop in sub-Saharan Africa (Nyor et al, 2017).

In rural Nigeria, most household cannot afford food products rich in vitamin A and this gave rise to the introduction of bio fortified agricultural produce such as orange fleshed sweet potato varieties (Babatunde et al, 2019). Orange fleshed sweet potato has been fortified in key vitamins, especially vitamin A and minerals whose deficiency in most rural diets continues to pose a very serious constraint to human health and economic development (Chah et al, 2020). Vitamin A deficiency is a major risk factor for pregnant and lactating women and also a leading cause of visual impairment xerophthamia, corneal scars and corneal xerosis. (Tariku et al, 2016). It improves sight and good for diabetics. In extreme cases, it leads to premature death in children and pregnant women (Kuku-Shittu et al, 2016). In sub-Sahara Africa, it has been estimated that 43 million children under the age of 5 are vitamin A deficient. In Nigeria, the prevalence of vitamin A deficiency (VAD) affects 29.5% of her population, resulting to the World Health Organization (WHO) listing Nigeria as one of the number one countries with the highest risk of vitamin A deficiency (Mendu et al, 2019).

Perception is one of the cognitive behaviours of every human being. It is fundamentally a psychogenetic process that lies at the base of every human activity. Farmer knowledge and perceptions are intrinsic factors that influence the decision for adoption of innovations, while the technology, the external environment, and the adopter (structural) characteristics are the extrinsic factors that affect farmer decisions (Meijer, et al, 2015). In agriculture, the technology innovations adoption by farmers could indicate logical decision-making determined from farmers' perceptions of the suitability of the technology's characteristics and value in the future years. Perception is the view that farmers have about innovation based on their needs and experiences, which will affect farmers' attitudes towards innovation (Meijer, et al (2015).

Perceptions indicate the users view of a technology/method/initiative, which is formed based on his or her previous experiences. (Reghunath and Kumar, 2016). Perception in this case was operationalized as the farmer's opinion towards various innovations in technology dissemination implemented by different agricultural institutions. In the light of the above, adoption of a new technology by farmers is usually driven by a combination of many factors and

one of the factors is farmers' attitudes, perceptions and knowledge towards the technology (Okello et al, 2015).

The crop productivity in Edo state and in Nigeria in general is still at a declining stage. The poor output by the farmers may be an indication of their perception and resources needed for its production has not been utilized at the optimum level (Umeh et al, 2020). Succinctly observed that industrial potentials and nutrition contents of orange fleshed sweet potato have not been exploited due to lack of awareness of the commercial benefits derived from it such as vitamin A. Orange fleshed sweet potato production technologies have been disseminated in Edo state by extension agents but still there is dearth of information on the products perception by the farmers. based on this. The study was designed to investigate the perception of the farmers towards orange fleshed sweet potato among small-scale farmers in Edo state, Nigeria. Specifically, the objectives described the socio-economic characteristics of the farmers, identified the economic benefits of OFSP to the farmers, and ascertain the farmers' perception of OFSP to their livelihood.

Methodology

The study was carried out in Edo State, Nigeria. Edo State is located in the South-South geopolitical zone of the federal republic of Nigeria states. The state is divided into three agricultural zones, namely Edo south, Edo central and Edo north. Within the zones, there are blocks corresponding to the respective local government areas and cells corresponding to communities within the local government areas. The Edo north covers six extension blocks namely Akoko Edo, Estako east, Estako west, Estako central, Owan east and Owan west. The Edo central zone comprises of five blocks namely Esan central, Esan north, Esan south east, Esan west and Igueben. Edo South has the largest number of blocks, it has seven blocks namely; Egor, Ikpoba-okha, Oredo, Orhiomwon, Ovia north east, Ovia south west and Uhwole (Edo State ADP (ESADEP), 2022). Edo state lies between longitude 06 04' and 06 04'E and 06 43' E and latitude 05 44' and 07 34'N and is bounded in the north by Kogi state, in the west by Ondo state, in the south by Delta and in the east by Anambra state. It occupies a land area of about 17,802km with estimated population of 4,777,000 people (National Population Commission (NPC), 2022). Many areas of Edo state lies in the tropical rain forest belt of Nigeria although the northern part shows evidence of derived Savannah and is typically an agricultural zone with favourable climate and even distribution of rainfall. The climate conditions permit the cultivation of a wide variety of crops ranging from tree crops, tuber root crops, cereals and legumes to vegetable. It has a flourishing livestock even though the major players are small-sale poultry, fish and small ruminant farmers.

The population of OFSP Farmers in this study comprises all OFSP farmers in the rural households of Edo states of Nigeria. A multi stage sampling procedure involving purposive and random sampling was used to select 120 respondents for the study. Stage I, involved the purposive selection of two agricultural zones Edo North and Edo Central from Edo state, because of high intensity of sweet potato farmers among the zones.

Stage 2, involved a purposive selection of three blocks each from the selected agricultural zones due to high level of OFSP production in the area given a total of six blocks and they include Akoko edo, Estako east, Estako west, Esan north-east, Esan south-east and Esan west.

Stage 3, involved random selection of two circles each from the selected blocks to give a total of 12 circles.

Stage 4, at this stage ten (10) OFSP farmers each from the selected circles sampled using random sampling technique. This gave a total of one hundred and twenty (120) farmers for the study.

The data for the study were collected through primary sources. Data were collected through a structured questionnaire. The interview schedule was divided into different sections. Section one deal with socio-economic characteristics of OFSP farmers'; section two was designed to elicit information on the economic benefits of the OFSP farmers and section three deals with farmers' perception of OFSP production to their livelihood.

To determine the economic benefits derived from farmers perception of orange fleshed sweet potato (OFSP), a list of possible economic benefits were presented to farmers on five point likert type scale with option as to a very great extent =5, to a great extent =4, to a moderate extent =3, to a little extent =2, and to no extent=1. This was summed up to get 15 and later divided by 5 to get a mid point of 3.0. This implies that any mean score that is greater than or equal to 3.0 was perceived as an economic benefit while any mean score less than 3.0 was perceived as not an economic benefit derived from farmers perception of OFSP.

To ascertain the farmers perception towards orange fleshed sweet potato, five-point likert scale of strongly agree = 5, agree=4, neither agree nor disagree =3, disagree =2, and strongly disagree =1. These were summed and divided by 5 to get a mean cut off point of 3.0. This implies that any mean score less than 3.0 was regarded as negative while any mean score equal to or greater than 3.0 was regarded as positive to the perception of the OFSP farmers in the study area as used by Anyaegbunam et al, 2019.

To obtain a qualitative measure on farmers perception towards orange fleshed sweet potato, exploratory factor analysis (EFA), varimax rotation and Kaiser normalization where variables that failed to attain the item to total correlation threshold of 3.0 or factor loading of 0.4 were discarded, indicating that they do not load significantly on the factor as used by Ogbonna, 2018, statistical tools such as frequency, percentage, mean, mean score, and factor analysis were used in analyzing the data collected.

Results and discussion

Socio-economic Characteristics of the Respondents

Sex: The results of the study presented in table 1 show that the majority (73.33%) of the respondents were female while 26.67% were male. This implies that male and female were involved in orange fleshed sweet potato production, but with female dominance. The female dominance may be attributed to the existing culture, tradition and belief that sweet potato is regarded as women crop. It could also be argued that commercialization of orange fleshed sweet potato is presently new in the country, hence more female tend to engage in the production of the crop. This result is in line with the findings of Egwuonwu and Ozor (2020) that succinctly observed more female participation in the adoption of improved sweet potato production technologies in Ohaji/Egbema Local Government Area of Imo State, Nigeria. However, this is at variance with the findings of David et al (2022) who observed male dominance in their work on adoption of improved orange fleshed sweet potato (OFSP) production technologies in Kwara State, Nigeria.

Age: Findings of the study as shown in table 1.1 show that a greater proportion (35.00%) of the respondents were between the ages of 31-40 years while 26.67% fell within the age bracket of 41-50 years. Also 18.33% were within the age range of 51-60 years. Those that were less than 30 years of age recorded 16.67%, while those that were 61 years and above accounted for 3.33%. The mean age of the respondents was approximately 42 years. This implies that most of the OFSP farmers were still within active and productive age that is likely to favour adoption of OFSP production technologies. This could further be argued that age have the capacity to search and try new innovations to better their well beings and agribusiness. This findings is in line with Babatunde et al (2019) who observed that the mean age of their farmers in their work in Kwara State Nigeria was 43 years. Also Ebido et al (2020) opined that the mean age of their farmers in Anambra State, Nigeria was 45 years. This finding could also be a good indicator that young farmers are likely to participate in agricultural activities that are promising because young people are readily innovative, risk loving and ready to try new concepts.

Educational Level: Table 1.1 reveal that the greater proportion (46.67%) of the respondents had primary education while 33.33% had secondary education. 11.67% did not receive any formal education in their life and 8.33% of the respondents attended tertiary education. This implies that 88.33% of the respondents were literate. This results shows that the respondents were appreciably literate, showing that they can read and write having obtained formal education. The implication of this is that acquisition of education could enhance decision making ability among farmers. It might enhance their ability to try and adopt new agricultural technologies and benefit from its advantages. Also, it can be argued that educated farmers can easily access agricultural information from the array of sources, hence increase their ability to understand, evaluate new production techniques and increases productivity. These assertions are in consonance with Salau et al (2018) that identified education as a “spring board for agricultural production and utilization by farmers”. They further stated that “education is widely believed to create favourable and mental attitudes 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 improved technologies”.

Household Size: Information in table 1.1 indicates that the majority (54.17%) of the respondents had household size of 7-9 persons while 35.00% of the respondents had household size of 4-6 persons. The remaining 2.50% of the farmers had household size of 10 persons and above. The mean household size of the respondents was approximately seven persons. This is an indication that the orange fleshed sweet potato farmers had large family size which is a characteristic of most rural dwellers. A farmer with large household size can easily participate in new agricultural ventures while delegating other important farming activities to other household members. This could help the household to increase their standard of living as the number of available hands determines to a greater extent the production and productivity of rural families. “Household size have proved to be a source of cheap labour, thereby reducing costs incurred in farming activities and adopt new practices and extension packages” as observed by (Salau et al, 2018). These strengthen the finding of Ishola and Arumugam (2019) who reveal that “large household provides family labour and family labour reduces costs of production, thus leading to increase in household income”.

Farm Size: Results in table 1.1 show that a majority (73.33%) of the respondents had farm size of less than one hectare of land while 21.67% had farm size between 2-3 hectares (HA). Also, 3.33% of the respondents had farm size of 4-5 hectares and the remaining 1.67% owned between 6 hectares and above. The average farm size was 1.53 hectares, indicating subsistence nature of the farmers. The size of land is one of the major determinants in crop production activities. The small nature of farmer's land holding in the study area may be attributed to the land tenure system prevalent in most rural areas. This shows that the respondents are generally small-scale farmers which suggests limited output of orange fleshed sweet potato thus relying on importation for its demands for household consumption and industrial uses. This is in consonance with the findings of Anyaegbunam et al (2019) who found that small scale orange fleshed sweet potato farmers in their work had an average farm size of 1-1.9 hectares of land. They further reported that this could be attributed to land tenure system and nature of land acquisition that encourages land fragmentation, which negatively influence farmers' production potentials, resulting in reduced profit and culminating in inability to the adoption of new innovations.

Farming Experience: Entries in table 1.1 show that the majority (51.67%) of the respondents had 9-12 years of farming experience while 38.33% had 13 years and above experience in farming OFSP production activities. Those that had 5-8 years accounted for 6.67% and 3.33% had 1-4 years experience. The average farming experience of the farmers was approximately 11 years. This distribution showed that majority of the respondents are not new entrants into farming but had relative long period of farming experience hence promote knowledge, specialization, skills and aspiration which could as well influence the rate of adoption of improved agricultural technologies. "Their many years of interaction with the farming environment might have translated into familiarity with improved knowledge of growth performance of crops, common challenges and approaches to yield may enhance their adoption decision process. Also the attendant impacts of past innovations adopted and experienced over the years may be a profitable platform for a new innovation adoption decision" (Kolawole et al, 2017). Moreover, farming to them can be way of life borne out of their many years of experience, which may make them to be less risk averse, take firm farm decision and therefore, be willing to invest into farming by adopting new innovations to boost their production. This aligns with David et al (2022) who reported that many years of farming experience enhances sound decision in resource allocation, managerial and technical know-how, use of various extension methods which in turn facilitates adoption of improved agricultural technologies.

Table 1: Distribution of the respondents according to socio-economic characteristics

Variable	Frequency	Percentage	Mean
Sex			
Male	32	26.67	
Female	88	73.33	
Age (years) Less than 30			41.77
	20	16.67	
31 - 40	42	34.00	

41 – 50	32	26.67	
51 – 60	22	18.33	
61 and above	4	3.33	
Educational Level No formal education	14	11.67	
Primary education	56	46.67	
Secondary education	40	33.33	
Tertiary education	10	8.33	
Household size 1 – 3	10	8.33	6.50
4 – 6	42	35.00	
7 – 9	65	54.17	
10 and above	3	2.50	
Farm Size (Hq) Less than 1	88	73.33	1.53
2 – 3	26	21.67	
4 – 5	4	3.33	
6 and above	2	1.67	
Farming Experience (years) 1 – 4	4	3.33	10.92
5 – 8	8	6.67	
9 – 12	62	51.67	
13 and above	46	38.33	
Sources of credit Commercial banks	4	3.33	
Microfinance banks	8	6.67	
Cooperative societies	12	10.00	
Friends and families	34	28.33	
Personal saving	62	51.67	
Membership of farmers' organization ..1 – 2	46	38.33	
3 – 4	54	45	
5 and above	20	16.67	
Extension Contact 1 – 3	102	85.00	2.98
4 – 7	16	13.33	
8 and above	2	1.67	
Annual Income (₹) Less than 100,000	12	10.00	2241,291.67
101,000 – 200,000	30	25.00	
201,000 – 300,000	52	43.33	

301,000 – 400,000	16	13.33	
401,000 – 500,000	8	6.67	
501,000 and above	2	1.67	

Source: Field survey 2022

Membership of Farmers' Organization: The data presented in table 1.1 show that greater proportion (45.00%) of the respondents belonged to 3-4 farmers' organization/cooperative societies while 38.33% belonged to 1-2 farmers' social organization. The remaining 16.67% of the respondents accounted for 5 and above farmers' organization. The mean membership of farmers' organization in the study area was approximately 3 cooperative societies. This implies that the farmers belonged to more than two farmers' organization. The fairly high number of cooperative membership may be attributed to increased awareness created by extension education and benefits involved in training, access to inputs, access to agricultural information's and sharing of ideas amongst themselves. Also, high level of social participation and interactions of farmers' membership in organization increases innovativeness amongst farmers due to group dynamic effects. This strengthens the report of Uchemba et al (2021) who opined that belonging to different cooperative societies enhances social trust, ideas and information exchange that will raise the living standard of the farmers. The findings gave support to Egwuonwu and Ozor (2020) who observed that farmers' social organization enables them to have access to many opportunities such as credit, shared labour, joint input purchase, group marketing, group training and information sharing.

Extension Contact: Information in table 1.1 show that a majority (81.67) of the respondents had 1-3 times contacts with extension agents within the production period of orange fleshed sweet potato production. The farmers were also visited 4-6 times by extension agent who accounted for 13.33% while 7-9 times visit accounted for 3.33% and the remaining 1.67% was for 10 and above times only within the production cycle of OFSP in the study area. The mean visit of the extension agents to the OFSP farmers was approximately 3 times. This indicates that extension contact with the OFSP farmers were relatively very low. This may be as a result of the existing disproportionate extension agents to farmers' ratio, due to inadequate extension agents in the employment of ministry of agriculture and other sister agencies or the use of local leaders which may not involve having to bring farmers in direct contact with extension agents as stated by (Kolawole et al, 2017). The implication of this is that the OFSP farmers had little or no access to vital information on improved agricultural technologies through extension service, irrespective of the fact that the service is recognized as an essential mechanism for information delivery and advice as input into modern resources management. Extension agents play a vital role in the dissemination of agricultural information to farmers as well as the brain behind farmers' adoption of improved agricultural technologies. Equally, extension agents are very important personnel because they supply the needed information on the mode of application or use of recommended technologies to farmers as observed by (Anyaeibunam et al, 2019).

Source of Credit: Sources of credit in table 1.1 reveal that the majority (51.67%) of the respondents financed their orange fleshed sweet potato production through their personal savings while 28.33% funded the OFSP production activities through money borrowed from

friends and families. The result further show that 10.00% of the respondents funded their farming operations through money borrowed from cooperative societies, 6.67% from microfinance banks and the remaining 3.33% of the farmers got theirs from commercial banks. This showed that majority of the farmers financed their OFSP production activities from their personal savings. This could be attributed to the inability of the farmers to have access to formal credit from commercial banks due to collateral required by banks. Kangile et al (2021) succinctly noted that credit plays a crucial role in the adoption of improved agricultural technologies disseminated by extension agents. Also, the findings support Chah et al (2020) who reported in their work that 93% of their respondents had no access to credit from commercial banks for orange fleshed sweet potato production operations because they could not provide the collateral needed by the banks as well as banks' high interest rates charged.

Annual Income: Income is one of the major determinants in any business venture. It is also the brain that enables the farmer to either continue or disengage from any business. The results of the annual income of the respondents were as shown in table 1.1. The results show that a greater proportion (43.33%) of the respondents earned between the range of 201, 000 - 300,000 naira per annum while 25.00% of the farmers earned between 100,000 – 200,000 naira per annum. The results also indicated that 13.33% of the respondents earned between 301,000 – 400,000 naira per annum. 6.67% earned between 401,000 – 500,000 naira per annum and the remaining 1.67% earned 501,000 and above per annum. The mean annual income of the respondents was N241,291.67. The result also show that 65.00% of the farmers earned more than 200,000 naira and above per annum which is more than 75,000 naira per annum, equivalent of \$1.35 dollars per day, poverty bench mark as observed by (Saleh and Oyinbo, 2017). This indicates that the farmers realized relatively high income even though they were operating in small-scale basis as a result of farming risks and systems of land tenure in the study area which discourages farm expansion, mechanization and in accessibility of formal credits.

Results of Exploratory Factor Analysis of Farmers' Perception Towards Orange Fleshed Sweet Potato Production.

The results of exploratory factor analysis (EFA) used to evaluate farmers' perception towards OFSP production is as shown in table 2. Out of the 18 perception statements towards orange fleshed sweet potato production subjected to factor analysis, 10 statements were excluded from the analysis. This was because they failed to attain the item-total correlation threshold of 0.3 or factor loading of 0.4, indicating that they do not load significantly on the factor. A close scrutiny of the excluded perception statements revealed that they were presented in italics as in table 2. This implies that the excluded perception statements were not subjected for further factor analysis in the study, rather they were discarded. However, the remaining eight perception statements were further used for factor analysis (Ogbona, 2018). The results showed that the final matrices of the remaining eight (8) perception statements had overall Kaiser – Meyer – Oklin (KMO) of 0.813 indicating that the data can be subjected to factor analysis (Varr, 2008 in Okello, 2015). Bartlett's test of sphericity yielded a P-value of 0.0000. This implies that the respondents perception statements were inter-correlated as required for factor analysis to be applicable (Hair et al 2010). The Cronbach's alpha statistic was above

0.7, which is above recommended minimum cut-off value level of 0.6 , indicating that factor analysis was appropriate (Carr, 2008 in Okello, 2015).

The results in table 2 further show that the exploratory factor analyses extracted only perception statements that relates to orange fleshed sweet potato and represents positive perception and were used for further analysis in the study. The perceptions extracted were based on yield, nutritional benefits, taste, disease resistance, storability, sweetness, and popularity for human consumption. This implies that the respondents agreed or strongly agreed with the perception statements that were positive towards orange fleshed sweet potato production and disagreed or strongly disagreed with statements that were negative towards OFSP. This mean that the perception of the respondents towards OFSP production and consumption can be captured by one latent construct. The construct relates to the positive yield, taste, storability, nutritional superiority, disease resistance and popularity among the populace. Further explanation of the result could mean that these perceptions coalesce in the mind of the farmers into a single construct namely positive perception towards orange fleshed sweet potato.

Table 2: Results of exploratory factor analysis of farmers perception statements towards orange fleshed sweet potato production technologies

Statement	Factor 1 OFSP Attribute Preference only
OFSP leaves can be eaten as vegetable	0.5437
OFSP is nutritionally superior to WFSP	0.6753
OFSP leave are good for human consumption	0.6478
OFSP is good for children and women only	
OFSP is the most reliable crop during food scarcity	
You can't grow OFSP and be considered a man	
OFSP do not taste as good as WFSP	0.6937
OFSP yields more than WFSP	0.589
OFSP gives more vitamin A than WFSP	0.5738
OFSP stores as well as WFSP	0.5628
OFSP matures earlier than WFSP	
You can't eat too much of OFSP because they are sweet	
OFSP are not loved by children	
OFSP are not tolerant to diseases	0.5351
People dislike sweet potato that have orange flesh colour	
OFSP are very sweet to eat	
Eaten too much OFSP causes stomach problem	
Sweet potato remains part of our diet when other food stuff are available	

Source: field survey, 2022

Note: cronbach's alpha (co-efficient alpha) = 0.7452
 Bartlett's P-value (shows whether to accept or reject) = 0.0000
 Overall kmo (sample adequacy: 0.8 – 1.0 = adequate, less than 0.6 = inadequate) = 0.813
 OFSP = orange fleshed sweet potato
 WFSP = White fleshed sweet potato

Perceived Farmer's Economic Benefits of Orange Fleshed Sweet Potato Production among Farmers.

Orange fleshed sweet potatoes are believed to be one of the most nutritious food in the world especially as a source for vitamin A. The perceived farmers' socio-economic benefits of orange fleshed sweet potato production technologies deals with the activities of the farmers that were engaged in its production in order to earn a living or solve some of their family needs. Table 3 indicate the mean score of farmers' perceptions towards socio-economic benefits from orange fleshed sweet potato production. The results show that increased income of the farmers was the first with a mean score of 4.83. This implies that the respondents that adopted and involved in OFSP production technologies, had their income increased more than their counterparts that did not adopt the technologies. Also, the perceived economic changes of the farmers can be linked to a specific crop which may encourage them to adopt it too. The implication of this could be attributed to the respondents' having various investments that may lead to visible changes in their lives such as increased standard of living, building of houses, buying more household needs, paying of children's school fees, increased ownership of animals, and buying more lands. Mudege et al (2017) succinctly opined that farmers are willing to adopt and try new crops when their perceived benefits outweighed the opportunity cost. They further stated that farmers depend on agriculture for their livelihood and interventions that improved the chances of sustainability which are likely to be more attractive.

The results in table 3 also show that the perceived socio-economic benefits of the respondents on health had a mean score of 4.67. This implies that the respondents that had adopted OFSP production technologies had more improved health conditions. Other areas of healths conditions that received favourable blessings toward OFSP includes; increase in energy for work, source of vitamin A, development of reproductive systems, eye sight, brain development as observed by (Birol et al, 2015). Table 3 also show that increased yield and effective marketing of produce had mean score of 4.25 and 4.18 respectively. These implies that those respondents that cultivated OFSP, had their yield increased and readily available market to dispose their products. This implies that OFSP production was regarded as having much higher yields as compared to other varieties while linkage to market the produce were financially more rewarding than other crops. Anyaegbunam et al (2019) stated that the perceived benefits of OFSP are not only based on superior yield but also on quality of processed products for food and general economics of the improved varieties within local situation. They further stated that farmers' attitude to innovation adoption rests on its perceived benefits.

Other socio-economic benefits that received blessings in table 4.4 include; improved taste of produce (m=3.70), increased participation in cooperative organization (m=3.65), improved standard of living (m=3.50), building of houses (m=3.49), buying more household needs (m=3.48), payment of children's' education (M=3.47), increased food security (m=3.45), poverty reduction (m=3.33), enough food (m=3.23), increased ownership of animals (3.12 and buying of

more land ($m=3.10$). This implies that the respondents agreed that all the variables considered were perceived as benefits derived from cultivating OFSP, having the above threshold of 3.0. This suggests that socio-economic benefits are an important consideration for farmers before they decide to grow a crop. It is therefore important to understand what motivates farmers' interest in keeping use of technology and how the perceived benefits from the different array of crop they grow, as those perceived benefits may be the key in determining whether to adopt or not (Howley, 2015). FAO (2019) opined that potato generally can be used as food security crop, feed for animals, cash crop and other industrial needs, due to its nutritional nature and value, hence potato is the most suitable crop to curb food insecurity in developing world.

Table 3: Distribution of the respondents according to mean socio-economic benefits of orange fleshed sweet potato production technologies among farmers.

Variable	Mean score
Increased income	4.83
Increased health	4.67
Increased yield	4.25
Effective marketing of produce	4.18
Increased taste of produce	3.70
Increased participation in cooperative organization	3.65
Improved standard of living	3.50
Building of houses	3.49
Buying more household needs	3.48
Payment of children's school education	3.47
Increased food security	3.45
Poverty reduction	3.33
Enough food	2.23
Increased ownership of animals	3.12
Use for animal feed	3.12
Buying more lands	3.10

Source: Field survey, 2022 m = mean.

Conclusion

The perception of small-scale farmers towards orange fleshed sweet potato production is a means of improving farmers' yield and leading to sustainable economic development. In the study area, the production of OFSP was dominated by female. The respondents were highly literate, experienced and in their active working age. The farmers were innovative and participated actively in farmers' social organizations. The production of OFSP was a promising business as their annual income was relative high enough to move the farmers out of poverty level. The farmers had positive perception towards OFSP production, especially relating to key attributes such as yield, nutrition, taste, storability, disease resistance and popularity. The perceived benefits by the farmers outweighed the opportunity cost. The study suggest that there is the urgent need to sensitize the farmers more on the nutritional value of growing and consuming orange fleshed sweet potato which would greatly enhance their perception of the product.

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