

**ASSESSMENT OF ADOPTION OF IMPROVED SWEET POTATO PRODUCTION
TECHNOLOGIES AMONG FARMERS IN OHAJI/EGBEMA LOCAL
GOVERNMENT AREA OF IMO STATE, NIGERIA.**

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ABSTRACT

The study assessed adoption of improved sweet potato production technologies among farmers in Ohaji/Egbema Local Government Area of Imo State, Nigeria. The specific objectives were to describe the socio-economic characteristics of the farmers; ascertained the stages of adoption of improved sweet potato production technology and identified the constraints to the adoption of improved sweet potato production technologies among farmers in the study area. Multi stage sampling procedure was used in the selection of 60 sweet potato farmers. Data were collected with the aid of structured and validated questionnaire. Descriptive statistical tools (frequency, percentages and mean) were used to analyze the data generated. Findings on the socio-economic characteristics revealed that the mean age of sweet potatoes farmers in the study area was 35.5years, 55% of them were female, majority were married (65.0%), average household size was eight persons with an average monthly income of ₦21, 500 and an average farm size of 1.1ha. Majority of the farmers were literate (51.6%), an average farming experience was 13 years, majority (85.5%) belonged to social organization and (61.7%) of farmers had contact with extension officers. The majority (78.3%) of the farmers were aware of the improved technologies of sweet potato while most farmers adopted 10 out of the 14 improved sweet potato technologies. In the overall, (51.7%) adopted the improved sweet potato. Major constraints to adoption of improved sweet potato were low consumer preference associated with sweet potato products (75.0%), lack of capital (70.0%), unavailability of land for cultivation (65.0%), high cost of labour (61.7%) and lack of market to sell increase quantity of sweet potato (55.0%). Based on the findings of the study, it is recommended that extension agents should help farmers to increase adoption by intensifying campaigns and trainings on sweet potato technology through community- level education program. Also, government should intervene in the problems of high cost and unavailability of such farm inputs as fertilizer and agrochemicals by strengthening the input delivery system of the extension service in order to increase their adoption of sweet potato production technologies.

Keywords: Sweet potato, Improved production technologies, Adoption.

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INTRODUCTION

Sweet potato (*Ipomoea batatas (L) Lam*) is one of the major staple crops and the most important food security promoting root crop in the world, especially in sub-saharan Africa (Low, *et al.* 2009). Nigeria is second largest producer of sweet potato in Africa after Uganda with 2,600,000 metric tonnes annually (National Root Crops Research Institute, 2009). Sweet potato is highly adaptable to relatively marginal soils and erratic rainfall and has high productivity per unit land and labour, and guarantees some yield even under the most adverse conditions. Sweet potato varieties exist in many colours of skin and flesh, ranging from white to purple, although white and yellow- orange flesh is the most common. Sweet potatoes are usually consumed without special processing. According to Steffey (2015) the fresh root is boiled, roasted, baked or fried as chips which may be sold as snacks or salted and eaten as sweet potato crisp in most part of Nigeria, sweet potatoes are also fed to livestock or processed industrially into alcohol, starch, noodles, dessert and flour. Sweet potato is grossly under-exploited as food in Nigeria Nwosu (2005) observed that the minimal utilization of sweet potato in Nigeria is obviously due to non-availability of adequate sweet potato based recipes that satisfy the food habit of Nigeria.

The National Root Crops Research Institutes (NRCRI), Umudike embarked on rigorous and active research into the genetic improvement, production, processing, storage, utilization and marketing of root and tuber crops of economic importance in Nigeria NRCRI (2009). These research efforts have led to the introduction of improved varieties of sweet potato such as TIS 87/0087, TIS 2532, OP.1.13, TIS 8441 and TIS 8164 which are high yielding and tolerant to prevalent pests, notably sweet potato weevil, *Cylas* spp and with wide adaptation across Nigeria (NRCRI, 2000). The components of the sweet potato production technology are: use of improved sweet potato varieties (TIS 87/0087, TIS 8164, TIS 2532.OP.1.13, Ex-Igbariam); seed bed preparation (ridges or mounds; never flats); use of correct spacing (30cm x 100cm on ridges; 25cm x 100cm on mounds on both sole and intercrops); correct length of vine cuttings (2.5 nodes); use of insecticides/fungicides and herbicides; planting material (vine cutting containing 5-6 nodes); application of fertilizer (45kg N, 15kg P, 40kg K - 400kg or 8 bags of NPK 20:10:10); time of planting (late May to June); weed control/use of herbicide (2.5kg /ha of Primextra super) at 4 to 6 weeks after planting; earthening up (at weeding, 4-6 weeks after planting); pest and disease control (timely harvest, use of resistant varieties, use of neem leaves dust, earthening up, crop rotation and use of clean planting materials); time of harvest of 3 – 4 months after planting (Federal Agricultural Research and Training Station, 2015).

The adoption of improved sweet potato technologies can lead to greater yield and improved food security. Adoption according to Rogers (2015) is a decision to make full use of an innovation or technology as the best course of action available. It is the decision of an individual or group of people to use or apply an innovation. This decision is a process involving the acquisition and processing of information about an innovation, followed by a behavioural change. Adoption of improved technologies to achieve higher yield, can indirectly affect food consumption patterns and food security through changes in production patterns. However, despite the nutritional value of sweet potato, sweet potato is regarded as a

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crop with little economic importance. Farmers paid little or no attention to the time of planting sweet potato, its time of harvest, storage, processing and marketing. New innovations are of little or no value unless they are put to use. This study assesses the adoption stage of improved sweet potato technologies in Ohaji/Egbema Local Government Area of Imo State.

The specific objectives of the study are to:

- i. describe the socio-economic characteristics of the farmers in the study area;
- ii. assess the stages of adoption of improved sweet potato production technology in the study area;
- iii. identify the constraints to the adoption of improved sweet potato production technologies in the study area.

METHODOLOGY

The study was carried out in Ohaji/Egbema Local Government Area of Imo State, Nigeria. It has its headquarters at Mmahu in Egbema District and other district headquarters at Ohaji west and Ohaji east its location is in the south/western part of Imo State and shares boundaries with Owerri in the east, Oguta in the north and Ogba/Egbema/Ndomi in Rivers state in the south west. located imo state between. It was located between Latitude 5^o 13N and 5^o 38N and Longitude 6^o 39E and 7^o 30E (National Population Commission, 2006). It covers an area of approximately 958.010 square km and a population of 800,904 at the 2006 population census, making it the largest local government by area in Imo State. The Local government also has sixteen (16) autonomous communities namely: Egbema, Umuagwo, Oloshi, Umunkwaku, Obile, Obitti, Mgbirichi/Alakuru, Opuoma, Assa, Awarra, Ikwerede, Umuokanne, Obiakpu, Ohaba, Obosima, Mmahu (Imo state Agricultural Development Programme (Imo-ADP, 2013). The population for the study comprised of all sweet potato farmers in the Ohaji/Egbema Local Government Area of Imo State. Multi stage sampling procedure was used to select sixty sweet potato farmers. Six (6) communities were purposively selected from the 16 communities in the L.G.A based on their production of sweet potato. Then, ten (10) farmers were randomly selected from each of the selected communities in the study area which gave a total sample size of 60 sweet potato farmers. The primary data were collected through the use of structured and questionnaire administered to the 60 respondents. For examining level of adoption of sweet potato technologies, farmers responded to seven adoption stages modeled by Agwu (2000) of Not aware = 0, Aware = 1, Interest = 2, Evaluation =3, Trial = 4, Adoption = 5, and Rejection = 6. The data for this study were analyzed using descriptive statistics. Descriptive statistics such as frequency distribution, percentages and mean were used to analyze data to realize the objectives.

RESULTS AND DISCUSSION

Socio-economic characteristics of the sweet potato farmers

Table 1 shows the result of the socio-economic characteristics of sweet potato farmers. Majority (55.0%) of the farmers were female which implies that women were more involved in the production of sweet potato than men. This is in accordance with Orinda (2013) that sweet potato is considered a woman's crop. Also, the mean age of the farmers was 35.5years.

Majority (65.0%) of the farmers were married, greater proportions (51.6%) of the farmers had secondary education. This means that majority of the farmers were literate, the high proportion of literate people among the farming population implies that majority of them were in a better position to access information about improved sweet potato production technology. The result also shows that the farmers had average household size of 8 persons. The farmers had average farm size of 1.1-hectare, average farming experience of 13 years and average farm income of ₦21, 500. Also, greater proportion (61.7%) of the farmers had extension contact, this implies that farmers that had contacts with extension will have access to information on innovations and improved sweet potato technologies. The study reveals that majority (85.5%) of the farmers were members of social organization. This implies that farmers that belong to social organization could get access to information on new practices such as the sweet potato production and processing technologies. This result is supported by Olwande *et al.*, (2011) that farmers' social organizations enable farmers to have access to many opportunities such as credit, shared labour, joint input purchase, group marketing, and group training.

Adoption Stage of Improved Sweet Potato Production Technologies in the Study Area.

Table 2 reveals that majority (51.6%) of the farmers indicated that they have adopted improved sweet potato variety TIS 8164, this implies that the farmers are in adoption stage. The improved variety with bland taste such as TIS 87/0087 was at adoption stage, that is, 46.7 % of sweet potato farmers were using it already. Also, 56.7% of the respondents adopted improved variety TIS 2532, this result support the findings of Nwosu (2005) that improved sweet potato varieties of TIS 8164, TIS 87/0087 and TIS 2532 have wide adaptation in Nigeria and have led to increase in yields of sweet potato from 5t/ha to 20t/ha in farmer's fields. Few (18.3%) of the respondents adopted the variety of Orange-fleshed sweet potato on their farms and 51.7% rejected the orange sweet potato this is because it is a new variety which is still under research in Umudike and Imo ADP. On the seed bed preparation, the result shows that the majority (51.6%) of the farmers were at the adoption stage. This implies that the sweet potato farmers had adopted the recommended seed bed preparation of either using ridges or mounds and not flat bed. Result on the Table 2 shows that majority (53.3%) of the respondents adopted the recommended time for planting of sweet potato. This implies that sweet potato farmers decided to use the recommended time of planting sweet potato around late May to June.

The recommended plant spacing on sweet potato farms was rejected by many (38.3%), this means that a greater proportion of the farmers rejected the plant spacing recommended for sweet potato production. The correct spacing is 30cm x 100cm on ridges and 25cm x 100cm on mounds for both sole and intercropped systems. The reason for rejecting this technology by the farmers was that it was too wide and did not enable them to get their envisaged plant population. It is evident from research, however, that high population densities in sweet potato farms produce root tubers that are small in size (NRCRI, 2009). The Table 2 also reveals that 50% of the sweet potato farmers adopted the recommended vine cuttings are 2-node cuttings and 5/6-node cuttings technology. Thus, majority of the respondents are using the sizes of vine cuttings recommended as planting material for sweet potato production.

On the use of insecticide on sweet potato for controlling weed the result shows that majority (40%) of the sweet potato farmers were at the adoption stage. Most of the farmers had adopted the use of the use of insecticide on their farms after planting. Weed control using herbicide (2.5kg /ha of Primextra super) at 4 to 6 weeks after planting was adopted. The result also shows that 63.3 percent of the sweet potato farmers were at the adoption stage, the recommended fertilizer application rate for sweet potato production is 400 kg NPK 20:10:10 per hectare. This implies that most farmers use the recommended rate of fertilizer application for sweet, improving the fertility of the soil with fertilizer application in order to increase their yield hence result in high number of adoptions of the technologies.

Data on timely harvest of sweet potato indicates that majority (68.3%) of the respondents harvested their sweet potato root tubers as soon as they mature. This is within the period of 3 to 4 months after planting. On earthening-up practice, about 52 percent of the sweet potato farmers were at the adoption stage. The stages of adoption of pest and disease control measures among sweet potato farmers revealed that majority (68.3%) of the respondents adopted the recommended pest and disease control measures on their sweet potato farms. This is supported by Tewe (2003) who carried out on control measures on pest infestation of sweet potato and showed that soil insecticides were effective against weevil and prevented root losses. Also, timely harvest, use of resistant varieties, crop rotation and use of clean planting materials are used in pest and disease control.

Generally, the study revealed that the majority (78.3%) of the farmers were aware of the improved technologies of sweet potato while most farmers adopted 10 out of the 14 improved sweet potato technologies.

Constraints to Adoption of Improved Sweet Potato Technologies

Figure 1 shows the constraints of adopting sweet potato technologies by the farmers. The findings reveal that the major constraint to adoption of improved sweet potato was identified as low consumer preference associated with sweet potato products (75.0%). Lack of capital (70.0%) was also identified as most farmers require inputs such as planting vines, fertilizer etc. for the production of crops and this requires fund. Poor economic condition can hinder farmers in adopting some technologies due to lack of funds. Farmers were also constrained with unavailability of land for cultivation (65.0%). This was because of land tenure system which results in small farm holdings that does not support mechanization and commercialization of agriculture (Mbanaso, 2011). High cost of labour (61.7%) was also a constraint because majority of the youth move to urban areas in search of white-collar jobs hereby limiting rural work force and cause high cost of labour. Also, Inadequate market to sell increase quantity of sweet potato (55.0%) and high cost of fertilizer (53.3%) were identified by farmers, fertilizer is important for boosting production of sweet potato, Agwu (2000) noted that fertilizers are diverted to the neighboring states and black market thereby make fertilizer scarce at farm land.

CONCLUSION AND RECOMMENDATIONS

The adoption of sweet potato production technologies is a means of improving farmers yield and leading to constant socio-economic development. Many of the sweet farmers are in adoption stage of most of the recommended sweet potato production technologies. However, the sweet potato farmers were constrained with low consumer preference associated with sweet potato products, lack of capital, unavailability of land for cultivation, high cost of labour and lack of market to sell increase quantity of sweet potato. Based on the findings of this study government should intervene in the problems of high cost and unavailability of such farm inputs as fertilizer and agrochemicals by strengthening the input delivery system of the extension service in order to increase their production of sweet potato. There should be vigorous sensitization of farmers by the extension agents on the benefits of the sweet potato consumption so that preference for sweet consumption can be increase thereby increasing the rate of adoption among farmers. Also, extension agents should create adequate awareness about improved sweet potato technology through community- level education program.

REFERENCES

- Agwu, A.E (2000). Diffusion of Improved Cowpea Production Technologies among Farmers in the North-East Savanna zone of Nigeria. PhD thesis, Dept. of Agricultural Extension, University of Nigeria, Nsukka.
- Federal Agricultural Research and Training Station (2015). Research Programmes 2014 – 15 of the Federal Agricultural Research and Training Station, Umudike, Umuahia. Federal Ministry of Agriculture and Natural Resources.
- Imo State Agricultural Development Programme (ADP) (2013). An Assessment Study of the National Agricultural Technology Support Project in Imo State with Focus of Adoption of technology and their Social Economic Improvements; Pp: 1-34.
- Low, J., Lynam, J., Lemaga, B., Crissman, C., Bakr, I. and Thiele, G (2009). Sweet potato in Sub-saharan Africa. In the Sweet potato, Netherlands.Springer.
- Mbanaso, E.O (2011). Adoption and Dis-adoption of Sweet Potato Production and Processing Technologies by Farmers in South-eastern Nigeria. PhD Thesis, Dept. of Agricultural Extension, University of Nigeria, Nsukka.
- National Roots Crops Research Institute (2009). Evaluation of Selected Genotypes of Sweet Potato in Different Ecological Zones of Nigeria. Annual Report of the National Root Crops Research Institute, Umudike, pg48.
- Nigeria Population commission (2006). Nigeria Population Commission, Nigeria Federal Government Initiative of Individual Head Count by Gender Spread, State by State, Nigeria.
- Nwosu, K. I (2005). Agricultural Rebirth for Improved Production in Nigeria. A Keynote Paper Presented at the 39th Annual Conference of the Agricultural Society of Nigeria, University of Benin, pp. xvii – xxiii.
- Olwande, J., Sikei, G and Mathenge, M (2011). Agricultural Technology Adoption: A Panel Analysis of Smallholder Farmers’ Fertilizer Use in Kenya. *Contributed Paper Prepared for Presentation at the African Economic Research Consortium Conference on Agriculture for Development, Mombasa, Kenya*
- Orinda, M.A (2013). Analysis of Factors Influencing Sweet Potato Value Addition amongst Smallholder Farmers in Rachuonyo South District, Kenya.
- Rogers, E. M. (2015). Diffusion of Innovation. 4th edition. New York: Free Press, pp24-26.
- Steffey, K.L. (2015). IPM today: Are we Fulfilling Expectations? *Journal of Agricultural Entomology*, 12 (4), 183-190.

APPENDIX**Table 1: Distribution of sweet potato farmers by their socio-economic characteristics**

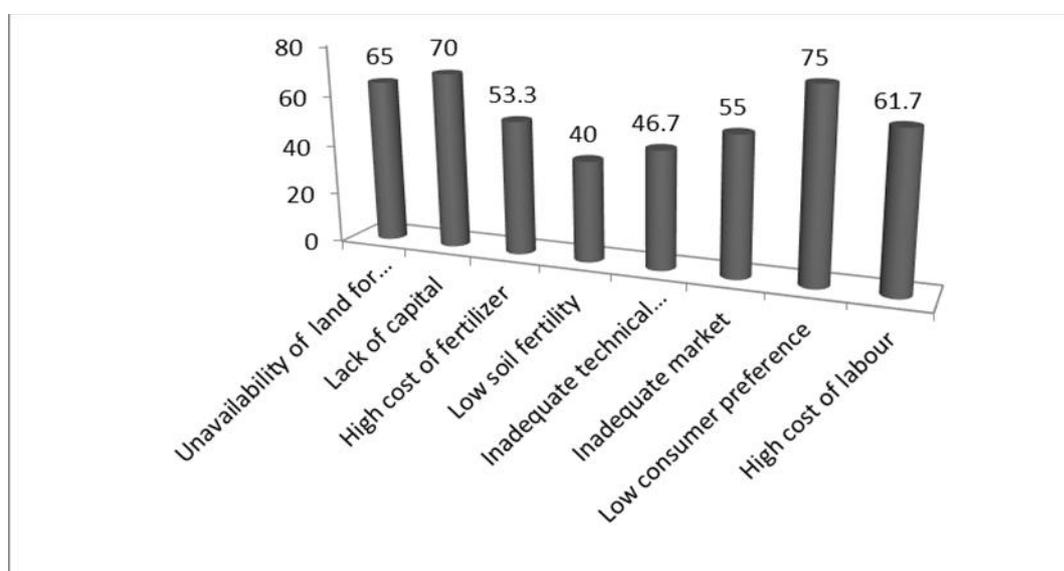
Socio-economic characteristics	Frequency	Percentage (%)	Mean/Mode
Sex			
Male	27	45.0	
Female	33	55.0	
Age			
15-24	11	18.3	35.5years
25-34	13	21.7	
35-44	27	45.0	
45-54	6	10.0	
50 and above	3	5.0	
Marital status			
Single	13	21.7	
Married	39	65.0	
Widowed	5	8.3	
Divorced	3	5.0	
Educational level			
Primary	20	33.3	
Secondary	31	51.7	
Tertiary	9	15.0	
Household size			
1-5	15	25.0	8 persons
6-10	42	70.0	
11 and above	3	5.0	
Farm size			
0.1ha – 1.0ha	43	71.7	1.1ha
1.1ha – 2.0ha	13	15.0	
2.1ha – 3.0ha	5	8.3	
3.0ha and above	3	5.0	
Farming experience years			
1-5	7	11.7	13years
6-10	11	18.3	
11-15	14	23.3	
16 and above	28	46.7	
Monthly farm income (₦)			
1,000 - 10,000	4	6.7	₦21, 500
10,000-20,000	17	28.4	
21,000-30,000	22	36.6	
31,000-40,000	9	15.0	
Above 40,000	8	13.3	
Extension contact			
Yes	37	61.7	
No	23	38.3	
Social organization membership			
Yes	51	85.5	
No	9	15.0	

Source: Field Survey Data, 2018.

Table 2: Stages of adoption of improved sweet potato production technologies.

s/ n	Adoption	Not Aware	Aware	Interest	Evaluation	Trial	Adoption	Rejection
1	TIS 87/0087	0	5.0	11.7	30.0	3.3	46.7	3.3
2	TIS 8164	1.7	3.3	8.3	11.6	21.6	51.6	1.7
3	TIS 2532	8.3	20.0	8.3	1.7	3.3	56.7	1.7
4	Orange-flesh sweet potato	51.7	13.3	5.0	1.7	0	18.3	10.0
5	Seed bed preparation	10.0	31.7	6.7	0	0	51.6	0
6	Correct time of planting	0	35.0	8.3	0	3.3	53.3	0
7	Correct spacing	11.7	18.3	10.0	0	5.0	16.6	38.3
8	Correct length of vine cutting	5.0	13.3	6.7	10.0	5.0	50.0	10.0
9	Use of insecticides	18.3	15.0	11.7	6.7	0	40.0	8.3
10	Application of fertilizer	0	20.0	0	5.0	11.7	63.3	0
11	Timely harvesting of sweet potato	0	21.7	10.0	0	0	68.3	0
12	Earthing-up	6.7	18.3	13.3	3.3	6.7	51.7	0
13	Pest and disease control	0	23.3	8.3	0	0	68.3	0

Source: Field Survey Data, 2018

**Figure 1. Constraints to adoption of improved sweet potato technologies**