

**RESEARCH ARTICLE****Analysis of the Influence of Personal and Socio-Economic Characteristics of Small Scale Farmers on Sweet Potato (*Ipomoea Batatas L*) Production in South East Agro-Ecological Zone, Nigeria**

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**ABSTRACT**

The study analyzed the influence of personal and socio-economic characteristics of small scale farmers on sweet potato production in south east agro-ecological zone of Nigeria. Specifically the study identified the personal and socio-economic characteristics of sweet potato farmers in south east agro-ecological zone of Nigeria and also determined the influence of these personal and socio-economic characteristics of farmers on sweet potato production in the zone and its implications for extension and food security. A structured interview guide was used to source relevant information from one hundred and forty-four (144) sweet potato farmers in the study area. Data obtained were analyzed using descriptive statistics and multiple regression. The result revealed that age of the farmers, number of people in the house that formed the labour force, number of hectares of land available to the farmer for cultivation of sweet potato, number of years of experience in sweet potato production and high revenue derived from sale of sweet potato positively and significantly influenced sweet potato production in the study area. It was also discovered that sweet potato is not a gender specific crop in the area. It was then recommended that full mechanization of the production of sweet potato be vigorously pursued and more land made available to farmers by government for increased productivity, food security and poverty alleviation.

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**INTRODUCTION**

Sweet potato (*Ipomoea batatas L*) is a major tuber crop throughout Africa and the Pacific region, yet it is one of the least marketed. This is a paradox since production of this food crop has been growing steadily over the last 40 years (Spore, 2013). It is among the world's most important, versatile, and under exploited food crops, with more than 133 millions tones (FAOSTAT, 1997) in annual production. Among the root and tuber crops, it is the only crop that has a positive per capita annual rate of increase in production in sub-Saharan Africa (Bashaasha and Mwanga, 1992). Sweet potato is one of the most misunderstood of the major food crops (Ezeano, 2006). It is often viewed as an 'unloved' crop or 'poor man's food' or 'strictly subsistence', 'food security' or 'famine relief crop' and is grown mainly by women on small plots (Scott and Maldonado, 1999; Spore, 2013).

Available data showed that sweet potato production in Nigeria is on the increase (Ezeano, 2006). This is confirmed by FAO production year book (1989-2001) which revealed that sweet potato production yield (Kg/ha)

and area harvested witnessed a steady increase in Nigeria from 149 thousand metric tones in 1989 to 2,468 thousand metric tones in 2001. Less than 20% of all sweet potato produced in Africa is marketed, although Africa ranks second after China in sweet potato production with 17 million tones produced in 2011 (Spore, 2013). Food and Agriculture Organisation (FAO) estimates of average sweet potato yield of 5 to 8t/ha are similar with estimate from survey conducted by State Agricultural Development Project (ADPs) in Nigeria which reported yield of popular local varieties from 7t/ha in the south eastern zones, 3.5t/ha in the northern zone, and 7 to 8t/ha in plateau and Bauchi states (Tewe *et al.*, 2003).

Sweet potato is a simple, short-cycle, low input crop that is adapted to a range of farming conditions, including drought and poor soils. Its production is however, hampered by several problems like lack of available seed at the right time (onset of the rainy season), an insufficient number of varieties, low yield (4-5 t/ha on average compared to 22 t/ha in China), as well as the use of rudimentary production conservation and storage techniques, leading to high post harvest losses (Spore, 2013).

### Problem Statement

The pertinent questions are;

1. What are the personal and socio-economic characteristics of the sweet potato farmers?
2. What is the influence of the personal and socio-economic characteristics of the farmers on sweet potato production in south east agro-ecological zone of Nigeria?

### Objectives of the study

The objective of this study was to analyze the influence of personal and socio-economic characteristics of small-scale farmers on sweet potato production in south east agro-ecological zone of Nigeria. Specifically the study was to;

1. Identify the personal and socio-economic characteristics of small-scale sweet potato farmers.
2. Determine the influence of these personal and socio-economic characteristics of farmers on sweet potato production and its implication for extension and food security.

### Literature review

Sweet potato is grown throughout the world from latitude 40 °N to 32 °S under contrasting system of agriculture ranging from intensive horticultural practice to subsistence farming, and cultivars differ considerably in their adaptability to soil and other conditions. It is a warm weather crop and grows best at a temperature between 24 °C to 28 °C with an annual rainfall of 700mm-1000mm (Ezeano, 2006). The optimum pH for sweet potato is 5.6-6.6. The best soil is a well-drained moderately deep sandy loam that is not too rich (Ajakaiya, 1982). In a study conducted by Spio (1997), on the intercropping of sweet potato as a solution to land scarcity and household food security, it was revealed that intercropping has a higher total productivity per unit land area and greater stability of yield and revenue than its mono cropping counterparts. Sweet potato may be planted on ridges, mounds, beds or flat depending on locality and choice using vine cutting of sprouts.

These cultivars have been isolated and recommended by National Root Crops Research Institute (NRCRI) Umudike for high yields of tubers; TIS146/3092, TIS 2534, TIS 2421, BIS 23, TIS 2353, TIS 2498, TIS 8504, TIS 1176, TIS 14487, JK 70 (Chineka, 1983).

Sweet potato is subject to fungal diseases like stem rot caused by *Fusarium oxysporum*, black rot caused by *Ceratocytis timbriata* and soft rot caused by *Rhizopus spp* (Jennifer, 1992). It is also attacked by nematodes and insects like *Meloidogyne spp* (root- rot) and *Rotylenchulus reniformis*, and weevil *Cylas formicarius* (Ezeano, 2006). Sweet potato is ready for harvesting 3-8 months after planting and may require only one weeding (Jennifer, 1992; Ezeano, 2006).

## MATERIALS AND METHODS

### Design of the study

The design of the study was survey design which made use of structured questionnaire used for data collection.

### Area of study

The study was carried out in the southeast agro-ecological zone of Nigeria made up of nine states namely; Abia, Ebonyi, Anambra, Enugu, Akwa-Ibom, Cross-River, Rivers, Bayelsa and Imo. It is located between latitude 4°15' and 9°30' and 7°N and longitude 5°50' and 9°305'E (Emielu, 1996).

### Population of the study

All the sweet potato farmers in the study area formed the population of the study.

### Sampling techniques and sample size

A purposive sampling procedure was used to select the states and communities, while simple random sampling procedure was used to select the farmers in the following ways:

1. Three states (3) (Cross-River, Ebonyi and Enugu) were purposively selected so as to cut across the entire agronomic and socio-cultural situations in the zone.
2. Four (4) communities from each of the selected states were purposively selected based on their high potentials in sweet potato production (viz; Cross River: Bekwara, Bendege, Utugwan and Akamkpa; Ebonyi: Ishiagu, Nkalagu, Abomega and Noyo-Elike; Enugu: Ugwuoba, Ihe, Ogbaku and Edem).
3. Simple random sampling techniques was used to select twelve (12) farm households from each town who are seriously involved in sweet potato production making a total of 144 farm households which formed the sample size.

### Data collection

An interview guide containing both semi-structured and open-ended questions were developed and used for data collection from sweet potato farmers by extension officers previously trained by the researcher. Variables considered under the personal and socio-economic characteristics of the respondents included: age, gender, marital status, household size, religion, educational qualification, major occupation, type/source of farm labour, plot size, farming experience in sweet potato, revenue from sale of sweet potato, membership of social organisation, and extension contact/visit, production of sweet potato in metric tones in the three states selected from 2008 to 2012 were measured.

### Data analysis

Data were analyzed by use of descriptive statistics. Linear regression analysis was employed to determine the personal and socio-economic factors (independent variable) which influenced farmers' production potentials (dependent variable) represented by the equation:  $Y = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + \dots + b_{13}x_{13} + e$ ; where Y = production potentials of the farmers, a = intercept (constant),  $b_1$ - $b_{13}$  = regression coefficients,  $x_1$ - $x_{13}$  = predictor variables, e = error term,  $x_1$  = age,  $x_2$  = gender,  $x_3$  = marital status,  $x_4$  = household size,  $x_5$  = religion,  $x_6$  = educational qualification,  $x_7$  = major occupation,  $x_8$  = type/source of labour,  $x_9$  = plot size/hectare,  $x_{10}$  = farming experiences in sweet potato,  $x_{11}$  = annual income from sale of sweet potato,  $x_{12}$  = membership of

social organizations and  $x_{13}$ =extension contacts/visits with farmers.

## RESULTS AND DISCUSSION

### Personal and socio-economic characteristics of respondents

Entries in Table I showed that majority (52.0%) of sweet potato farmers fall within the age bracket of 50-69 years, with a mean age of 52.4. The indication is that the farmers were predominantly in their middle ages. The implication is that the farmers were still in their productive ages and have potentials for investment, acceptance, adoption and utilization of both exotic and indigenous technologies for increased productivity for food security, poverty alleviation and improved standard of living (Ezeano, 2006). Majority (51.4%) of the sweet potato farmers were males while 48.6% were females. This finding disagreed with that of Spore (2013) which observed that sweet potato is grown mainly by women on small plots. However, some of the men who grow sweet potato confirmed that it was a joint venture between them and their wives and also a household enterprise (Ezeano, 2006). The study showed that majority (87.5%) of the sweet potato farmers were married, 7.6%, 2.8%, and 2.1% were widowed, divorced/separated and single respectively. The implication of this finding is that married people tend to be more committed to tasks (Ezeano, 1996; Onu, 2003) and so increased productivity and less wastage is expected. Majority (55.6%) of the farmers had 6-10 household members with mean size of 8.1. The implication of this finding is that the farmers enjoyed a relatively large family size which is a source of labour in the farm production. Data also showed that majority (85.4%) of the farmers were Christians while only 14.6% were African traditionalists. This is not unexpected since Christianity is a dominant religion in these parts of the country. The result revealed that majority (68.1%) of the farmers had a minimum educational attainment of First School Leaving Certificate (FSLC), 27.1%, 3.5% and 1.3% had secondary school/teachers grade two certificate, OND/NCE and HND/Degree certificates respectively. The indication is that the sweet potato farmers were educated and literate enough to adopt innovations, utilize them appropriately and source market for their products since intensity of adoption is related to level of education (Onyenwaku and Mbuba, 1991; Madukwe, 1995; Lucia, Lapar, Pand and Waibel, 1999). Majority (88.2%) of the farmers were full-time farmers while others were part-time farmers. Also majority (46.5%) of the farmers had artisan/crafts as other sources of income while 27.1% and 11.8% had teaching/business and farming respectively as other sources of income. The implication of this finding is that farmers prefer artisanship/craftsmanship as other sources of income to augment their income from sweet potato farming. Majority (52.1%) of the farmers belonged to average of three social organizations. This indicates high levels of social participation and linkages which can give rise to high level of innovation dissemination, mass adoption and increased productivity due to group dynamism (Ladele, 1994; Ebii, 2000 and Oladele and Afolayan, 2005). Data revealed that majority (66%) of the

**Table 1:** Distribution of farmers according to personal and socio-economic characteristics

Characteristics	Farmers(n=144) %	
Age (Years)		
30-49	41.7	
50-69	52.0	52.4
70-89	6.3	
Gender :		
Male	51.4	
Female	48.6	
Marital status		
Single	2.1	
Married	87.5	
Divorced/Separated	2.8	
Widowed	7.6	
Household Size		
1-5	20.8	
6-10	55.6	8.1
11-15	23.6	
Religion		
Christianity	85.4	
African traditional	14.6	
Muslim	-	
Educational Status		
Primary/FSLC	68.1	
Secondary/TCII	27.1	
OND/NCE	3.5	
HND/Degree	1.3	
Major Occupation		
Farming	88.2	
Trading/business	2.8	
Artisanal/Crafts	2.1	
Civil Servant	6.9	
Other Sources of income		
Farming	11.8	
Trading/business	27.1	
Artisanal/Crafts	46.5	
Civil Servant	-	
Type of labour employed		
Family labour	32.6	
Hired labour	14.6	
Exchange labour	2.8	
Family & hired labour	20.8	
Family + hired + exchange labour	4.9	
Family and exchange	24.3	
Membership of social Organs:		
1-2 organization	52.1	
3-4 organization	34.7	2.8 (3)
5-6 organization	6.9	
7-8 organisation	6.3	
Frequency of EA Visit:		
1-10 visits	66.0	
11-20 visits	27.1	9.0
21-30 visits	6.9	
31-40 visits	-	
41-50 visits	-	
Farming Experience in Sweetpotato (Yrs)		
1-10	84	
11-20	8.3	8.0
21-30	4.2	
31-40	2.1	
41-50	1.4	
Mean annual income (#) realized from sweet potato sales	#31,250.00/ha	
>1.99	-	
2-3.99	85.3	
4-5.99	14.6	1.2

**Table 2:** Regression analysis of the influence of personal and socio-economic characteristics of farmers on sweet potato production

Independent variables	Unstandardized coefficient	Standardized coefficient	t-value	F-ratio	R-square adjusted
(constant)	2.55(0.80)	-	3.48	1.76	0.25
Age	0.06(0.02)	0.30	2.48*		
Gender	-0.13(0.13)	-0.10	-0.98		
Marital status	0.22(0.17)	0.13	1.25		
Household size	0.12(0.08)	0.18	2.18*		
Religion	-0.15(0.12)	-1.3	-1.24		
Educational qualification	0.04(0.03)	0.19	1.34		
Major occupation	0.19(0.22)	0.11	0.92		
Type/sources of farm labour	0.23(0.19)	0.26	1.88		
Plot size(hectarage)	0.09(0.04)	0.20	2.26*		
Farming experience in sweet potato production	0.13(0.09)	0.14	2.06*		
Revenue from sale of sweet potato	0.07(0.03)	0.28	2.30*		
Membership of social Organisation	0.21(0.07)	0.17	1.60		
Extension contact/visit	0.22(0.23)	0.21	1.99		

Values in parenthesis are standard errors; \*P≤0.05

farmers had an average of an extension visits per year. This is grossly inadequate since it is expected that a farmer/client should be visited at least twenty-four times a year by an extension agent. This is an unhealthy development for agricultural development and transformation and does not augur well for linkage formation, innovation transfer and adoption. However, this might be due to low extension-client ratio prevalent in this area of study (Alfred, 2004). According to FAO (1984), the ratio of extension workers to farmers should be between 1 to 50 and 1 to 200 instead of the current mean of 1 to 2,250 farmers in developing countries. According to ADP project co-coordinating unit (1999), the extension worker-farmer ratio was 1:3,700 in Cross-River; 1:6,632 in Ebonyi and 1:4,450 in Enugu. This is very low. In the same vein majority (84%) of the farmers had 1-10 years of farming experiences in sweet potato production which on the average is 8 years. This indicates high levels of experience, which is an advantage in technology adoption, utilization and high productivity (Onyenwaku and Mbuba, 1991; Igbokwe, 2000). The average annual income per ha from sale of sweet potato was #31,250.00 as against #21,000.00 reported by Tewe *et al.* (2003). The increase in income from sale of sweet potato may be attributed to return on investment in improved management and technological practices by the farmers.

#### Influence of personal and socio-economic characteristics of farmers on the production of sweet potato

Entries in Table 2 showed the influence of personal and socio-economic characteristics of farmers on sweet potato production. Age of the farmers ( $t = 2.48$ ), household size ( $t = 2.18$ ), plot size/hectarage (2.26), farming experience in sweet potato ( $t = 2.06$ ), and annual revenue from sale of sweet potato ( $t = 2.30$ ), were significant in explaining 25% of the variation in their production potentials as represented in the equation below:

$$Y = 2.55 + 0.30x_1 - 0.10x_2 + 0.13x_3 + 0.18x_4 + 1.3x_5 + 0.19x_6 + 0.11x_7 + 0.26x_8 + 0.20x_9 + 0.14x_{10} + 0.28x_{11} + 0.17x_{12} + 0.21x_{13}$$

Where Y=sweet potato production potentials of farmers.

In this study, age of the farmers, number of people in the house that formed the labour force, number of hectares

of land owned by the farmers, number of years of cultivating sweet potato and revenue derived from sale of sweet potato positively influenced sweet potato production. The indication of these findings are that since the farmers are still in their productive age of 52.4, that they have the potentials for increased productivity and the mean household size of 8.1 indicated a major source of labour for increased productivity (Ezeano, 2006). The possession of enough plot of land for cultivation of sweet potato gave the farmers room for expansion, adoption of sweet potato technologies and increased productivity. Also the average year of cultivating sweet potato which is 8 years indicated wealth of experience and expertise which is a propensity for increased production (Ezeano, 2006). All these culminated in increased revenue which made sweet potato production a profitable enterprise. The large household size which supplied labour to the farm is in agreement with Onyenwaku *et al* (1991) and Ezeano (2006) which observed that the number of adult agricultural workers in a farmer's household is expected to ease labour constraints, thereby enhancing the adoption process. In a study of rice farmers in Awgu, Igbokwe (2000) discovered or isolated farming experience as one of the factors that influenced adoption of new technologies among farmers. According to Ezeano (2006), the positive sign for revenue derived from sale of sweet potato agreed with a priori expectation that increase in investment in improved management and technological practices by farmers result from increase in revenue or income from sale of sweet potato. Also the number of cultivable land a farmer owns determines his production potentials (Ezeano, 2006).

#### Conclusion

Based on the results of the study, the age of the sweet potato farmers, number of people in the house that formed the labour force, number of years of cultivating sweet potato and revenue derived from the sale of sweet potato positively, influenced sweet potato production in south east agro-ecological zone of Nigeria.

#### Recommendation

It is recommended that;

1. Government should make more land available to sweet potato farmers for increased production.

2. The full mechanization of sweet potato production should be vigorously pursued by the agricultural policy makers and agricultural engineers to ease the production and increase productivity.  
Youths should be encouraged to be involved in this all important crop because it gives quick revenue at a short time.

## REFERENCES

- Ajakaiya MB and MC Corvey, 1982. Vegetable Gardening in the Northern states of Nigeria. AERALS. Ahmadu Bello University, Zaria. Extension bulletin No. 1. Horticulture Series No.1
- Alfred SDY, 2004. Strategies for improving the livelihood of the rural dwellers through extension services. In: Adedoyin SF and OA Adekun (Eds). Institutional frames and Processes for Enhancing Effectiveness of Extension service. Proceedings of the 1<sup>st</sup> South west AESON workshop (1<sup>st</sup> December) 55-60.
- Bashaasha B and RO Mwangi, 1992. Sweet potato. A source of income for low-income rural families in Uganda. In: G Scott, PI Ferguson and JE Herrera (eds). Product development for Root and Tuber crops vol.III. Africa. Proceedings of the workshop on Processing, Marketing, and Utilization of Roots and Tuber crops in Africa, held October 25-November 2, 1991 at the International Institute of Tropical Agriculture (IITA), Ibadan, Nigeria by (CIP) International Sweet potato centre, Lima, Peru 56-72.
- Chineka CC, 1983. Sweet potato Production: Agricultural Extension and Research Liaison Training. National Root Crops Research Institute Extension Bulletin Umudike-Umuahia.
- Ebii CO, 2002. A Guide In Rural Sociology for Students of Agricultural Science in a Developing Economy. Enugu Snaap Publishers.
- Emielu SA, 1996. Senior Secondary Geography Ilorin. Geographical Bureau (Nig) Ltd.
- Ezeano CI, 1996. Performance Indicators for Extension Agents in Enugu state. Agricultural Development Programme (ENADEP). M.Sc. Thesis. Department of Agricultural Extension University of Nigeria, Nsukka.
- Ezeano CI, 2006. Trends in Sweet potato Production, Utilization, and Marketing among Households in Southeastern Nigeria. Ph.D. Dissertation. Department of Agricultural Extension, University of Nigeria, Nsukka.
- FAO, 1984. Food and Agriculture Organization for Agriculture and Rural Development. FAO of United Nation Organization. Rome.
- FAO, 2001. Food and Agriculture Organizations Production Year Book. Vol 55. P.100.
- FAOSTAT, 1997. Statistics Database. (On-line) Accessed, June. Available [HTTP:http://apps.fao.org](http://apps.fao.org)
- Igbokwe EM, 2000. The Relationship between Socio-Economic variables and Adoption rate of Rice Farmers in the Awgu Agricultural Zone. Enugu state. Journal of Agricultural Extension, 4: 9-14.
- Jennifer AW, 1992. Sweet potato: An untapped Food Resource. New York, Port Chaster. Mesbourne Sydney Cambridge University Press.
- Ladele AA, 1994. Dynamics of Agricultural Extension Service Structure and Policy: The Need for Group Extension in Sustainable Agricultural Technology Transfers in Nigeria. In: Afolayan, S.O. and I.A. Akinbode (eds). Issues and Priorities for Nigeria Agricultural Extension in the 21<sup>st</sup> century. Proceedings of the Inaugural Conference of the Agricultural Extension Society of Nigeria (February 28-March 4) p: 57-58.
- Lucia MA, A Lapar, Sushi Pandey and Herman Waibal, 1999. Adoption of Contour Hedgerows by Upland Farmers in the Philippines: An Economic Analysis. Discussion paper No 36. International Rice Research Institute (IRRI) p: 42.
- Madukwe MC 1995. Obstacles to the Adoption of Yam Miniset Technology by Small Scale Farmers in Southeastern Nigeria. Agro-Research, 1: 1-6.
- Oladele W and SO Afolayan, 2005. Group Dynamics and leadership in Agriculture Extension. In: Adedoyin, SF (ed). Agricultural Extension Society of Nigeria % Agricultural and Rural Management Training Institute (ARMTI), Ilorin pp:134-138.
- Onu MO, 2003. Factors Affecting Job Satisfaction of Front-line extension workers in Enugu state Agricultural Development Programme (ENADEP). Pre-Ph.D Proposal Seminar. Department of Agricultural Extension. University of Nigeria, Nsukka.
- Onyenwaku CE and AC Mbuba, 1991. The Adoption of the Seed Yam Miniset Multiplication Techniques by farmers in Anambra state. In: *The Nigerian Journal of Agricultural Extension (NAELS)*. National Agricultural and Research liaison service. Ahmadu Bello University Zaria: 26-33.
- Scott GJ and L Madonado, 1999. Sweet potato facts. A compendium of key Figures and Analysis for 30 important Sweet potato producing countries (CIP). Lima, Peru, 142-148.
- Spio K, 1997. Intercropping –the Hidden Revolution: A solution to land scarcity and Household food security World Agricultural Economics and Rural Sociology Abstracts. August vol.39 No 8.
- Spore, 2013. Sweet potato: An amazing tuber. The magazine for agricultural and rural development in ACP countries. <http://spore.cta.int>. No 165 p.20 August-September.
- Tewe OO, FE Ojeniyi and OA Abu, 2003. Sweet potato Production, Utilization, and Marketing in Nigeria. Social Sciences Department, International Sweet potato Centre (CIP), Lima, Peru, Database (On-line). Accessed. March 2003, Available, June 2005. [HTTP:http://www.esiap.cipotato.org/MFESEAP/F-Library/spin Nigeria pdf](http://www.esiap.cipotato.org/MFESEAP/F-Library/spin Nigeria pdf).