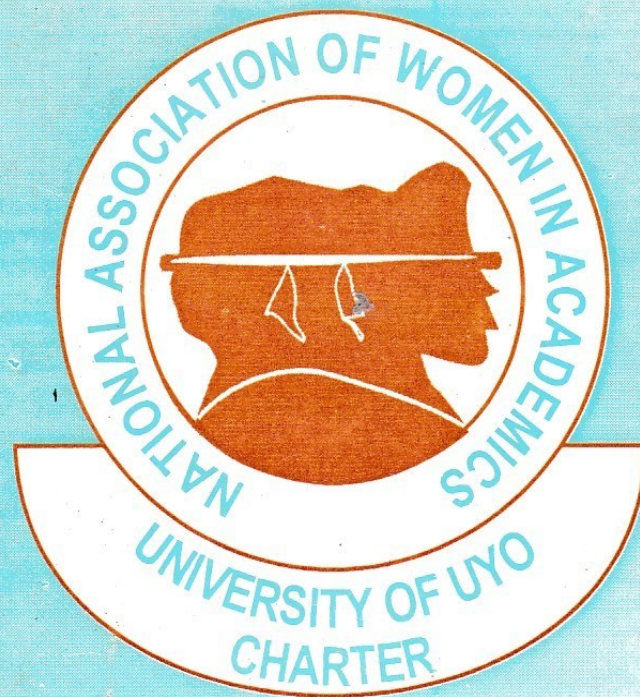


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Levels of Awareness and Adoption of Innovation on Sweet Potato by Farmers and Food Processors in Akwa Ibom State, Nigeria

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Abstract

This study was undertaken to determine the levels of awareness and adoption of innovations on sweet potato "*Ipomea batatas*" (local name-ediam) among farmers and food processors in Uyo zone of the Akwa Ibom Agricultural Development Programme. Fifty (50) farmers/processors were sampled for the study and results presented using descriptive statistics. Findings revealed that respondents recorded a high level of awareness in only 4 of the 17 innovations presented for verification, while none of the innovations was adopted on a sustained basis. The generally very low status accorded potato production and consumption in the food security plan of the state has been noted and appropriate recommendations proffered to rectify the anomaly.

Introduction

A nation's potential for qualitative and sustainable national development is enhanced by her ability to feed her teeming populace. It has been ascertained (Dresrusse, 1996) that population growth is perhaps the most crucial variable in the food security equation of any country. This is because while annual population growth rate increases geometrically, food production growth rate increases only in arithmetical proportions. Nigeria's average population growth rate of about 2.9% and its impact on economic welfare, is of particularly serious worry (World Bank 2000).

Against this background, there is an urgent need to increase food production and reverse the deleterious trend of agro-stagnation and decline, in Nigeria. Despite the series of strategies that have been embarked upon to improve agricultural production in Nigeria, staple food production has not kept pace with population growth rate (World Bank, 2000). One important strategy which has not been utilized

though, is that of raising the levels of awareness, cultivation and consumption of some hitherto neglected food crops. Dresrusse (1996) asserted that only 200 of the 50,000 edible plants found in the world are regularly cultivated. He also averred that only 15 percent of all crop species are responsible for 90 percent of the world's food.

One of such undervalued food crops is the sweet potato (*Ipomea batatas*) locally called in Ibibio "ediam". Sweet potato is a warm weather dicotyledonous starchy tuber/root vegetable crop. It is presently considered a minor root crop in Nigeria as it is grown only in a few restricted areas. The volume of production is also limited, with areas cropped annually estimated at about 200 – 300,000 hectares (ha). The crop however has a short growth cycle of between 3- 5 months, depending on variety; and a high yield potential of between 5 -20 tonnes per hectare. It may also be grown over a wide range of climatic conditions (NRCRI, 1987; IITA, 1983; Komolafe et al., 1980; Agboola, 1979) IITA., (1989) also asserted that the number of sweet potato cultivators is larger than those of yam, cassava or coco yam and that the sweet potato family (*Convolvulaceae*) include about 45 genera and 1000 species.

The contribution of sweet potato to human diet is not principally energy but also protein, vitamins and minerals. Sweet potato contains a protein caloric ratio higher than that of other root crops, its biological value is better than that of cow milk, it also contains high level lysine, it is especially rich in Vitamin "C" and is a moderately good source of iron, phosphorus, magnesium and calcium (Akoroda and Arene, 1986). Essentially, if properly harnessed, sweet potato can help solve the problem of food wastage due to its varied methods of utilization, either in processed (chips, fried, flakes and powder) or unprocessed form. The leaves are also useful for preparing drugs and are utilised as cover crops (Akoroda, 1994; Bender, 1987; Akoroda and Arene, 1986).

Sweet potato has of recent been receiving much attention in the food security plan of some African countries and states in Nigeria. However not much has been heard about the plans of governmental and non-governmental bodies to incorporate sweet potato production and utilization in the food security plan of Akwa Ibom State. The Akwa Ibom Agricultural Development Programme (AKADEP) is the governmental body responsible for the improvement and sustenance of staple food production in Akwa Ibom State. It therefore becomes imperative to ascertain the efforts of this government's organization to raise the level of awareness of the populace on the important benefits derivable from the cultivation and utilization of sweet potato as a staple food source. It is also important to determine the level of awareness and adoption of a particular innovation because the manner in which farmers/consumers become aware of and ultimately adopt a new technology, product or service, is important to the existence and effective functioning of any extension agency, as it aids to perfect its strategies for future extension activities.

Against this background, this study was undertaken to examine innovations associated with the production and processing of sweet potatoes in Akwa Ibom

State and to ascertain the level of awareness and adoption of innovations on potato, by crop farmers and food processors in the study area. It is hoped that this study will identify constraints militating against the cultivation and utilization of sweet potato as a staple food crop and based on findings, proffer useful recommendations to enable this utility staple food crop contribute its own quota to the alleviation of hunger and enhancement of food security in Akwa Ibom State of Nigeria.

Methodology

The study was conducted in 1999 in Uyo zone of the AKADEP which comprises 7 blocks, all distributed within 5 Local Government Areas, viz; Uyo, Uruan, Itu, Ibiono-Ibom and Ibesikpo Asutan. For the purpose of this research, 50 farmers and processors were randomly selected during a joint meeting of members of the Uyo zone of Nigeria Farmers Organisation (NFO), AKADEP, and Women in Agriculture (WIA) groups.

Data was collected through interviews and two sets of structured questionnaires. The first questionnaire which was targeted at extension agents of the AKADEP, contained evaluative questions on recommendations introduced to their clientele (farmers/processors) on sweet potato production. The second questionnaire targeted at farmers / processors, consisted of evaluative questions on respondent's socio-economic background, level of awareness and adoption of introduced innovations.

Questions on levels of awareness consisted of 17 items which were measured on a 2-point likert scale of "No" (1) and Yes (2), respectively; while questions on levels of adoption also consisted of 17 items measured on a 3 point likert scale of "Regularly" (3); "Sometimes" (2) and "Not -At -All" (1). Data analysis involved use of simple descriptive statistics. Validation of instrument was by "face" validity, while a test-retest reliability yielded a coefficient of 0.80.

Results and Discussion

Innovations on Sweet Potato Production and Processing introduced to Farmers in Uyo Zone of AKADEP.

Innovations on Production Included:

- (a) Use of sweet potato as a cover crop to improve soil fertility and erosion prevention
- (b) Use of sweet potato to control weed proliferation in maize -yam -cassava intercropped system
- (c) The leaves and the stems are introduced as effective for vines which are planted for the production of "seed plants"
- (d) Mounds and ridges introduced with increasing yields per hectare
- (e) Late planting system introduced into sweet potato production principles
- (f) Sweet potatoes are introduced as excellent in the crop rotation system.

- (g) Good effect of plant spacing and planting times on the performance of sweet potatoes intercropping system
- (h) In-ground storability of sweet potatoes.
- (i) The use of herbicides called Amiben for the control of weeds and insecticides to control pests and diseases.
- (j) Introduction of improved unsweetened varieties.
- (k) The unique field maturity of only 4 -5 months, which is uncommon to other root crops.
- (i) The curing of sweet potatoes before storage to increase the shelf life.

Innovations on Processing Methods were:

- (a) The use of leaves and vines for feeding rabbits and the tubers for feeding pigs and other livestock.
- (b) Potato leaves are used as drugs for curing ailments, for example oedema.
- (c) The use of potato leaves as vegetables for food.
- (d) Leaves and tubers used for the preparation of the local delicacy, "Ekpang nkukwo".
- (e) Sweet potatoes mixed with food crops as in the preparation of African delicacies and snacks.
- (f) Potato tubers can be cut and fried as chips
- (g) The tuber can be processed into flour for baking of breads, biscuits, pies and rolls
- (h) The tubers can be processed into porridges, pottage and other African dishes like "Amala"
- (i) The tuber can be prepared into baby foods like "Nan".

Socio-Economic Characteristics of Respondents

Table 1 reveals that 70 percent of the respondents were male; 41 percent of the respondents were married and 54 percent were in the 41 -60 years, age range. Findings also indicated that a majority of the respondents were literate, since 68 percent had acquired a secondary level of education. Seventy-four percent of the respondents were fully involved in farming and/or processing as a major occupation, 52 percent of whom had acquired farming experience ranging between 6 - 10 years. It was also ascertained that 60 percent of respondents practiced their vocation on a land area of less than 1 hectare (ha), while the remaining 40 percent had land sizes ranging between 1 – 5 ha.

Eighty six (86) percent of the respondents were full-time crops enterprise (only) farmers, while only 22 percent included sweet potato in their crop mixture. All the potato farmers planted the sweet potato (ediam) variety on their farms, i.e. none planted any improved variety nor Irish potato. Forty-five percent potato farmers asserted that they acquired first hand awareness of potato crops from their parents,

while only 27 percent acquired potato cultivation awareness from extension agents.

It was also revealed that extension agents/agencies accounted for only a paltry 27 percent of avenues for potato stock (planting material) acquisitions, while 54 percent potato cultivators claimed to acquire planting stock from the previous season's harvest.

Awareness of Innovations on Sweet Potato

Table 2 reveals that out of the 17 innovations on potato production and processing presented to the respondents for verification, they recorded a high level of awareness in only 4 of such innovations. Three of the innovations in which respondents recorded a high level of awareness were related to food processing, while the fourth innovation to which a high level of awareness was recorded, was agronomic in orientation. The four innovations are:

- (i) Sweet potato may be mashed into baby food and prepared as porridge and pottage foods ($x = 1.8$; $s = 0.36$)
- (ii) Sweet potato may be cooked with beans for food (pottage beans) ($x = 1.76$; $s = 0.28$)
- (iii) Sweet potatoes may be sliced and fried into chips for eating ($x = 1.74$; $s = 0.24$)
- (iv) Sweet potatoes may be planted on mounds ($x = 1.54$; $s = 0.04$).

A general overview of the levels of awareness of the stated innovations in (Table 2) reveals that innovations on processing generally scored higher levels of awareness than innovations that are agronomic in nature. The reason for this trend was explained by the AKADEP Zonal Extension Officer and Director of Technical Services at the AKADEP head quarters, to be due to the fact that agronomic oriented innovations on sweet potato production are in the On-Farm Adaptive Research (OFAR) trial stages on research farms and have not yet been practicalised on farmers' plots. In essence, only very few farmers have actually witnessed innovations on potato production on any farmer's plot. Conversely however, the WIA section of the AKADEP has taught innovations on potato processing methods to many women groups. The WIA sector of the AKADEP however attributes the low level of awareness of the innovations to the fact that the crop is not a popular staple food in this part of the country. Processors may therefore not even come across the tubers to buy and process for sale as food, and even if they did, the demand may be too low to sustain the enterprise. AKADEP, however, revealed that the level of awareness of potato as an important staple food may be higher in Eket Zone (especially Eket and Onna LGAs) due to a preponderance of foreigners who may demand the food crop.

(i) Adoption of Innovations on Sweet Potato

Table 3 reveals that none of the listed 17 innovations on sweet potato was adopted on a sustained basis. This, of course, is attributable to the generally low level of awareness of sweet potato as an important staple food crop.

Conclusions and Recommendations

Sweet potato is an important root crop with a lot of potentially beneficial characteristics, which may be harnessed to enhance the dwindling food security situation in Nigeria and Akwa Ibom state. This study has however revealed the low status the crop is accorded in Akwa Ibom State food security plans, down to the deplorable extent of sweet potato not being mentioned in the annual reports of AKADEP - the main body responsible for the improvement and sustenance of staple food crop production in Akwa Ibom State. The study has also revealed reasons for the low level cultivation and consumption of this important crop and the relatively low level of awareness and absolute lack of application of innovations associated with the production and processing of this all important crop; inclusive of the fact that AKADEP has not done much to popularise the cultivation of this crop, as the programme is yet to embark on Small Plot Adoption Techniques (SPAT) for potato crop on farmers' plots. It is very important to raise the general level of the awareness and ultimate adoption of this all important staple food crop in the Akwa Ibom society. Against this background the following recommendations become pertinent:

- (i) Enlightenment campaigns and jingles should be sponsored on radio and television network, to raise awareness on the importance of sweet potato as an important staple food. Special focus should be targeted at espousing the values of sweet potato on the popular radio/television programme "Oto Inwang"**
- (ii) Pamphlets should be produced and distributed as advertisement tools to highlight the usefulness and nutritive value of sweet potato.**
- (iii) The State Ministry of Agriculture and AKADEP should organize seminars, symposia, workshops and agricultural shows, throughout the state; in order to espouse the qualities of sweet potato, with regards to: short maturity duration, high protein content, medicinal value and potential as animal feed. All the above is necessary to eradicate the erroneous perception of sweet potato as an inferior crop.**
- (iv) Efforts should be made to introduce sweet potato into the Agric Science syllabus of primary and secondary schools. Also Faculties of Agriculture should impart adequate knowledge and ensure adequate practical application of sweet potato cultivation and processing among the students.**
- (v) It is also essential for the government and relevant agencies to make available improved inputs especially improved potato cultivars for adoption by potato**

farmers. Efforts should be targeted at the urban populace and in this wise, the government should motivate extension agents and supply all necessary logistic support, to enable them demonstrate improved methods of potato cultivation and processing, to the expectant populace.

In conclusion it should be noted that potato production and consumption can be made to occupy its rightful place in the food security plan of Akwa Ibom State. It is a well-known fact that it can be substituted for cassava in many instances (IITA, 1989). This can be done with the benefit of hindsight concerning the popularization and whole sale utilization of soyabean, which was hitherto unknown in the state. It is hoped that the recommendations proffered above will be well implemented to make the dream of adequate food security in Akwa Ibom State, a reality.

Table 1: Frequency Distribution on Socio-Economic Characteristics of Respondents

| S/NO | Characteristics | | Percentage (%) |
|------|-------------------------------|---------------|----------------|
| 1. | Sex of Respondents | Frequency (f) | |
| | Male | 35 | 70.0 |
| | Female | 15 | 30.0 |
| 2. | Marital Status | | |
| | Married | 41 | 92.00 |
| | Single | 9 | 18.00 |
| 3. | Age (Years) | | |
| | Less than 20 | 3 | 6.00 |
| | 21 – 40 | 3 | 6.00 |
| | 41 – 60 | 14 | 28.00 |
| | More than 60 | 27 | 54.00 |
| | | 6 | 12.00 |
| 4. | Educational Status | | |
| | Adult education | 1 | 2.00 |
| | Completed Primary Education | 12 | 24.00 |
| | Completed Secondary Education | 24 | 68.00 |
| | Completed Tertiary Education | 3 | 6.00 |
| 5. | Major Occupation | | |
| | Farming / Processing | 37 | 74 |
| | Business | 5 | 10 |

| | | | |
|-----|---------------------------------------------|----|-------|
| | Civil Service | 8 | 16 |
| 6. | Farming/Processing Experience | | |
| | Less than 5 years | 11 | 22.00 |
| | 6 years | 26 | 52.00 |
| | More than 10 years | 13 | 56.00 |
| 7. | Farm Size (hectares -"ha") | | |
| | Less than 1 ha. | 30 | 60.00 |
| | 1 - 5 ha. | 20 | 40.00 |
| 8. | Type of Agriculture Practiced | | |
| | Crops only | 43 | 86.0 |
| | Livestock only | 1 | 2.0 |
| | Mixed Farming | 6 | 12.0 |
| 9. | Types of Crop Planted | | |
| | Sweet potato with other Staple food crop | 11 | 22.00 |
| | Other crops without sweet potato | 39 | 78.00 |
| 10 | First Time Awareness of Sweet Potato | | |
| | Parents | 5 | 45.46 |
| | School | 1 | 8.09 |
| | Friends | 2 | 18.18 |
| | Extension Agent | 3 | 27.27 |
| 11. | Varieties of Potato Planted | | |
| | Irish potato | - | - |
| | Sweet potato | 11 | 100.0 |
| | Improved Varieties | - | - |
| 12. | Acquisition of Planting Stock | | |
| | Extension Agent | 3 | 27.27 |
| | Local market | 6 | 54.55 |
| | Storage from previous harvest | 2 | 18.18 |

Table 2: Levels of Awareness of Innovations on Sweet Potato

| S/N | INNOVATIONS | Responses | | Total Awareness Score | No. of Respondents | Mean Score (X) | Standard Deviations | Remarks |
|-----|-----------------------------------------------------|-----------|--------|-----------------------|--------------------|----------------|---------------------|----------------|
| | | No. F. | (1) P. | | | | | |
| 1. | Use as cover crop for fertility | 30 | 70.0 | 15 | 30.0 | 65 | | Not Aware (NA) |
| 2. | Use of leaves for vines & seed plant | 38 | 76.0 | 12 | 24.0 | 62 | | NA |
| 3. | Use of leaves for rabbit & tubers for pigs | 34 | 68.0 | 16 | 32.0 | 66 | | NA |
| 4. | Use of improved variety to prevent weavil attack | 37 | 74.0 | 13 | 26.0 | 63 | | NA |
| 5. | Planting on mounds & ridges for increased yield | 23 | 46.0 | 27 | 54.0 | 66 | | Aware |
| 6. | Maturity in about 4 months | 34 | 68.0 | 16 | 32.0 | 66 | | NA |
| 7. | Use of leaves to cure oedema | 42 | 84.0 | 8 | 16.0 | 58 | | NA |
| 8. | May be stored underground to avoid wastage and glut | 34 | 68.0 | 16 | 32.0 | 66 | | NA |
| 9. | Should be cured before storage | 35 | 70.0 | 15 | 30.0 | 65 | | NA |
| 10. | Cut & fried into chips for food | 13 | 26.0 | 37 | 74.0 | 87 | | Aware |
| 11. | Mashed and used as baby food | 7 | 14.0 | 43 | 86.0 | 93 | | Aware |
| 12. | Cooked with beans (pota beans) | 12 | 24.0 | 38 | 76.0 | 88 | | Aware |
| 13. | Grated with yam for local delicacy (Ekpang nkukwo) | 31 | 62.0 | 19 | 38.0 | 69 | | NA |
| 14. | Processed into flour for bread, confectionaries | 35 | 70.0 | 15 | 30.0 | 65 | | NA |
| 15. | Can be intercropped with other food crop | 41 | 82.0 | 9 | 18.0 | 59 | | NA |
| 16. | Use for Ice-cream & Custard | 40 | 80.0 | 10 | 20.0 | 60 | | NA |
| 17. | For puree, pudding & candies | 41 | 82.0 | 9 | 18.0 | 59 | | NA |

Note: (i) $F = \text{Frequency}$

(ii) $P = \text{Percentage}$

(iii) For Mean (X) - Cutoff point = 1.50

Table 3: Levels of Awareness of Innovations on Sweet Potato

| S/ N | INNOVATIONS | Not At All (1) | Responses Sometimes (2) | Regularly (3) | Total Adoption Score | No. of Resp. | Mean Score (X) | Standard Deviations | Remarks |
|---------|-----------------------------------------------------------|-------------------|----------------------------|------------------|----------------------------|-----------------|----------------------|------------------------|----------------|
| | Frequency of: | | | | | | | | |
| 1. | Use as cover crop | 39 (78.0) | 8 (16) | 3 (6) | 64 | 50 | 1.28 | 1.82 | Not Adopted |
| 2. | Use of leaves for vines & seed plants | 50 (100) | 0 (0) | 0 (0) | 50 | 50 | 1.00 | 1.0 | N/A |
| 3. | Use of leaves for rabbit & tubers for pigs | 46 (92.0) | 4 (8) | 0 (0) | 50 | 50 | 1.08 | 0.18 | N/A |
| 4. | Planting of improved varieties | 50 (100.0) | 0 (0) | 0 (0) | 50 | 50 | 1.00 | 1.0 | N/A |
| 5. | Planting on mounds & ridges | 39 (7.80) | 3 (6.0) | 8 (16.0) | 69 | 50 | 1.38 | 0.74 | N/A |
| 6. | Maturity in about 4 months | 42 (84.0) | 5 (10.0) | 3 (6.0) | 61 | 50 | 1.22 | 0.84 | N/A |
| 7. | Use of leaves to cure oedema | 43 (86.0) | 4 (8.0) | 3 (6.0) | 60 | 50 | 1.2 | 0.89 | N/A |
| 8. | Stored underground | 39 (78.0) | 10 (20.0) | 1 (2.0) | 62 | 50 | 1.24 | 0.83 | N/A |
| 9. | Curing before storage | 39 (78.0) | 7 (14.0) | 4 (8.0) | 65 | 50 | 1.30 | 0.80 | N/A |
| 10. | Cutting into chips & frying before eating | 14 (28.0) | 31 (62.0) | 5 (10.0) | 91 | 50 | 1.82 | 0.25 | N/A |
| 11. | Use as baby food | 50 (100.0) | 0 (0) | 0 (0) | 50 | 50 | 1.0 | 1.0 | N/A |
| 12. | Mixed with beans for food (pota beans) | 17 (34.0) | 25 (50.0) | 8 (16.0) | 91 | 50 | 1.82 | 0.25 | N/A |
| 13. | Grated with water/yam for "Ekpang nkukwo" | 48 (96.0) | 2 (4.0) | 0 (0) | 52 | 50 | 1.04 | 0.99 | N/A |
| 14. | Processed into flour for bread & other confectioneries | 50 (100.) | 0 (0) | 0 (0) | 50 | 50 | 1.0 | 1.0 | N/A |
| 15. | Intercropping with other crops | 39 (78.0) | 5 (10.0) | 6 (12.0) | 67 | 50 | 1.0 | 1.0 | N/A |
| 16. | Used for Ice-cream & Custard | 50 (100.0) | 0 (0) | 0 (0) | 50 | 50 | 1.0 | 1.0 | N/A |
| 17. | Used for puree, pudding & candies | 50 (100.0) | 0 (0) | 0 (0) | 50 | 50 | 1.0 | 1.0 | N/A |

Note: (i) Percentages are in parentheses

(ii) For mean (X) – cutoff point = 2.0

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