

Source: field survey 2017. Multiple responses.



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## **Socio-institutional factors influencing Orange Flesh Sweet Potato (OFSP) production in Offa Local Government Area of Kwara State, Nigeria**

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### **Abstract**

This study examined socio-institutional factors influencing Orange Flesh Sweet Potato (OFSP) production in Offa Local Government Area (LGA) of Kwara State, Nigeria. The specific objectives are to; describe socio-economic characteristics of the OFSP farmers, estimate costs and returns of OFSP production, determine the factors influencing OFSP production and identify constraints associated with OFSP production. Three-stage sampling procedure was used for the selection of 96 OFSP farmers on which questionnaire was administered.

Data collected were analyzed using descriptive statistics, farm budgeting technique and Ordinary Least Square (OLS) regression model. Results of the analysis revealed that 93.8% of the respondents were males, while 96.9% were married. The mean age, farming experience and household size of the respondents was 53 years, 18.5 years and 9 people, respectively. The cost and returns analysis revealed that the farmers' revenue from production was ₦132,875.00, while the Net Farm Income of the farmer was ₦ 99,381.65 per hectare with returns invested of 2.97 implying that for every one naira (₦1) invested in OFSP production, there is a profit of two naira, ninety-seven kobo (₦2:97k) indicating a profitable venture. The OLS regression analysis result revealed  $R^2$  value of 0.7376 implying that about 73.8% variation in the output of OFSP production are due to socio-institutional factors such as age (-1.848,  $p < 0.1$ ), marital status (2.404,  $p < 0.05$ ), education (1.733,  $p < 0.1$ ), experience (2.957,  $p < 0.01$ ), Labour (1.822,  $p < 0.1$ ) and extension contact (2.035,  $p < 0.05$ ). These variables were significant and statistically influences OFSP production. Major constraints of OFSP production identified was unavailability of finance and high cost of labour (90.6%) ranked 1<sup>st</sup>, followed by inadequate government support (85.4%) ranked 3<sup>rd</sup>. In conclusion, the production of OFSP was profitable. It was therefore recommended that, Government in partnership with relevant stakeholders (private investors) should help in formulating policy that will support OFSP production.

**Keywords: Orange, fleshed, Sweetpotato, Production, socio-institutional**

### Introduction

The role of agriculture in the development of a nation cannot be over-emphasized. Transformation of rural economy through agriculture will create new economic viability zones, provide jobs and incomes for the populace (Salau *et al.*, 2013). According to African Development Bank (AfDB) (2015), transforming agricultural sector will have greatest impact on economic growth of the continent, given that 70 – 80% labour force of Africa is engaged in agriculture. In Nigeria, agriculture is still the main stay of the economy as majority of the rural dwellers are into farming (National Bureau of Statistics (NBS), 2018). Salau *et al.* (2013) posited that Nigeria's agriculture has high potentials for employment generation, food security, poverty reduction and industrialization. The need to produce enough food crops to meet the ever-growing demands have necessitated research for improve varieties of various crops including root and tuber crops. Root and tuber crops such as yam, cassava, cocoyam, Irish and sweet potato are most important food crops for human consumption in Africa (International Institute for Tropical Agriculture (IITA), 2015). Sweet potato (*Ipomea batatas*) is regarded as a poor man's food, probably because of its early maturity, relatively little labour requirement and ability to thrive under Sub-Saharan Africa's climate (Uzoigwe *et al.*, 2019). It is one of the starchy staple crop, which contains appreciable amount of beta-carotene, ascorbic acid, amino acid and lysine that is deficient in cereal-based diets like rice (Ukpabiet *et al.*, 2012).

Orange Flesh Sweet Potato (OFSP) is a bio-fortified improved variety of potato with high content of beta-carotene which is a precursor to vitamin A (Omoara *et al.*, 2015). OFSP variety serves as a cheapest means of accessing vitamin A and help to combat vitamin A deficiency in vulnerable rural community. vitamin A deficiency is a wide spread health challenge in Sub-Saharan Africa, so bio-fortification strategies seek to enhance the micro-nutrient dense trait in the variety that has preferred agronomic and consumption trait, such as high yield and disease resistant (Food and Agriculture Organization (FAO), 2013). Orange Fleshed Sweet Potato has a shorter maturity period between 3-5 months (IITA, 2015). It has the ability to cost-effectively improve nutrition, empower women and youth in employment generation, and increase income earning opportunities for the rural household. The nutritional benefit proffers a unique opportunity to expand the marketing and processing of sweet potato, which will help to increase demand as well as farmers' income (International Potato Center (IPC), 2012). Despite the significant of this new variety, OFSP Production is restricted by numbers of constraints such as little numbers of vines available for farmers, poor participation in field days and demonstration activities, unavailability of processing and storage facilities, and incidence of pests and diseases. There is also problem of production as the estimated yield ranges from 6 to 10 metric tonnes/ha which is far below attainable yield of 23 to 35 metric tonnes/ha and global average yield of 17.4 metric tonnes/ha (Uzoigwe *et al.*, 2019). The cultivation of OFSP in the study area largely depend on favourable climatic and edaphic factors. However, socio-institutional factors that could also influence the production of OFSP are age, household size, level of education, farming experience, farm size, access to credit, extension contact and cooperative membership by the farmers. There is need to close the gap that exist between production and demand by investigating the likely factors that could influence the production of OFSP. It is against the backdrop of aforementioned that this study was conceived to determine the socio-economic factors

that influence production of Orange Flesh Sweet Potatoes (OFSP) in Offa LGA of Kwara State, Nigeria. Thus, the specific objectives of the study were to: describe the personal characteristics of the OFSP farmers; estimate costs and returns of OFSP production; determine the socio-institutional factors influencing OFSP production, and identify the constraints associated with OFSP production.

### Methodology

The study was conducted in Offa Local Government Area of Kwara State, Nigeria. The State comprises of 16 Local Government Areas grouped into four agricultural zones. The State lies between latitude 7° 45' and 9° 30' N and longitude 2° 30' and 6° 35' E of the equator. It is situated in the forest and savannah vegetation zone with humid tropical season starting from April and ends in October, while dry season starts in November and terminate in March. Offa LGA has a population of 88,975 people (National Population Commission (NPC), 2006). However, with growth rate of 2.5% (World Bank, 2015), the population was projected to 119,661 as at 2018. The dominant tribe of people in Offa is Yoruba, while major occupation is farming. Three - stage sampling procedure was adopted for the study. First stage was random selection of four communities from Offa Local Government Area of Kwara State. The second stage involved random selection of two villages from each of the community selected to get eight villages, while the third and last stage was random selection of 12 OFSP farmers from each of the villages selected to get a sample size of 96 respondents. Primary data were obtained with the aid of structured questionnaire complemented with an interview schedule. Both descriptive and inferential statistics was employed to analyze the data collected from the field. Descriptive (frequency counts, percentages and mean) was used to achieve objective i and iv, costs and returns analysis was used to achieve objective ii and Ordinary Least Square (OLS) regression analysis was used to achieve objective iii.

### Model Specification

#### Farm budgeting technique

Farm budgeting technique was used to achieve objective ii which is costs and returns of OFSP production. This will be achieved through the use of Net Farm Income (NFI) or simply Net Income (NI) given as in equation (1):

$$NFI = GI - (TVC - TFC) \quad (1)$$

Where;

NFI = Net Farm Income of OFSP farmer (N) per annum

GI = Gross Income is the revenue accrued by the OFSP farmer (N) per annum (the total output multiplied by the unit price, i.e.  $Q \cdot P_y$  where  $Q$  = quantity or output of OFSP in kg and  $P_y$  = unit price of OFSP output (N)).

TVC = Total Variable Cost incurred during production (N)

TFC = Total Fixed Cost incurred during production (N) (this was depreciated)

#### Ordinary Least Square (OLS) regression model

The ordinary least square regression model was used to determine the factors influencing OFSP production in the study area. The implicit form of the OLS is specified as in equation (2):

$$Y = f(X_1, X_2, X_3, X_4, X_6, X_7, X_8, X_9) \quad (2)$$

The OLS model in its explicit form is expressed as in equation (3):

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \dots + \beta_9 X_9 + e \quad (3)$$

Where;

Y = Output of OFSP measured in kilogram

$X_1$  = Age (years)

$X_2$  = Marital status (married=1, otherwise=0)

$X_3$  = Education (years)

$X_4$  = Farming experience (years)

$X_5$  = Household size (hectares)

$X_6$  = Labour usage (naira)

$X_7$  = Cooperative (years)

$X_8$  = Extension visit (number)

$X_9$  = Access to credit (naira)

$\beta_0$  = constant,  $\beta_1 - \beta_9$  = coefficients of the independent variables

$X_1 - X_9$  = independent variables

### Results and Discussion

**Socio-economic Characteristics of the Respondents:** Result in Table 1 revealed that majority (59.4%) of the farmers were within the age group of 46 - 55 years with mean age of 53 years. This implies that the respondents

were above their mid-age. Poor participation of youth in OFSP production could be due to rural-urban drift in the quest to search for white collar job. This finding is in line with the work of Omoare *et al.* (2015) who stated that rural-urban migration of the youth had led to ageing population in the rural area of Nigeria that are into agricultural production. More so, majority (93.8%) of the farmers were males, while 6.2% were females. This implies that males are the dominant gender involved in production of OFSP compared to females. This finding is in corroboration with the work of Okere and Shittu (2012) who revealed that males are the dominated work force in Nigeria's agricultural communities. Majority (96.9%) of the OFSP farmers were married, while 3.1% were widowed implying that the farmers are responsible individuals with sense of responsibility to provide for the needs of their families. This result agrees with Ukpabi *et al.* (2012) who stated that married people tend to be committed to farming activity. More so, majority (86.5%) of the farmers had household size ranging from 6 - 15 people with mean household size of 9 people implying a relatively large household size which is very important in agricultural production. Large household size could provide the much needed family labour in order to reduce cost of hired labour in farming activities. This finding also agrees with the findings of Olayinka (2016) who reported that large family size serves as source of labour in farm production.

Furthermore, half (50.0%) of the farmers had primary education, while 31.2% had no formal education. Although, most of the OFSP farmers acquired formal education that could assist them to adopt innovation like OFSP, the level of education was generally low. This result agrees with Ukpabi *et al.* (2012) who stated that sweet potato farmers who were educated and literate would adopt innovations and apply them appropriately. More than half (53.1%) of the farmers had been into farming within the range of 11 - 20 years with mean farming experience of 18.5 years. This implies that the OFSP farmers in the study area are experienced in term of sweet potato production. Anyoha *et al.* (2010) posited that farming experience enables farmers set realistic production goals within the limit of available resources. Majority (76.0%) of the OFSP farmers had farm size between the ranges of 1.1 to 2 hectare with an average farm size of 1.9 hectares. This implies that OFSP production is still on a small scale level in the study area. This finding agrees with Babatunde *et al.* (2007) who stated that sweet potato cultivation is still at subsistence level and small scale.

**Costs and Returns of OFSP Production:** The cost and returns analysis from OFSP production result is shown in Table 2. It revealed that the farmers' revenue from production was ₦132,875.00. The aggregated Total Variable Cost (TVC) incurred by the farmers on cultivars (planting material), fertilizer or manure, agro-chemicals, labour, transportation, loading and offloading of OFSP was ₦19,277.32, while the Total Fixed Cost (TFC) incurred was depreciation on fixed items such as Land, Housing and Farm tools (such as cutlass, hoes, carts, ridgers, etc) amounted to ₦14,216.03 given a Total Cost of ₦33,493.35. The Net Farm Income of the farmer was ₦99,381.65 per hectare with returns in invested of 2.97 implying that for every one naira (₦1) invested in OFSP production, there is a profit of two naira, ninety-seven kobo (₦2:97k). This is an indication that OFSP is a profitable enterprise in the study area. This findings is in agreement with Olayinka (2016) who reported net farm income per hectare of sweet potato production in their study area to be ₦67,292.80 with 2.60 return in naira invested.

**Factors Influencing OFSP Production:** The result in Table 3 revealed the OLS estimate of factors influencing OFSP production. From the regression analysis result, R-square which is the coefficient of determination was 0.7376 implying that about 74% variation in the output of OFSP production is explain by the variables specified in the model, while the remaining 26% unaccounted for could be due to some externalities beyond the control of the researcher. The F-statistic value of 10.98 was significant at 1% level of probability indicating overall model goodness of fit, t-value result revealed that out of the nine socio-institutional variables included in the model, six variables (age, marital status, education, experience, labour and extension contact) were found to be statistically significant at p=0.1, 5% and 10% levels of probability, respectively. Age (-1.848, p<0.1) was significant and negative implying inverse relationship with output of OFSP production. As the ages of the farmer's increases, there is corresponding decrease in the output of OFSP which could be due to lack of strength or capacity to carry out large production. More so, marital status (2.404, p<0.05), education (1.733, p<0.1), experience (2.957, p<0.01), Labour (1.822, p<0.1) and extension contact (2.035, p<0.05) were significant and positive implying direct relationship with output of OFSP production. This means that an increase in any of the variable will lead to corresponding increase in the output of OFSP. These variables were found to be statistically significant and influences the production of Orange Flesh Sweet Potato (OFSP) in the study area.

**Constraints associated with OFSP Production:** The Table 4 revealed the result of constraints associated with OFSP production in the study area. Major constraints identified by the farmers with respect to OFSP production includes unavailability of finance and high cost of hired labour (90.6%) ranked 1<sup>st</sup>. This is followed by

inadequate support from government (87.5%) ranked 3<sup>rd</sup> and problem of marketing produce and processing equipment (85.4%) ranked 4<sup>th</sup>. The least constraints identified by the farmers was problem of acquiring farmland (17.7%) ranked 11<sup>th</sup>. This implies that farmland for OSFP production is not a serious challenge as there is abundant land area for cultivation in the study area. This finding is in corroboration with Fawole (2007) who posited that inadequate government aid, high labour cost, poor access to credit, poor storage facilities, lack of new technologies, high incidence of pests and disease, poor marketing channel and outlet are the constraints faced by the sweet potatoes farmers in his study area.

### Conclusion and Recommendations

Based on the findings of this study, it could be concluded that youths are not involve in OFSP production as the respondents in the study area were above their mid ages and married with relatively large family. However, production of Orange Flesh Sweet Potato (OFSP) was found to be profitable with good returns in naira invested. Socio-institutional factors that influences the production of OFSP were the age, marital status, education, experience, labour and extension contact. Meanwhile, major constraints identified to be associated with OFSP production in the study area includes unavailability of finance, high cost of labour and inadequate government support. Therefore, it is recommended that Government in partnership with relevant stakeholders (private investors) should help in formulating policy that will support OFSP production and attract youth participation. Financial institutions should also help to facilitate credit acquisition to the farmers for increase production.

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**Table 1: Socio-economic Characteristics of the Respondents**

Description	Frequency	(n = 96) Percentages	Mean
Age (years)			53
< 46	4	4.2	
46 – 55	57	59.4	

> 55	35	36.4	
Gender			
Male	90	93.8	
Female	6	6.2	
Marital status			
Married	93	96.9	
Widowed	3	3.1	
Household size			
< 6	10	10.4	9
6 - 10	42	43.8	
11 - 15	41	42.7	
> 15	3	3.1	
Education			
Tertiary	2	2.1	6
Secondary	16	16.7	
Primary	48		
Non-Formal	30	31.2	
Experience (years)			
< 11	6	6.2	18.5
11 - 20	51	53.2	
> 20	39	40.6	
Farm size (hectares)			
< 1.1	7	7.3	1.9
1.1 - 2.0	73	76.0	
> 2.0	16	16.7	

Source: Field Survey, 2016

Table 2: Costs and Returns analysis of OFSP production

Cost/Returns of items	Amount (N) / ha	% of Total Cost	Income (N)
Cost/Returns of items			132,875.00
Returns			
Variable costs	12,166.70	9.15	
Cost of Cultivars	1,067.40	3.19	
Cost of Fertilizer/manure	1,758.33	5.25	
Cost of agro-chemicals	3,065.10	9.15	
Cost of Labour	8,44.27	2.52	
Cost of Transportation	375.52	1.12	
Cost of Loading/Offloading	19,277.32	57.56	
Total variable cost			
Fixed cost	5,833.33	17.42	
Depreciation (Land)	4,375.20	13.06	
Depreciation (Housing)	4,007.50	11.97	
Farm tools (cutlass, ridgers, carts, hoes)	14,216.03		
Total fixed cost	33,493.35	100.00	113,597.68
Total cost			99,381.65
Gross Margin (GI-TVC)			2.97
Net Farm Income (GM-TFC)			
Profitability Ratio (NFI/TC)			

Source: Field Survey, 2016

Table 3: OLS Estimate on the socio-institutional factors influencing OFSP production

Variables	Coefficient	Standard Error	t-value
Constant	3555.45	1293.36	2.749***
Age	-97.29	52.65	-1.848*
Marital status	1765.66	734.47	2.404**
Education	113.30	65.37	1.733*
Experience	946.07	319.93	2.957***
House hold	81.56	73.23	1.114
Labour	731.61	401.45	1.822*
Cooperative	-384.29	626.43	-0.613
Extension contact	1289.92	633.79	2.035**
Credit	-388.66	461.64	-0.842

R-squared 0.7376  
 Adjusted R-squared 0.7139  
 F - Statistic 10.98\*\*\*

Source: Field Survey, 2016

Note: \*implies significant at 10%, \*\* significant at 5% and \*\*\* significant at 1% probability level

Table 4: Distribution of respondents based on the constraints faced by the respondents

Variable	Frequency*	Percentages	Ranks
Unavailability of finance	87	90.6	1 <sup>st</sup>
High cost of hired labour	87	90.6	1 <sup>st</sup>
Inadequate government support	84	87.5	3 <sup>rd</sup>
Problem of marketing produce	82	85.4	4 <sup>th</sup>
Problem of processing equipment	82	85.4	4 <sup>th</sup>
Problem of climate change	79	82.3	6 <sup>th</sup>
Problem of storage facility	77	80.2	7 <sup>th</sup>
Problem of machinery	34	--	--
Pests & disease outbreak	16	16.7	9 <sup>th</sup>
Inadequate OFSP cultivar	16	16.7	9 <sup>th</sup>
Problem of acquiring farmland	17	17.7	11 <sup>th</sup>

\*Multiple Response

Source: Field Survey, 2016