*UNIZIK Journal of Agricultural Economics and Extension (UJAEE) Vol. 2 No. 1 (2025): 1-9*
*A Journal of the Department of Agricultural Economics and Extension, Nnamdi Azikiwe University, Nigeria*
*ISSN: 3043-6540 (Print) and 3043-6559 (Electronic) /Available at: https://journals.unizik.edu.ng/ujaee*

# Assessment of Selected Socioeconomic Factors Influencing the Use of Improved Sweetpotato Production Technologies disseminated to farmers in Ebonyi State, Nigeria

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***DOI:*** *https://www.doi.org/10.5281/zenodo.17993234*

**KEYWORDS:**
*Socioeconomic factors, Sweetpotato production Technologies, Farmers, Use*

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**ABSTRACT**

*This study assessed selected socioeconomic factors influencing the use of improved sweetpotato production technologies disseminated to farmers in Ebonyi State. Multi-stage sampling and proportionate methods were used to collect data for the study. Two agricultural zones, two (2) blocks, three circles were randomly selected from the blocks and finally, the farmers were selected proportionately from the circles to give a sample size of 201 sweetpotato farmers. Data were collected using structured questionnaire and analyzed using descriptive and inferential statistics such percentages, mean, and simple linear regression model. The result shows that mean of age was 37.3 years, mean education was 12 years and mean of farm size was 0.6ha. Grand mean of level of use of sweetpotato production technologies was 2.68. Linear regression result showed significant effect on sex (-2.595)**, education (4.771)***, marital status 5.370***, household (2.290)**, farming experience (4.113)***, farm size (-4.542)***, and extension visitation (3.289)*** respectively. The study concluded that the farmers used the improved sweetpotato production technologies disseminated to them in production of sweetpotato in Ebonyi State. Also, there were some socioeconomic factors influencing the use of the technologies disseminated. The study therefore, recommended that male farmers need to get actively involved in cultivation of sweetpotato and to make use of its improved production technologies to increase sweetpotato production since it was found in this study that women dominated in sweetpotato farming. Also, Extension agents in Ebonyi States Agricultural Development Programmes (ADP) of should reach out to sweetpotato farmers regularly to enable them use the technologies.*

## INTRODUCTION

Sweetpotato (*Ipomoea batata (L) Lam*) is an important tropical staple food crop, belonging to the morning-glory family known as *convolulaceae.* It originated from Latin America (Low *et al*., 2017). It is a root crop mostly grown in many parts of the globe, is native to tropical America and is commonly called a yam in parts of the United States. Nigeria is the fourth largest producer of sweetpotato in the world with China leading, followed by Malawi and Tanzania (CIP, 2024). Sweetpotato is regarded as early maturing crop, has relatively little labour requirement and ability to thrive under Sub-Saharan Africa's climate (Uzoigwe *et al*., 2019). Its ease of cultivation and ability to thrive even under harsh conditions promote its spread in Africa. Sweetpotato is an important storage root crop which has played an important role in the food and nutrition security of many sub-Sharan countries including Nigeria, it is cultivated as annual crop due to its capacity to produce storage root at a shorter period of 3.5 to 4 months unlike cassava and yam (Nwankwo *et al*., 2022). Sweetpotato is an important food security crop in Nigeria and Africa at large,

and it is known as the crop that is there when the maize fails (Low *et al.,* 2017). It feed over 100 million people in the poor communities in Nigeria and therefore plays a significant role in human nutrition and livelihood (Nwankwo *et al*., 2022)

Sweetpotato is grown for multipurpose, its roots and vines are used both for human food and for animal feed. All sweetpotatoes are dual purpose crops used both as human food and animal feed (Nwaobiala, Odoemelam and Dybia, 2020).The roots have a high level of carbohydrates for daily energy production and are appropriate for meeting the nutritional needs of malnourished children and elderly populations who need high-energy foods that are also suitable for small stomachs. Sweetpotatoes also have traditional medicinal qualities; sweetpotato leaves are boiled in water to make tea to cure problems ranging from mouth and throat tumors to asthma and diarrhea. Mostly in the rural areas, apart from the roots, the young leaves of sweetpotato serve as green vegetable for man and livestock (Olayinka, 2016).

Sweetpotato consumption has increased its role in the nutritional status of the average Nigerian, and it has high agronomic yield potential as a food security crop (Nwokocha, Odoemelam and Agbarevo, 2022). However, one of the reasons identified for the failure to achieve increased sweetpotato production in Nigeria was the bad agronomic system of cultivation and the devastating pests notably Cylas spp. However, NRCRI has developed high dry matter, low-sweet, easy to pound varieties that would appeal to this large population segment (Afuape, 2016). There is dearth of information on the socioeconomic factors influencing the use of improved sweetpotato production technologies disseminated to farmers in Ebonyi State, to see if socioeconomic factors have influence on the use of the technologies disseminated in the study area. The specific objectives of this study were to: describe some selected socio-economic characteristics of the farmers; ascertain the farmers' level of use of the sweetpotato production technologies disseminated and; examine the constraints famers faced in using the sweetpotato technologies.

## METHODOLOGY

The study was conducted in Ebonyi State, Nigeria. A multi-stage sampling and proportionate methods were used to elicit data for the study. Two agricultural zones were randomly selected from the State, two (2) blocks were randomly selected from each of the zones to give a total of four (4) blocks, three (3) circles were selected from each block, given twelve (12) circles. Finally, proportionate sampling technique was used to select farmers from the circles to give a sample size of 201 sweetpotato farmers. A list of sweetpotato farmers from sweetpotato farmers' association, Ebonyi State served as the sampling frame. Data were collected from primary sources using a structured questionnaire. Data were analyzed through descriptive and inferential statistics such as percentages, and mean. To ascertain the farmers' level of use of improved sweetpotato production technologies, and to examine the constraints, the two objectives were realized using mean. To measure this, a three-point rating scale was used. For level of use of technologies, the points in the scale were Never =1, Sometimes = 2, and Always = 3. While to examine the constraints faced by farmers in using the technologies, the points were never =1, serious =2, and very serious = 3. Based on three points, a mid-point of 2.00 was established thus: 3+2+1 = 6/3= 2.0. The inferential statistic used was linear regression model. Thus the model is implicitly stated as;

$Y= f (X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, +u)$……..1

Where:

Y = Use of improved sweetpotato production technologies (mean)
X= Socio-economic characteristics of the farmers
$X_1$= Sex (male = 1, Female = 0)
$X_2$ = Age (years)
$X_3$ = Education level (number of years a farmer spent in school)
$X_4$ = Marital status (married = 1, Single = 0)

$X_5$= Household size (numbers)
$X_6$= Farm size (hectares)
$X_7$= Farming experience (years)
$X_8$= Extension contact (very regular=3, regular =2, not regular =1))
U = error term

**Socioeconomic Characteristics of the respondents**

Table 1 shows that majority of the farmers (74.13%) were females. This result implies that female folks were involved in sweetpotato farming more than their male counterparts in the area of study. The finding is in agreement with Anyaegbunam, Nwokocha, and Uwandu (2019), who reported in their study that sweetpotato is traditionally viewed as a women's crop, grown predominantly by women farmers. The result shows that 35.82 % of the farmers fell between the age bracket of 30-39 years and also 30.34% fell between 40-49years. The mean age was 37.3 years. The mean education level was 12, indicating that a greater number of them had a secondary education level and are considered literate farmers. Tijani and Sanusi (2019) stated that education is an important socioeconomic factor that influences farmers' awareness, perception, reception, and transfer of innovations that can bring about an increase in production. On marital status, the result shows that the majority of the respondents (96.52%) were married. This implies that married people were mostly involved in the utilization of sweetpotato production technology. This finding is also in line with Nzeakor and Nwokocha (2023) who reported in their study that that married farmers engaged themselves in sweetpotato farming. Average percentage (53.23%) of the farmers had household size of between 6 – 10 persons. The mean of household size was 6 persons. The result shows that there are high numbers of people living under the same roof and eating in the same pot. This implies that larger household size tends to increase sweetpotato cultivation and possible utilization of its production technologies. It is expected that large number of persons in a household will increase sweetpotato cultivation and use of sweetpotato production technologies. This finding is in consonance with that of Nwachukwu and Ezeh (2018), who reported that farmers will be more committed to farming activities so as to cater for their large household size. The result also shows that majority (65.17%) of farmers had farm sizes of less than 1 hectare (0.1-0.9 ha). The mean farm size was 0.6ha. Some of the farmers (41.79%) had farming experience of 6 -10years, while (37.81%) of the farmers had farming experience of 11-15years. The mean years of farming experience was 10.6 years. This implies that the farmers had enough farming experience on sweetpotato farming. Years of farming experience could show practical knowledge acquired in farming. According to Tokula, Nwokocha and Mazza (2022), farmers have been on sweetpotato production for many years. Majority (81.59%) of farmers indicated that they had no regular extension visitation. This implies that there was low level of extension agents' visitation in the study area. This finding agrees with finding of Osahon (2018) which indicated that majority of the farmers from Enugu State said they have had low contact with extension.

**Farmers' Level of Use of Improved Sweetpotato Production Technologies**

Result from Table 2 shows that farmers' level of use of improved sweetpotato production technologies on a three-point rating scale had the following means: plant spacing 30 x 30 cm was ($\bar{x}$ =3.13), 1st and 2nd weeding was ($\bar{x}$ =3.05), harvesting time was ($\bar{x}$ =3.05), planting time had ($\bar{x}$ =2.98), improved sweetpotato varieties had ($\bar{x}$ =2.93), land preparation technology had ($\bar{x}$ =2.86), earthen-up had ($\bar{x}$ =2.86), vine cutting 3 and 4 nodes was ($\bar{x}$ =2.42), sweetpotato intercropping technology was ($\bar{x}$ =2.40), use of fertilizer was ($\bar{x}$ =2.20), use of herbicide had ($\bar{x}$ =2.27), use of insecticide (pest control management) had ($\bar{x}$ =2.01). Grand mean of use of improved sweetpotato production technologies was 2.68 on a three-point rating scale, indicating high level of use of sweetpotato production technologies by the farmers. This finding is in agreement with Nwachukwu (2017), who stated that farmers would most probably accept and use innovations when they are fully aware of the relevance of the innovation. This

finding is also in line with Odoemelam *et al.* (2016), who opined that farmers can only use technologies when they are aware of such technologies.

**Table 1: Distribution of farmers according to their socioeconomic characteristics (n=201)**

| Variables | Ebonyi | Mean |
|---|---|---|
| Sex | | |
| Male | 52(25.87) | |
| Female | 149(74.13) | |
| Age | | |
| 20-29 | 36(17.91) | |
| 30-39 | 72(35.82) | 37.3 years |
| 40-49 | 61(30.34) | |
| 50-59 | 32(15.92) | |
| Educational level | | |
| Non formal education | 4(1.99) | |
| Primary | 5(2.49) | |
| Secondary | 101(50.25) | 12 years |
| Tertiary | 91(45.27) | |
| Marital status | | |
| Single | 7(3.48) | |
| Married | 194(96.52) | |
| Household size | | |
| 1-5 | 58(28.86) | |
| 6-10 | 107(53.23) | 6 persons |
| 11-15 | 36(17.91) | |
| Farm size | | |
| 0.1-0.9 | 131(65.17) | 0.6ha |
| 1-1.9ha | 59(29.35) | |
| 2- 2.9ha | 11(5.47) | |
| Farming experience | | |
| 1-5 | 25(12.44) | |
| 6-10 | 84(41.79) | 10.6 years |
| 11-15 | 76(37.81) | |
| 16-20 | 9(4.45) | |
| 21-25 | 5(2.49) | |
| 26-30 | 2(1.00) | |
| Extension visit | | |
| Very regular | 2(1.00) | |
| Regular | 35(17.41) | |
| Not regular | 164(81.59) | |

*Source: Field Survey, 2023 Figures in parenthesis are percentages*

Farmers' Constraints in Use of Improved Sweetpotato Production Technologies

Table 3 shows farmers' constraints in use of improved sweetpotato production technologies on a three-point rating scale had the following means: low finance was ($\bar{x}$ =2.75), followed by high cost of labour ($\bar{x}$ =2.54), high cost of herbicides ($\bar{x}$ =2.51), high cost of fertilizer ($\bar{x}$ =2.40), and lack of land ($\bar{x}$ =2.16). According to Akpan et al. (2017), land being one of the factors of production is critical input in agricultural production. High cost of insecticides and susceptibility to diseases and pests had mean of 2.31 and 2.02, respectively. This finding supports the finding of Akpan et al. (2017), who reported that farmers agreed that high cost of farm inputs is a serious economic constraint to farming activities in the Region. The

grand mean of farmers' constraints to use of improved sweetpotato production technologies was 1.84, indicating that generally, the farmers had no constraint in use of the sweetpotato production technologies disseminated to them. According to Njoku and Anedo (2017), constraints to sweetpotato production include lack of capital, high labour cost, low prices, and destruction of crops by animals, pest and diseases and lack of land.

**Table 2: Farmers' level of use of improved sweetpotato production technologies (n=201)**

| Technologies | Mean | Decision |
|---|---|---|
| Improved sweetpotato varieties | 2.93 | Used |
| Sweetpotato intercropping | 2.40 | Used |
| Land preparation methods | 2.86 | Used |
| Vine cutting (3 and 4 nodes) | 2.42 | Used |
| Plant spacing (30cmx30cm) | 3.13 | Used |
| Planting time | 2.98 | Used |
| Herbicide | 2.27 | Used |
| Weeding (1st and 2nd) | 3.05 | Used |
| Fertilizer | 2.20 | Used |
| Earthen-up | 2.86 | Used |
| Insecticide | 2.01 | Used |
| Proper harvesting time | 3.05 | Used |
| Grand mean | 2.68 | Used |

*Source: Field Survey, 2023. Note: Not used ≤ 2.00, Used ≥ 2.00 and above. Bench mark mean score= 2.00*

**Table 3: Farmers' constraints in use of improved sweetpotato production technologies**

| Constraints | Mean | Decision |
|---|---|---|
| Low Finance | 2.75 | Constraint |
| Lack of land | 2.16 | Constraint |
| Unavailability of improved sweetpotato varieties | 1.15 | Not Constraint |
| High cost of the improved vine | 1.42 | Not Constraint |
| High cost of fertilizer | 2.40 | Constraint |
| High cost of herbicides | 2.51 | Constraint |
| High cost of insecticides | 2.31 | Constraint |
| Susceptibility to diseases and pests | 2.02 | Constraint |
| High cost of labour | 2.54 | Constraint |
| Unavailability of market | 1.18 | Not Constraint |
| Low demand of sweetpotato roots | 1.04 | Not Constraint |
| Low demand of sweetpotato vines | 1.54 | Not Constraint |
| Storage problem | 1.28 | Not Constraint |
| Climate Change | 1.43 | Not Constraint |
| Grand total | 1.84 | Not Constraint |

*Source: Field Survey, 2023 Note: ≤ 2.00 Not constraint, ≥ 2.00 Constraints. Bench mark mean score = 2.00.*

**Relationship between Selected Farmers' Socioeconomic Characteristics and Use of Improved Sweetpotato Production Technologies**

Table 4 shows the linear regression analysis of relationship between selected socioeconomic characteristics and farmers' use of improved sweetpotato production technologies. The $R^2$ value of 0.7870 implies that about 78.70% of the variation in use of improved sweetpotato production technologies by the respondents was explained by independent variables. F-ratio of 41.799*** was also highly significant at 1%, indicating goodness of fit.

Variables such as sex, education, marital status, household size, farming experience, farm size, and extension contact were significant. The result in Table 4 reveals that sex was significant and negative at 5% level. This implies that more female farmers were involved in sweetpotato production, and use of improved sweetpotato production technologies in the study area. This is in conformity with the report of Anozie *et al.* (2015), that women in sub-saharan Africa perform over 60% of farming activities and use improved technologies in farming.

Educational attainment was found to be significant at 1% level and is positively related to use of the improved sweetpotato production technologies. This implies that increase the level of education will lead to corresponding increase in use of the technologies disseminated. Farmers possess formal education and this will boost their interest to use improved production technologies of sweetpotato in sweetpotato farming. This is in conformity with findings of Tijani and Sanusi (2019) who stated that education is an important socioeconomic factor that influences farmers' awareness, reception and transfer of innovations that can bring about increase in production.

Marital status was highly significant and positive at 1% level. This implies that more married people used the improved sweetpotato production technologies disseminated in South-East. It is expected that married farmers usually get involved in farming activities because of the opportunities they have in family labour toward farm work. This is in agreement with Olaniyi, Nwokocha and Anyaegbunam (2020), who reported that married families are likely to be involved in production practices because they have more family labour at their disposal.

Also, household size was significant and positive at 5% level. This implies that the more the number of persons in the same house, the more the utilization of improved sweetpotato production technologies. This finding is in line with the finding of Ejechi *et al.* (2022) who reported that a relatively large family is an indication for ready availability of farm labour in a traditional farming setting which reduces labour cost. The increase of household sizes suggests that more family labour would be readily available since relatively large household size is an obvious advantage in terms of labour supply, where wage rate is relatively costly. The result reveals that farming experience was significant and positive at 1% level. This implies that the more experience one had in sweetpotato farming, the more the use of sweetpotato production technologies. This finding is in line with *a priori* expectation and agrees with Kanu *et al.* (2019) who in their studies reported that experience is a major factor in the adoption of technologies and should serve as an advantage for increased investment and technology utilization. Also (Agada *et al.,* 2018) opined that long years of farming enhance efficient utilization of farm resources by small scale farmers. Farm size was revealed to be significant and negative at 1% level. This implies that use of improved sweetpotato production technologies decreased with increase in farm size. This result may be attributed to most of the farmers operating within the same farm size of land and also, having small portion of land for sweetpotato cultivation in the area. This finding disagrees with Tokula, Nwokocha and Onwuka (2020), who reported in their study that increase in farm size, increases the involvement of the farmers in crop production.

The result also, shows that extension visitation was significant and positive at 1% level. This implies that use of sweetpotato production technologies increased with increase in extension agents' visitation. This finding is in line with Ngaka and Zwane (2017), who observed that modalities used by agricultural

extension workers were very effective in disseminating improved and proven agricultural innovations to farmers. Okeke and Emaziye (2017) stated that presence of extension agents will help to enhance farmers' resources use efficiency that will culminate in increased productivity, reduced subsistence and poverty hence, improved living standard for the rural households. Hence, since the variables were significant at 1% and 5% levels, the null was therefore rejected.

**Table 4: Linear Regression Analysis of the Relationship between selected farmers' socioeconomic characteristics and use of improved sweetpotato production technologies**

| Variables | Coefficient | Standard Error | t value | p value |
|---|---|---|---|---|
| Constant | 0.0980 | 0.0110 | (8.909)*** | 0.000 |
| Sex | -0.0924 | 0.0356 | (-2.595)** | 0.028 |
| Age | 0.1240 | 0.7450 | (0.166) | 1.900 |
| Educational status | 0.0563 | 0.0118 | (4.771)*** | 0.000 |
| Marital status | 0.0435 | 0.0031 | (5.370)*** | 0.000 |
| Household size | 0.0591 | 0.0290 | (2.290)** | 0.041 |
| Farming experience | 0.0860 | 0.0211 | (4.113)*** | 0.000 |
| Farm size | -0.9181 | 0.2021 | (-4.542)*** | 0.000 |
| Extension visitation | 0.0952 | 0.0258 | (3.289)*** | 0.002 |
| R Adjusted | 0.7629 | | | |
| $R^2$ | 0.7870 | | | |
| F-Statistics | 41.799*** | | | |

*Source: field survey, 2023. Note: Figures in parenthesis represent t-ratios; *** = at 1% and ** = at 5% significant levels.*

## CONCLUSION AND RECOMMENDATIONS

The study concluded that the farmers used the improved sweetpotato production technologies disseminated to them and they had low constraints generally in the use of the technologies. The study also, revealed that there were some socioeconomic factors influencing the use of the technologies disseminated such as sex, educational level, marital status, household size, farming experience, farm size and extension visitation. Therefore, it is recommended that male farmers need to get actively involved in cultivation of sweetpotato and to make use of its improved production technologies to increase sweetpotato production since it was found in this study that women dominated in sweetpotato farming. Also, Extension agents of Agricultural Development Programmes (ADPs) in Ebonyi States should work effectively in order to reach out to sweetpotato farmers in the villages, since the respondents indicated that extension agents' visitation were not regular.

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