



ASSESSMENT OF THE LEVEL OF ORANGE FLESHED SWEET POTATO PRODUCTION AMONG SMALL SCALE WOMEN FARMERS IN ABIA STATE, NIGERIA

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Abstract

The study was conducted among women in Abia State Nigeria to assess the level of orange fleshed sweet potato production. A Multi-stage sampling technique was used to select 108 respondents for the study. Data were collected with structured questionnaires. Data collected were analyzed by means of descriptive statistics (such as frequency distribution, percentages, mean), and ordinary least square regression analysis. A three point rating scale was used to present the participation of farmers in orange fleshed sweet potato production. The result showed a high level of participation in orange fleshed sweet potato planting (2.7), harvesting (2.7), weeding (2.5), land clearing (2.4), ridging/mounding (2.4) and processing (2.0) activities. The major factors affecting orange fleshed sweet potato production were unavailability of planting materials (-6.520)***, pests (5.4472)*** cost of labour (-5.864)***, cost of processing (5.5845)***, lack of knowledge/skill (5.3247)*** and age (2.71)** which were significant at various levels of probabilities. The major challenges in the production of orange fleshed sweet potato among the respondents were lack of finance, land issues, poor storage facilities and inaccessibility of credit facilities. Based on these findings, it is recommended that farmers should be provided with funds, improved seeds, storage and credit facilities for increased sweet potato production in the study area.

Keywords: Women, Farmers, Production, Orange Fleshed Sweet Potato

Introduction

Sweet potato (*Ipomoea batata*) is one of the food crops grown worldwide due to its nutritive value, early maturity and ease of planting. It is sixth most important food crop after rice, wheat, potato, maize and cassava and Nigeria ranked 2nd with the production output of 2.6 million metric tons per annum (Mwanja *et al.*, 2017). It is an important food security and early maturity crop that can be intercropped with some crops like yam and maize. Sweet potato can also be a mono crop based on the intentions of the farmer. In Nigeria, more than 85% of the sweet potato production is done by farmers who maintain small scale farming and carry out their operations manually with traditional farm tools. The production of sweet potato is increasing in Nigeria's farming systems due to increased sweet potato innovations in the country (FAO, 2017). Sweet potato is used as food and cash crop, it is also used as raw materials and livestock feed, and an important food security crop as it matures early (Afuape *et al.*, 2015). Sweet potato has a significant potential for increasing total food production and income in Nigeria. It can be planted as a sole or an intercrop and it has high yielding characteristics and can be grown up to three times in one year. A lot of improved varieties of sweet potato have been developed by research institutes for increased

production and utilization. These improved varieties include the orange fleshed; Umuspo 1, Umuspo 3, Umuspo 4 (NRCRI 2020). These varieties are rich in pro vitamin A, and any increase in the production of these varieties will reduce malnutrition and sickness caused by vitamin A deficiency. One orange fleshed sweet potato (OFSP) gives you the vitamin A you need each day and helps to promote healthy vision. The various forms of sweet potato utilization in Nigeria include; boiling and eating with stew/palm oil, slicing and frying, roasting, boiling and eating as snack, boiling and pounding alone or with boiled yam/*gari* for eating with soup, cooking alone or with another crop to make pottage, slicing and sun-drying for milling into flour and household income is supplemented by sales of the roots in local markets and to urban dwellers (Akoroda *et al.*, 2007). Sweet potato is grown among the rural women as a food security crop and studies have shown that rural women play significant roles in sweet potato production and marketing in Nigeria due to their participation in various activities and utilization of the crop. Most of the women specialized in the sale of this produce for income generation. Studies have shown that rural women play significant roles in sweet potato production and marketing in Nigeria due to their participation in various activities and utilization of the crop (Odinwa *et al.*,

2016). This study therefore assessed the level of women participation in the production of OFSP among women in Abia State.

Methodology

The study was conducted among women farmers in Abia State, Nigeria. Six out of the seventeen Local Government Areas (LGA) of Abia State were randomly selected for the study, namely; Arochukwu, Isuikwuato, Bende, Umuahia South, Umuahia North and Isialangwa South. Three communities were also randomly selected in each of the LGAs which include: Agbagwu, Ihechiowa, and Ozu Abam in Arochukwu; Akolimenyi, Lodu and Niba in Bende; Eluama, Otamkpa and Ovim in Isuikwuato; Ubakala, Olokoro and Amakamma in Umuahia South; Umuekwule, Nkwoegwu and Ubani in Umuahia North; and Ahaba, Ikem and Ntigha in Isialangwa South. Six women lead farmers were purposively selected in each of these communities, especially those who plant sweet potato. The sample size of 108 respondents was selected and data collected with a structured questionnaire, which was administered to the farmers to elicit information from them about sweet potato production and processing. Data collected were subjected to descriptive and inferential statistical analysis, such as frequency tables, percentages, and mean, and ordinary least square regression. Three point rating scale type adapted from Ele *et al.* (2013) was used to capture the level of women participation in OFSP production. The ordinary least square regression analysis was used to analyze the factors affecting the production of OFSP. The model is explicitly specified as follows;

$$Y = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + \dots + b_{12} X_{12} + u$$

Where,

Y = Quantity of sweet potato produced and processed (kg)

X₁ = Age (years)

X₂ = Education (years)

X₃ = Household size (in number)

X₄ = Farm Experience (years)

X₅ = Membership of cooperative (yes = 1, no = 0)

X₆ = Farm size (in hectare)

X₇ = Lack of planting material/seed (yes = 1, no = 0)

X₈ = Access to input (yes = 1, no = 0)

X₉ = Cost of labour (in Naira)

X₁₀ = Pests problems ((yes = 1, no = 0)

X₁₁ = Cost of processing is high (yes = 1, no = 0)

X₁₂ = Lack of knowledge/skills (yes = 1, No = 0)

u = error term

Results and Discussion

Socio economic Characteristics of the Respondents

Table 1 shows that 67.6% of respondents were married, followed by 21.3 single, and the least were 3.7% divorced. This indicates that the sweet potato production might be so profitable that married and single persons are now venturing into it. In addition, while economic imperatives of family responsibility may be the driving force behind married persons

participating in sweet potato production, the mass unemployment may also account for unmarried persons going into the production. Table 1 also shows the age distribution of the respondents; many (32.6% and 32.6%) were within the age range of 31-42 and 43- 55 years. Those between 18 – 30 years were 21.5%, while 56- 68 age range were 13.8%. It is therefore clear that the mean age (41.6) of the sweet potato farmers' shows that they were still at their active age, and this can lead to increase in production of OFSP in the study area. This is an indication that more youths and active people constituted bulk of sweet potato farmers in Abia State, Nigeria. Furthermore, Table 1 reveals that many (32.4%) of the respondents were SSCE holders followed by primary school holders with 25% and the least were M.Sc holders with 0.9%. The table also revealed that 54.6% of sweet potato farmers were not members of cooperative society, while 54.6% belonged to cooperative society. The implication is that production was expected to be low because participation is always higher among people in farming co-operative societies. This is because membership of co-operative society is expected to improve productivity of farmers by encouraging them to accept new production packages, for increased production (Salehu and Oyegbemi 2007). Farmers that belong to Co-operative societies receive information about change earlier than their non-member counterparts. The result shows that 50.9% of the respondents had small farm size of less than 1 hectare, while, 30.6% cultivated 1-2 hectares. The mean farm size of 1.2 hectares showed that the women were small scale farmers. These findings agreed with the findings of Mbanaso (2010) which stated that small scale farmers dominated in the production of sweet potato in South East Nigeria. About 50.0% of the respondents had a household size of between 1 and 5 persons, 43.5 between 6 and 10 persons and 4.6%, 11 and 15 persons in their households with the average household size of six. However, some members of the household provided virtually free labour in sweet potato production. Moreover, Africans practice the extended family system and are always ready to accommodate their relatives. The result also showed that 51.8% had 10-19 years of farming experience in sweet potato production, followed by 29.9% of the respondents with 1 –9 years farming experience and the least (7.4%) with 29 years. The result indicated that the respondents were experienced in sweet potato production and is an age-long venture in the study area. The experience gained enables the farmer to participate in sweet potato production. Experience in farming also enhances output performance. This finding agreed with Okoye *et al.* (2014) who reported that farming experience and household size as the main determinants of sweet potato enterprise in Ebonyi State. Furthermore, 45.6% of the respondents were members of association of sweet potato farmers, while 54.6% were not. The result also shows that 63% had contact with extension agent, while 3.7% did not. It is expected that increased extension contact increases production. The table also shows that sweet potato farmers sourced their capital from personal savings with 74.1%, followed by those that sourced their

capital from banks with 13.9% and the least were those that source their capital from money lenders with 2.8%. The implication is that the farmers depended on their personal savings and this may not lead to large scale production of sweet potato. This distribution is poor and showed that there was a problem that needed to be addressed for increased production and marketing of sweet potato. This agrees with the findings of Nwakor and Amadi (2020a) who reported that factors like, inadequate and poor access to credit affect cassava production among rural dwellers in Abia state, Nigeria.

Level of Awareness and Use of Orange Flesh Sweet Potato

Table 2 above shows the level of awareness and use of OFSP by farmers in the study area. The result shows that 87% of the farmers were aware of OFSP, while 13% were not. About 77.8% of the farmers were involved in planting OFSP, while 22.2 did not. Finally 40.7% of the farmers spent less than-2years in production of OFSP, followed by those who spent 3-4years with 22.2% and the least were those who spent more than 4 years in production with 14.2%. The table also shows that majority (63.0%) of the respondents are aware of Umuspo 1; this implies that that Umuspo 1 has the highest (63.0%) awareness among the varieties followed by Umuspo 3 with 19.4% and Umuspo 4 (16.7%). There was high awareness and planting of OFSP by women in the study area. This is in agreement with Nwakor *et al.* (2019) who reported a high level of awareness of sweet potato technologies in Ebonyi State.

Sweet Potato Production Output

Table 3 showed the total annual output of sweet potato among women in the study area. The result showed that majority (50.0%) of the respondents had less than 200kg of OFSP as their annual production output, whereas, 45.4% produced 200-300kg, and 3.7% produced 401- 600kg. Only 0.9% of respondents produced quantity above 600kg annually. This shows that women are active sweet potato farmers in the study area, but they were mainly small scale and subsistence farmers. The finding agreed with Nwokocha *et al.* (2019) who stated that women have over taken the sweet potato production in Anambra State, Nigeria.

Level of Participation of Women in Sweet Potato Production Activities

Table 4 shows the level of participation of women in sweet potato production activities in the study area. The result revealed that planting and harvesting had the highest mean values (2.7 each), followed by weeding with mean value of 2.5. Others were land clearing, ridging/mounding with mean value of 2.4, processing (2.0), herbicide application (1.9), and Fertilizer application (1.8). There was high participation of women in almost all the sweet potato production activities considered, implying that women are highly involved in sweet potato production and processing in South East Nigeria. The finding agrees with Nwokocha *et al.* (2019) who reported a high level of involvement of women in OFSP in Anambra State, Nigeria.

Determinants of production and utilization of orange fleshed sweet potato

The Ordinary Least Square result of factors affecting the production and utilization of OFSP is shown in Table 5. The semi log functional form was chosen as the lead equation (+), based on statistical, economic and econometric reasons which include; magnitude of the coefficient of multiple determination, number of significant variables, agreement of the signs borne by the coefficients of the variables and significance of the F – ratio. The coefficient of multiple determination (R^2) was 0.89, which implies that 89% of the total variations in the dependent variable was explained by changes in the independent variables, while 11% unexplained due to error. The F-stat value was 11.340*** and F-prob value of 0.001 was observed from the analysis indicating that the estimated regression model was good. The coefficient of Age was statistically significant and positively related to the quantity of sweet potato produced in the study area at 5% level of probability (2.71)***. This implies that increase in age of the respondents led to a corresponding increase in the quantity of sweet potato produced. This agreed with the findings of Odoemenem and Obinne (2010) who stated that the older the farmer becomes, the more risk he/she takes to use agricultural innovation. The coefficient of cost of education was statistically significant and positively related to the quantity of sweet potato produced in the study area at 1% level of probability (2.01)*. This implies that increase in education leads to a corresponding increase in the quantity of sweet potato produced. This is tandem with *a priori* expectation and agrees with the findings of Ironkwe (2010) who opined that education had positive effect on the use of agricultural technologies. The coefficient of lack of planting material was statistically significant and negatively related to quantity of sweet potato produced in the study (6.520)***. This implies that increase in lack of planting material leads to a corresponding decrease in quantity of sweet potato produced. The coefficient of cost of labour was statistically significant and negatively related to quantity of sweet potato produced in the study area at 1% level of probability (-5.864)***. This implies that a unit increase in cost of labour leads to a corresponding decrease in quantity of sweet potato produced. High cost of labour is one of the serious constraints reported in agricultural production today because it leads to decrease in production. This agrees with Nwakor and Amadi (2020). The coefficient of pests problem was statistically significant and negatively related to quantity of sweet potato produced in the study area (5.4472)***. This implies that increase in pest problem leads to a corresponding decrease in the quantity of sweet potato produced. The coefficient of cost of processing was statistically significant and negatively related to quantity of sweet potato produced in the study area (5.5845)***. This implies that a unit increase in cost of processing leads to a corresponding decrease in quantity of sweet potato produced by the respondents. Finally, the coefficient of lack of knowledge/skill was statistically significant and negatively related to quantity of sweet potato produced

in the study area (5.3247)^{***}. This implies that increase in lack of knowledge/skill leads to a corresponding decrease in quantity of sweet potato produced.

Constraints militating against production and utilization of orange fleshed sweet potato in the study area

Table 6 shows factors affecting the production and utilization of orange fleshed sweet potato in the study area which includes: lack of land, access of fertilizer, unavailability of finance, lack of herbicide, poor yield, poor access to modern processing technology, high labour cost, high cost of processing equipment, pest and diseases, storage problems, poor marketing of roots, theft, lack of storage facilities, and inaccessibility of credit facilities. The frequency was based on multiple responses, which implies that a respondent may have more than one factor affecting the production of OFSP. However, unavailability of finance was ranked 1st, indicating that 67.9% of the respondents had issue with unavailability of finance, and that affects the production of OFSP. More so, 65.9%, 63.06%, 56.8%, 56%, 50.2%, 47.9%, 44.8%, 35.7%, 32.8%, 22.5%, 15.8%, and 13.7% of the respondents ranked lack of land, lack of storage facilities, inaccessibility of credit facilities, poor access to modern technologies, high cost of processing equipment, storage problem, poor marketing of roots, lack of fertilizer, high labour cost, pests and diseases, lack of herbicide, poor yield and theft respectively as factors affecting the production of orange fleshed in the study area.

Conclusion

The study shows that women were into sweet potato production and their production output per annum is encouraging because most of them were small scale farmers. There was high participation of women in OFSP production in the study area, and major factor affecting sweet potato production as age, education and cost of labour. Sweet potato farmers were being challenged by unavailability of planting materials, problems of pests and diseases, high cost of labour, processing problems, lack of skills and other prevailing factors. Improved sweet potato seed (orange fleshed) and pests control measures should therefore be multiplied and made available to the farmers; this will help to increase production of sweet potato among the respondents. Mechanization of agriculture especially in the area of land preparation will help to reduce high cost of labour and stress. This will encourage more women participation in farming activities. Women should be trained on improved sweet potato production techniques, in order to acquire more skills for increased sweet potato production.

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Table 1: Distribution of Respondents according to Socio-Economic Characteristics (n=108)

Variable	Frequency	Percentage	Mean(x)
Marital status			
Married		73	67.6
Single		23	21.3
Widow		8	6.7
Divorced		4	3.7
Age (years)			
18 – 30		23	21.5
31 – 42		35	32.6
43 – 55		35	32.6
56 – 68		15	13.8
Total		108	100
			Mean = 41
Level of education (years)			
No formal education		20	18.5
Primary		27	25.0
Secondary		35	32.4
NCE/OND		5	4.6
Tertiary		20	18.5
M.Sc		1	0.9
Membership of cooperative society			
Yes		49	45.4
No		59	54.6
Household Size			
1-5		54	50.0
6-10		47	43.5
11-15		5	4.6
16-20		2	1.8
			Mean = 6.0
Farming Experience (in years)			
1-9		32	29.9
10-18		56	51.8
19 -27		12	11.1
28- 36		8	7.4
			Mean=14 years
Membership of co operatives			
No		59	54.6
Yes		49	45.4
Farm Size			
< 0-1		55	50.9
1.1-2ha		33	30.6
2.1-3ha		18	16.7
3.1- 4ha		2	1.9
			Mean= 1. 2

Source: Field survey, 2021

Table 2: Distribution of Respondents according to awareness and use of orange fleshed- sweet potato

Awareness of OFSP	Frequency	Percentage
Aware	94	87
Unaware	14	13
Planting of OFSP		
Yes	84	77.8
No	24	22.2
No years grown		
0-2 years	44	40.7
3-4 years	24	22.2
Above 4 years	16	14.8
None	24	22.2
Varieties grown by farmers		
Umuspo 1	68	63.0
Umuspo 3	21	19.4
Umuspo 4	18	16.7
Other	1	9
Total	108	100

Source: Field survey, 2021

Table 3: Distribution of respondents according to their sweet potato production output(kg)

Variables	Frequency	%
Sweet potato output (kg)		
< 200	54	50.0
200 – 400	49	45.4
401 – 600	4	3.7
601 - 800	1	0.9
Above 800	0	0.0
Total	108	100.00

Source: Field survey, 2021

Table 4: Distribution of respondents according to the level of participation in sweet potato production

Participation	H	L	N	Total Score	Mean
Land clearing	60(180)	30(60)	18 (18)	258	2.4
Ridging/mounding	65(195)	23(46)	20(20)	261	2.4
Planting	87(261)	15(30)	6(6)	291	2.7
Weeding	67(201)	26(52)	15(15)	268	2.5
Fertilizer application	22(66)	40(80)	46(46)	192	1.8
Herbicide application	65(195)	13(26)	30(30)	208	1.9
Harvesting	76(228)	2(30)	30(30)	288	2.7
Processing	58(174)	13(26)	20 (20)	220	2.0

Field survey, 2021: Decision rule: ≥ 2.0 = High, < 2.0 = Low

Key: H =High; L = Low; N = No

Table 5: Regression analysis of factors affecting the production of orange fleshed sweet potato

Variables	Linear	Exponential	+Semi log	Double log
Constant	1,748 (-2.792)**	0.137 (1.111)	2.484 (1.400)	-3.141 (-5.054)***
Age (X ₁)	1.010 (9.181)***	-0.010 (-1.957)*	0.023 (2.71)**	0.467 (1.070)
Education (X ₂)	0.086 (6.000)***	0.217 (6.859)***	0.410 (2.015)*	0.100 (0.258)
Household size (X ₃)	0.140 (0.779)	0.761 (1.012)	0.994 (0.609)	0.431 (0.210)
Farm experience (X ₄)	-0.025 (-0.751)	-0.004 (-0.114)	0.521 (0.467)	0.124 (0.130)
Membership of co (X ₅)	0.005 (0.404)	0.003 (0.388)	0.255 (0.369)	0.085 (0.320)
Farm size (X ₆)	-0.349 (1.983)*	0.017 (1.935)*	0.212 (1.100)	0.256 (1.183)
Unavailability of Seed (X ₇)	1.187 (6.11)***	0.029 (1.365)	-1.304 (-6.520)***	0.025 (0.231)
Access o to input (X ₈)	0.330 (1.105)	6.629 (0.347)	0.460 (0.126)	0.032 (0.304)
Cost of labour (X ₉)	1.670 (0.744)	-0.058 (-1.122)	-0.001 (-5.864)***	-0.834 (-8.199)***
Pest problems(X ₁₀)	-1.018 (0.112)	5.006 (7.227)***	-0.084 (5.4472)***	-0.525 (1.116)
Cost of processing (X ₁₁)	-0.350 (1.183)	1.542 (0.916)	-1.156 (5.5845)***	-0.085 (-5.694)***
Lack of knowledge/skill (X ₁₂)	-0.040 (2.8571)**	1.087 (0.556)	-1.012 (5.3247)***	0.282 (6.181)***
R ²	0.52	0.81	0.89	0.88
Adjusted R ⁻²	0.50	0.79	0.88	0.87
F- ratio	8.941***	8.815***	11.340***	9.096***

Source: Field Survey, 2021

Table 6: Distribution of Respondents according to the constraints to the production of orange fleshed

Constraints	Frequency	Percentage	Rank
Lack of land	70	65.9	2 th
Lack of fertilizer	40	36.8	9 th
Unavailability of finance	85	67.9	1 st
Lack of herbicide	30	22.5	12 th
Poor yield	20	15.8	13 th
Poor access to modern technology	65	56.0	5 th
High labour cost	40	35.7	10 th
High cost of processing equipment	60	50.2	6 th
Pests and diseases	40	32.8	11 th
Storage problems	54	47.9	7 th
Poor marketing of root	52	44.8	8 th
Lack of storage facilities	60	50.2	6 th
Unavailability Planting materials	70	63.0	3 rd
Poor access to credit facilities	60	56.8	4 th

Source: Field survey, 2021 (Multiple response)