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Analysis of Sweet Potato Potentials among Farmers in a Part of Oyo State, Nigeria

By

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Abstract: The study investigates value-addition into sweet potato due to its seemingly wide acceptance by small-scale farmers in a part of Oyo State, Nigeria. A purposive random sampling technique was adopted to select one hundred farmers from five villages known for potato productions. Data sets were subsequently collected through questionnaire administration and analysed by frequency counts and chi-square test statistics. The results of the analyses showed that majority of the farmers were male (52%), more than 60% are youth, 56% are married while 79% are educated. Although, farmers' secondary occupations are driving, sewing, trading, and carpentry, but, majority (60%) of respondents cultivate sweet potato farming during raining season but on small pieces of land resulting in low yields as well. This culminated into poor production of sweet potato in the study area. Despite this, a high social value for sweet potato was established as shown by huge consumption of its recipes for various reasons including 33% who consume for no particular reason. This shows that farmers consume potatoes beyond their production level and might imply additional buying of sweet potato when they run out of stock. The study recommended that stakeholders in agriculture should embark on massive campaign on innovation of sweet potato production whilst farmers should be enlightened on the further potentials of sweet potato recipes among others.

Introduction

Sweet Potato (*Ipomoea Batata*) is a root and tuber crop and its production, marketing and utilization have expanded in the last decade to almost all ecological zones of Nigeria. It is rich in carbohydrate, starch, protein, fats; fibre, vitamin B-complex and these qualities make it a highly reliable source of food energy, sweeteners and industrial raw materials. In Nigeria, its production is largely rain fed while in the northern zones; planting is done along riverbank and irrigation canals. Yields have increased from farmers' pre-research era of 2-3 tonnes/ha to 30-40 tonnes due to the availability of improved varieties. As of 2008, Nigeria is the first largest producer of sweet potato in Africa with 3.46million tonnes being produced annually. Globally, Nigeria is the second largest producer, China topping the list with 106,197,100MT (FAO, 2008). The

fresh tuber is usually boiled, baked, roasted, and made into varieties of recipes such as sweet potato flour (Sparri), sweet potato casserole, spicy sweet potato wedges, sweet potato pudding among others (Health Media Venture, 2011). Sweet potato production has been established as a profitable enterprise which gives a reasonable benefit returns. For instance any N1.00 invested in sweet potato production gives a profit of 83kobo (45.4% profit). In other words, an input of N149, 355.20 (54.4% input) is required to 1ha of sweet potato with a monitoring return of N274, 054 and gives a financial benefit of N124, 698.80 (45.5% profit). Moreover, farmers can still earn more, only if value can be added to sweet potatoes besides the agronomic potentials and economic justification for its production (FAO, 2008). This study is therefore poised to provide solution that can strengthen the addition of enhancement to sweet potato by highlighting the common sweet potato recipes made by sweet potato farmers.

The main objective of the study is to analyse the value addition in sweet potato among small scale farmers in Atiba Local Government Area of Oyo State, Nigeria. But, to achieve this the following specific objectives are to describe the socio-economic characteristics of sweet potato farmers; examine sweet potato production level among other tuber crops, determine the sweet potato recipe consumption level by the respondents, and ascertain the constraints faced in harnessing the sweet potatoes potentials. This is expected to pave ways for agriculture stakeholders so as to strengthen value addition in sweet potato and reduce, to barest minimum, the problems confronting sweet potato farmers in the study area and Nigeria as a whole

Materials and Methods of Study

This study was carried out in Atiba Local Government Area of Oyo State, Nigeria following its obvious interest in sweet potato production. This study has an area of 1,757km² and a population of 168,246 (NPC, 2006). The climate is equatorial, characterised with dry and wet seasons and has relatively high humidity. The dry season lasts from November to March while the wet season starts from April and ends in October. Average daily temperature ranges between 25 °C (77.0 °F) and 35 °C (95.0 °F), almost throughout the year and this favours agriculture generally practices in any area (Encyclopaedia of African-American Heritage, 2013). The sample size for the study is one hundred (100) sweet potato farmers randomly selected from Alagbon, Alaidan, Ijawaya, Tokun and Oweyo

villages. These villages were purposively selected for their illustriousness in sweet potato production as well as consumption among other villages in the study area. Subsequently, questionnaire schedule was used to solicit the required data for the study. The socio-economic characteristics of sweet potato farmers and post-harvest activities were the independent variables while dependent variables were the consumption level and constraints militating against harnessing the sweet potato potentials by the sampled farmers. Chi-square analysis was used to determine the relationship between the socio-economic activities and sweet potato production level, and also the effect of sweet potato recipes on farmers' level of consumption.

The farmers were presented with a list of tuber crops and were asked to signify crops cultivated among all, each with reference to land space and yield accordingly. The consumption level of farmers were determined by asking respondents to list sweet potato recipes of their choice and to answer questions on how often they consume the chosen recipes. On post-harvest activities carried out on sweet potato by the farmers, the farmers were presented with four (4) post-harvest activities and asked to signify their choice and in addition to specify any other one not included in the questionnaire. Their constraints against harnessing sweet potato potentials were generated by presenting constraints confronting them and they were asked to rate each on a 5-point Likert's scale of Very severe (5), Severe (4), and Undecided (3), Very not severe (2), Not severe (1).

Methods of Data Analysis

The results of the data analyses show that 52% of the respondents are male while 48% are female (Table 1). It was also found that 54% of the farmers have a household size of 2-5. Nonetheless, 32% of them have a household size of 6-9, 10% of respondents have a family size of 10-13 while 4% have a size of 14 household members (Table 1). Obviously, the study area is dominated by the educated ones as those with secondary education constitute 30%, 21% are illiterates, 20% made it to tertiary education level, 16% are adult learners while only 13% have primary education (Table 1). 44% are traders in farmers' markets and they sell agricultural inputs, 26% of them are tailors, 14% takes on fishing while others who venture into carpentry, bricklaying, driving and vulcanizing among others constitute 16% of the respondents (Table 1).

Table 1: Socio-economic Characteristics of Respondents (n=100)

Characteristics	Percentage	Characteristics	Percentage
Gender		Household size	
Male	52.0	2-5	54.0
Female	48.0	16-9	32.0
Age		10-13	10.0
18-27	17.0	14 & Above	04.0
18-37	27.0	Level of Education	
38-47	27.0	Illiterate	21.0
48-57	19.0	Adult Education	16.0
58 & Above	10.0	Primary Education	13.0
Marital Status		Secondary Education	30.0
Single	20.0	Tertiary Education	20.0
Married	56.0	Secondary Occupation	
Divorced	09.0	Fishing	14.0
Widowed	15.0	Trading	44.0
		Sewing & Others	42.0

Source: The Authors.

Comparison of tuber crops production level by the farmers

Table 2 shows that 74% of the farmers allocate 1-3hectares of land area while 26% allocate 4-6hectares of land for the production of tuber crops.

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Table 2: Lands cultivated by respondents (Hectares)

	Range	Percentage
Sweet Potato	1-3	74
	4-6	26
Yam	1-5	55
	6-10	2
	11-15	2
	No response	17
Cassava	1-10	79
	11-20	10
	No response	11
Cocoyam	1-3	62
	4-6	04
	No response	34

Source: The Authors

It was also found that only 2% of farmers harvest 31-35 bags/hectare and another 9% harvest 26-30bags/hectare. This is closely followed by 11% who harvests 21-25bags/hectare while 6% of respondents have yields of 16-20bags/hectare. Again, 9% of respondents get 11-15bags/hectare. However, many of the farmers in the study (39%) harvest 6-10bags/hectare yield and the least yields range from 1-5bags/hectare and this is acclaimed by 24% of farmers (Tables 2 & 3).

Table 3: Tuber Yields Produced by Respondents (Land/Ha)

Yield/Ha	Range	Percentage
Sweet potato	1-10	63
	11-20	15
	21-30	20
	31-40	2
Yam	1-20	47
	21-40	23
	41-60	9
	61-80	21
Cocoyam	1-20	65
	21-40	1
	No response	34
Cassava	1-30	44
	31-60	33
	61-90	9
	91-120	1
	120-150	2
	No response	11

Source: The Authors.

It was shown that 32% of respondents regard chips as their choice, 18% like flour, 13% of them chose cake and porridge as their favourites. Boiled sweet potato is favourably consumed by 12% of the farmers, 6% of people cannot have

other delicacies over roasted potato while 1% of the respondents signify that they cultivate sweet potato for the income only (Table 4).

Table 4: Respondents' Preparation and Favouritism for Sweet Potato Recipe

Sweet Recipe	Potato	Frequency	Percentage	Preparation
Chips		32	32	Peeling, slicing, washing, salting, draining & frying
Flour		18	18	Peeling, slicing, washing, draining, sun drying & grinding
Cake		13	13	Peeling, slicing, washing, grating, spicing & frying
Porridge		13	13	Peeling, slicing, washing, boiling & spicing
Powder		5	5	Peeling, slicing, washing, draining, drying, grinding & sieving
Roasted		6	6	Washing, draining & roasting
Boiled		12	12	Washing, salting, boiling & peeling
Income Only		1	1	

Source: The Authors.

Consumption Levels of sweet potato productions

Consumption level of recipes with reasons by respondents is analysed based on the assertion that "the demand for sweet potato products is a reflection of the social value ascribed to it". Table 4 shows that 19% consume recipes on daily basis, 29% take any of the recipes once in a week, 38% of farmers eat it twice in a week while 6% of respondents consume it monthly and 8% specify that they consume as they wish. The sweetness is the reason for 19% of respondents, 25% based it on choice, 10% said it is because they would prefer to

ce, 18% like
Boiled sweet
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eat it along with other foods and 9% of the farmers indicated that the ease of preparation is their reason for consumption. Aroma or flavour for 2%, another 2% of respondents acclaimed it to seasonal availability of sweet potato while 33% of farmers do not have any reason for the consumption (Table 5).

Table 5: Respondents' reasons and consumption level of sweet potato recipes

Consumption Level	Percentage
Everyday	19
Once a week	29
Twice a week	38
Monthly	6
Occasionally	8
Reasons for consumption rates	
Sweetness	19
Choice	25
Other foods	10
Ease of preparation	9
Aroma/Flavour	2
Seasonal Availability	2
No reason	33

Source: The Authors

The value addition in sweet potato is further determined among farmers through their post-harvest activities. 35% of respondents wash sweet potato tubers after harvest, 24% of them preferred grading, and 21% do separate sweet potato into different baskets for better prices (sorting) while 17% engaged in air-drying potato tubers to prolong its shelf life before marketing and others constitute 3% signify cooling (Table 6).

that the ease
2%, another 2
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potato recipes

Table 6: Post-harvest activities adopted by respondents

Activities	Frequency	Percentage
Washing	35	35
Air Drying	17	17
Sorting	21	21
Grading	24	24
Cooling	3	3

Source: The Authors

Constraints on the harnessing of sweet potato potentials

Table 7 itemises factors limiting the maximisation of sweet potato potentials as submitted by respondents. This was analysed using the Likert's scale to ascertain the severity of each constraint. Although other constraints militate against harnessing sweet potato potentials in Atiba L.G.A, financial constraint (45% signify a very severe), equipment for processing is another constraint (39% signify very severe) and inadequate information (34%-very severe) constitute the major problems.

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Table 7: Respondents' constraints in harnessing the potentials of sweet potatoes

Likert's Scale	CONSTRAINTS					
	Lack of Finance	Inadequate Information	Processing Equipment	Poor Market	Unfavourable Consumption Habit	Indigenous Post- Harvest Activities
Not Severe	2	5	7	5	2	7
Very Not Severe	15	11	14	20	25	23
Undecided	15	17	18	20	23	19
Severe	23	33	22	32	24	23
Very severe	45	34	39	23	26	27

Source: The Authors

In Table 7, the effect of respondents' socio-economic characteristics on the sweet potato production level is tested, and the calculated values are insignificant when compared with decision rule. It is therefore glaring that there is no significant relationship between socio-economic characteristics of respondents and their production level of sweet potato.

potatoes

Indigenous
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Harvest
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Table 8: Chi-square analysis for effect of respondents' socio-economic characteristics on sweet potato production

Socio-economic Characteristics VS Sweet Potato Production				
		X ²	P-Value	Remark
7	Gender	3.561	0.736	NS
23	Age	28.440	0.242	NS
	Marital Status	17.161	0.512	NS
19	Household Size	10.619	0.910	NS
23	Education Level	21.242	0.624	NS
27	Secondary Occupation	26.984	0.079	NS

Decision rule $P < 0.05 = S$

Source: The Authors. NS= Not Significant

Discussion of Results

The results showing the gender distribution in Table 1 could be interpreted to mean that there is no gender disparity in their farming occupation even though there are fewer women than men. Further analysis of this result may indicate that the reason for the little difference could be due to other domestic chores handled by women. The belief in the sampled localities is that husbands' lands belong to the wife and she can cultivate the land if she wishes, even daughters who had gone out to marry and wishes to farm can still cultivate on their fathers' lands.

Observation during field survey reveals that family size is an important source of labour among small scale farmers. Notwithstanding the figures presented in Table 1, farmers still hired labour to complement their family efforts. Education levels among respondents is reasonably high. This shows that diffusion and adoption of agricultural innovation might not be a problem among

them. It was also found that farmers in the study have other occupation besides their major source of income. This implies that their livelihood does not depend on farming (Table 1). The table also shows that age has a bearing on farming productivity especially among the small scale farmers.

This is because small scale farmers largely depend on their strength and implements for efficiency and that is why youth (age categories of 28-47) constitute 27%, engage in farming more than others in the study (Table 1). Youth of 18-27 (17%) are few in farming activities because most of them are students who are probably busy with their studies while the aged ones (above 58 years) constitute 10% indicating that farming activities diminish with age. Marital status of the respondents show that 56% are married and they dominate the study population, this is followed by 20% who are single, and the widows (15%) outnumbered the divorced who constitute only 9% (Table 1). It is totally surprising to find this little population among the farmers in the study because the death of their husbands must have left them with family responsibilities which they could alleviate with farming occupation.

The comparative analysis of sweet potato production among other tuber crops shows that the land allocated to sweet potato as well as on-farm additional enhancement are very poor (Table 2). Furthermore, none of the respondents indicated that they do not consume sweet potato recipes as Table 3 presents diversified ways of enjoying and preparing sweet potato by respondents. Table 4 shows their favouritism and likeness for sweet potato. As asserted by Fajana (2010), farmers' work do not end with harvesting but dependent on value addition and product diversification as well as ensuring that produce reach the consumer in an acceptable form at a mutually accepted price. This cannot be done at the commercial level only, but most importantly, at the domestic level. Hence, the various preparations and various recipes made from sweet potato in the study area were analysed in Table 4.

Farmers' recipes consumption is not limited to when they grow sweet potato alone but they also buy sweet potato products though there are different reasons for consuming it (Table 5). This result shows that yields of farmers are generally low. Although, it was found that all farmers cultivate sweet potato; but the cultivation is less than those of other tuber crops such as cassava and yam. Cassava and yam are therefore placed on higher premiums than sweet potato.

asides the cocoyam which is not a major concern of this research. The results of the table shows that it is not a gainsaying that sweet potato has social value among farmers in the study area especially for the singular reason that they consume to satisfy their appetite without any specific reason.

It was shown that addition of value to sweet potato is being practiced by farmers at the local level in order to reduce immediate spoilage after the harvest and make a reasonable gain from the production (Table 6). It is obvious from the result in Table 8 that there is no significant relationship between sweet potato recipes and farmers' consumption level. This means that the listed socio-economic characteristics such as age, gender, marital status, and education level do not have a significant bearing on how much of sweet potato is consumed. However, the results indicated that the educational level, number of family members, the available land of respondents and agility of youths and adults dominating the area are not being utilized to boost and promote sweet potato production in the study area, instead they give much into production and processing of cassava than any other crops as shown in Table 3.

Conclusion

Based on the findings of the study, it was observed that all farmers cultivate sweet potato albeit on small portions of land which results in low yield unlike cassava and yam production that were grown on large spans of land with higher return. Many (35%) of the farmers wash their sweet potato after harvesting. The study establishes that sweet potato is being utilized in diverse ways as evidenced in the identification of many recipes. Some respondents (25%) even consumed sweet potato without any strong reason other than choice. Hence, it could be affirmed that there is a social value for sweet potato in the study area. Nevertheless, small scale farmers still face many challenges hindering them from maximizing sweet potato potentials in Atiba Local Government area. Therefore, in order to strengthen the value addition in sweet potato among small scale farmers in the study area, the study recommends that Extension stakeholders in agriculture, for example extension workers, should embark on massive campaign on innovation of sweet potato production and products. They should enlighten farmers on both agronomic and economic potentials of sweet potato. Food nutritionist in extension service should exhibit the various recipes of sweet potato emphasising their nutritional benefits.

Agricultural Trade Fair Exhibition to create new market opportunity for sweet potato farmers. Moreover, government should render help to relief farmers' burden on storage and irrigation facilities. These will ensure sustainable agricultural production; enhance value addition and product diversification as well as increasing Nigeria agricultural production capacity at both commercial and domestic level.

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