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PERCEPTION AND ADOPTION OF YAM MINISETT TECHNOLOGY BY FARMERS IN AGRICULTURAL ZONE ONE, RIVERS STATE, NIGERIA

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Abstract

This study examined farmers' perception and adoption of yam minisett technology. The study was carried out in Agricultural Zone One of Rivers State, Nigeria. A sample size of 120 yam farmers was used for the study. Data were collected using a structured questionnaire. Data generated for the study were analyzed using descriptive statistics such as frequency count, percentage and mean scores while the Sigma method was used for calculating adoption scores to ascertain the level of adoption for the various yam minisett technology items. Results of the study revealed that there were more male yam farmers (87.5 percent) than females. The mean age of respondents was 43 years and the mean household size was 7 persons. Also, a mean farming experience of 15 years was found for the respondents. Results on perception of yam minisett technology reveal that respondents had favourable perception on four statements out of the thirteen statements used to investigate their perception. These were statements 5,6,11 and 12. The remaining 9 statements were not favourably perceived. They include statements 1-4; 7-10 and 13. There was a low adoption of 7 and an average adoption of 2 yam minisett technology items with an overall adoption score of 3.38, which indicates a low utilization of yam minisett technology by the yam farmers. The study recommends that more awareness should be created about the benefits of the technology and farmers should be trained on how to effectively use the technology.

Keywords*:* Adoption, Yam minisetts, Technique, Analysis, Dioscorea rotundata

1. Introduction

Yam (Dioscorea rotundata) is among the principal root crops of the tropics consumed by rural and urban communities. It is well adapted to various soils and climatic conditions and a variety of farming systems. Yam tuber size ranges from 100 mg to 10kg

depending on the specie. The production pattern of yams reflects the agro-climate of an area. Yam grows for 6 – 10 months requiring about 1500mm uniform rainfall distribution. It is principally produced by small- scale and large- scale farmers using traditional tools and available inputs especially for weed and pest control.

It is a prestigious staple carbohydrates food celebrated among the tribes in Rivers State and Igbos of south eastern Nigeria, second to cassava in relation to land area under cultivation (Chukwu and Ikwelle, 2000). Yams are the fifth most cultivated and harvested crops in Nigeria, after cassava, maize, guinea corn, and cowpeas. Yams also are the third most produced and harvested root and tuber crop in the tropics after cassava and potato (National Bureau of Statistics, 2012). Yams do not only serve as the main source of earnings and food consumption, but also as a major employer of labour in Nigeria. Despite the importance of yams to people, the attention to its production is still questionable (Verter and Becvarova, 2014).

According to Aighewi, Maroya and Asiedu (2014), yam plays an important role by providing cash and dietary carbohydrate to millions of people. It has industrial values and can be processed into various utility forms. Yams also have high nutritional and medicinal values. Its nutritional profile includes potassium 816 mg, Manganese 4.40 mg, Vitamin E 0.39 g, Vitamin K 2.6mg, Beta Carotene 83mg, copper, fibre and antioxidants. These values are higher when compared with nutrient contents of major staple foods such as rice, wheat, potato, cassava, soybean, sweet potato, sorghum, maize and plantain (Akubuilo, Umebali, Mgbada, Ugwu, Egwu and Awoke, 2007).

Technology is the systematic application of scientific or other organized body of knowledge to practical purposes (Akubuilo et al., 2007). This includes new ideas, inventions, innovations, techniques, methods and materials. Agricultural technologies include all the materials, techniques, practices and innovations used to maximize agricultural production (Akubuilo et al., 2007). Adoption is a decision made by an individual or group to use an innovation in a continuous manner (Akubuilo et al., 2007). Adoption is regarded by Rogers (1992) as a decision to make full use of an innovation or

technology as the best course of action available. According to Van den Ban and Hawkins (1996), adoption of innovation is the decision of an individual or group to use or apply an improved technology. The importance of this improved agricultural technology (yam minisett) has been numerous but its adoption based on socioeconomic determinants has not received much empirical attention. According to studies by Ilesanmi and Akinmusola (2016), Ajieh (2012) and Ayoola (2012), a significant relationship exists between farmers' socioeconomics characteristic and adoption of improved technology (yam minisett). These socio-economic characteristics refer to the personal predisposing factors of the farmer or decision unit who makes decisions on adoption or rejection (Tey and Brindal, 2012). Considering the vitality of above stated facts, this research work will be carried out with main objective of investigating the adoption of yam minsett technology by farmers in Rivers state agricultural zone 1. In an extensive review of literature on the socio-economic factors influencing adoption of improved technologies like yam minisett, Gbegeh and Akubuilo (2012) found that one of the reasons why such projects failed was the lack of attention to socioeconomic issues in the development of the systems as well as in the extension of the technologies. His analysis also showed that few studies focused on farmers who adopted yam minisett. The most important research gap he identified on yam minisett was a lack of sufficient understanding of factors affecting farmers' adoption behaviour.

FAO (2013) noted that the food deficit experienced in the country would have been drastically reduced if concerted efforts were made by all stakeholders in the agricultural sector to increase the productivity of root and tuber crops. Over the years, the yam industry, though profitable, has been adversely affected by a number of factors, notably the unavailability of planting material and high production costs which are also associated with the unavailability of good quality seed yam; among others Ajieh (2012). Traditionally, yam is propagated vegetatively by means of small, whole tubers, called seed yam or pieces of tubers known as "setts". The seed yams weigh between 500-1500 grams and it is these that are planted to obtain large marketable ware yams. Yam planting material (seed yam or yam setts) are often difficult to obtain, expensive and at

times of low quality (Chukwu and Ikwelle, 2000). Okoli (1991) and Okoli and Akorada (1995) also noted that the low seed-tuber ratio in yam production is considered a major factor for the high cost of planting materials.

Due to short supply of seed yam, farmers at harvest have to reserve some portion of their yam as the subsequent season's planting material. Madukwe (1997) observed that the traditional methods of seed yam production have some economic disadvantages as it encourages competition between edible/saleable tubers and the tubers used as planting material. Hence the farmer faces a "two-edged problem": his income in the current season is reduced if most ware yam is used for seed; and / or his income in the next season is reduced if most ware yam is sold or eaten.

The major objective of the study is to evaluate the farmers' perception and adoption of yam minisett technology in Rivers State agricultural zone one. The specific objectives are to: examine the socioeconomic characteristics of yam farmers in the study area; ascertain the perception of farmers' on yam minisett technology in the study area; determine the level of adoption of yam minisett technology in the study area; ascertain the reasons for the level of adoption of yam minisett technology in the study area.

2. Methodology

2.1 Study Area

The study was carried out in Agricultural Zone One of Rivers State, Nigeria. Rivers State has principally three agricultural zones (Rivers State Agricultural Development Programme (RSADP), 2014 and Iyagba, 2013). The three Agricultural zones in the state with the accompanying Local Government Areas are as follows:

Zones	Local Government Area (LGAs)
Zone 1	Eleme, Gokana, khana, Tai, Obio/Akpor, Port Harcourt, Oyigbo, and Okrika.
Zone 2	Degema, Abua/Odual, Bonny, Andoni, Asari-Toru, Akuku-Toru, Opobo/Nkoro, and Ogu/Bolo.
Zone 3	Ikwerre, Emohua, Ahoada-East, Ahoada-West, Ogba/Egbema/Ndoni, Omuma, and Etche

Rivers State agricultural zone one was the study area. The survey research design was used in conducting this study. The study used primary and secondary data. Primary data were generated through questionnaire administered to yam farmers. Secondary data were based on published and unpublished literature.

All the yam farmers in Agricultural zone one formed the population of the study. Sample for the study was drawn through a multistage sampling technique. In the first stage, Three LGAs were randomly selected from the agricultural zone. In the second stage, four communities each from the three LGAs were randomly selected to give 12 communities in all. In the third stage, 10 respondents were randomly selected from each of the twelve communities, using a list of yam farmers provided by the extension agents covering the communities. This gave a total 120 yam farmers who served as respondents in the study.

The socio-economic characteristics of the respondents were analyzed using descriptive statistics such as frequency tables, percentages, mean, etc. Respondents' perception on yam minisett technology was determined by developing some perceptual statements and respondents were asked to respond to the statements along a four- point Likert - type scale of strongly agree = 4; agree = 3; disagree = 2; and strongly disagree = 1. The mean value of the response options which is 2.50 was taken as the cut = off point. Statements with mean score of 2.50 and above were, therefore, considered as those that respondents had favourable perception, while those statements with mean scores of below 2.50 are those respondents did not perceive as favourable. Adoption of yam minisett technology was determined by requesting the respondents to indicate the yam minisett items they have adopted. The percentage of adopters for each item was computed and used to calculate the adoption score using the Sigma method (Agbamu, 1995; Ajieh, 2010). For the purpose of the study, adoption level was grouped following Ajieh and Igbokwe (2006) as follows: Low adoption (for items with score of 0 - 3.9); Average adoption (for items with score of 4 - 6.9); and High adoption (for items with score of 7 - 10).

3. RESULTS AND DISCUSSION

3.1 Socio-economic Characteristics of Respondents

Table 1: Socio - economic characteristics respondents

Variables	Freq.	%	Mean
Sex			
Male	105	87.5	
Female	15	12.5	
Total	**120**	**100.0**	
Age			
20 - 29	14	11.6	
30 - 39	20	16.7	43
40 - 49	62	51.7	
50 - 59	20	16.7	
60 - 60	4	3.3	
Total	**120**	**100.0**	
Marital Status			
Single	20	16.7	
Married	90	75.0	
Widow	10	8.3	
Total	**120**	**100.0**	
Level of Educational (Years)			
No formal Education	20	16.7	
Primary Education	15	12.5	
Secondary Education	75	62.5	
Tertiary Education	10	8.3	
Total	**120**	**100.0**	
Household Size			
1 – 5	24	20.0	
6 – 10	82	68.3	7
11 – 15	14	11.7	
Total	**120**	**100.0**	
Farming Experience (Years)			
1 - 5	8	6.7	
6 - 10	12	10.0	15
11 - 15	50	41.7	
16 - 20	40	33.3	
21 - above	10	8.3	
Total	**120**	**100.0**	
Cooperative Participation			

Yes	72	60.0
No	48	40.0
Total	**120**	**100.0**
Access to Credit		
Yes	56	46.7
No	64	53.3
Total	**120**	**100.0**
Farm Size (Hectares)		
0.1 – 2.0	67	55.8
2.0 – 4.0	48	40.0
4.1 – 6.0	5	4.2
Total	**120**	**100.0**
Extension visits		
Yes	6	10.0
No	54	90.0
Total	**60**	**100.0**

Source: Field Survey, 2019

Table 1 shows that majority (87.5) of the respondents are male. This reveals that yam farming is dominated by males in the study area. This could be as a result of yam production being labour intensive and requiring substantial energy and time. This is in line with the findings of Okwor (1998) and Ajieh (2012), who described yam as a token of masculinity. Table 1 also reveal that majority of the respondents (51.7%) are within the age range of 40-49 years. On cumulative basis, 85% of the respondents are within the age bracket of 20-49 years, while the remaining 20% falls within the ages of 50-69 years. The respondents have an average of 43 years, which indicates that they are still strong and young, able to withstand the rigours of yam farming. This finding is supported by Ajieh (2012). Table 1 reveals that majority of the respondents (75%) are married. 16.7% of the respondents are single and 8.3% of them are widowed.

The table above shows that the yam farmers in the study are literate. Majority of them 62.8% finished secondary school. The table 1 shows that majority of the respondents (68.3%) have 6-9 persons in their households. The average household size is 8 persons. The respondents have large household size which can be useful in their yam farms as cheap labour.

Table 1 show that most of the respondents are well experienced in yam farming. The mean farming experience is 14 years. Table 1 show that 55.8% of the respondents had 0.1 – 2.0 hectares as farm land while 40% had 2.1 – 4.0 hectares as farm land. This implies that yam farmers in the study area are small holder farmers.

3.2 Farmer's Perception of Yam Minisett Technology

Table 2 Mean scores of respondents' perception on yam minisoft technology

	Statements	Mean score	PC	Remark
1.	Size of recommended tuber is scarce	1.62	A	NF
2.	Size of minisett is too small	2.02	A	NF
3.	Cutting tubers into minisetts consumes time	2.25	A	NF
4.	Minisett dust is expensive	2.20	A	NF
5.	Minisett technology increases yield	2.30	A	F
6.	Minisett technology controls weed	2.6	A	F
7.	Minisett technology is complex	2.42	A	NF
8.	Recommended spacing is difficult to achieve	1.41	A	NF
9.	Intercropping pattern is too complex	1.75	A	NF
10.	Minisett technology involves many steps	2.18	A	NF
11.	Minisett technology is costly to implement	3.30	D	F
12.	Minisett technology breeds pest	2.57	D	F
13.	Recommended planting depth too shallow	2.64	A	F
	Over all mean	**2.31**		**NF**

Key: A = agree; D = disagree; Rmk = remarks; F = favourable; NF = not favourable;

Information on Table 2 shows respondents' perception on yam minisett technology. Results reveal that respondents perceived four statements in favour of yam minisett technology out of the thirteen statements used to ascertain their perceptions. The four statements include; 5, 6, 11, and 12. The remaining nine statements were not favourably perceived by respondents. These include statements 1- 4, 7-10 and 13. A careful study of the information in the Table further reveals that all the nine statements that respondents did not perceive favourably are negative statements. This suggests that farmers in the study area are not favourably disposed to yam minisett technology. Furthermore, an overall perception score of 2.32 which is a low perception further confirms the fact that the farmers do not favour yam minisett technology.

3.3 Adoption of Yam Minisett Technology

Table 3 Adoption of yam minisett technology

S/N	Minisett technology items	Number of adopters	Percentage	Adoption score
1	Size of tuber for cutting	18	30	3.21*
2	Cutting into minisett size	21	35	3.50*
3	Air drying of minisetts	18	30	3.41*
4	Application of minisett dust	17	28	3.10*
5	Curing of minisetts	15	25	3.04*
6	Spacing	19	31	3.16*
7	Planting depth	20	33	3.25*
8	Time of planting	27	45	4.20**
9	Intercropping	25	42	4.16**
Overall adoption score				3.42*

Source: field survey, 2018 Key * = Low adoption **Average adoption

Table 3 shows the adoption of yam minisett technology in the study area. The table indicates that there is low adoption of yam minisett technology in the study area. The result shows the overall adoption score as 3.42 which is an indication of low adoption. This implies that most of the yam farmers in the study area rejected the yam minisett technology.

3.4 Reasons for Low Adoption of Yam Minisett Technology in the Study Area.

Table 3 Reasons for low adoption

Reasons for low adoption	N	%
• Low germination of setts	110	91.6
• Too small seed yam produced	95	79.2
• Labour intensive	93	77.5
• Poor access to inputs (fund, agro-chemicals, etc)	105	87.5
• Ignorance of technical details	98	81.6

Source: field survey, 2018

Tables 3 show the respondents reasons for low adoption of yam minisett technology in the study area. The table indicates that low germination of setts due to rotting and dying of nursery (91.6%), poor access to inputs (87.5), ignorance of technical details due to absence of extension agents and other relevant professionals to teach them the technology, too small seed yams produced (79.2%), etc are the major reasons for low adoptions in the study area.

Onwueme (1982) attributed the rotting and drying up of setts to the problem of apical dominance in tubers. He defines apical dominance as the phenomenon whereby tubers sprout first from the head region whether in whole tubers or cut sets, followed by the middle portion and lastly from the tail region, due to greater concentration of the hormones which promote sprouting on the head region.

4. Conclusion

Yam is an important crop traditionally and nutritionally in the study area and in Nigeria at large. Nigeria is a major yam producing nation in the world. It has however been reported that there is a dwindling trend in the total land area cultivated in recent times due to the problem of scarcity and high cost of seed yams. This situation is compounded by farmers' poor perception of the yam minisett technology and the low adoption of yam miniestt technology developed to overcome problems associated with seed yams. The farmers' perceive that the yam minisett technology is complex, cumbersome, involves many steps and time consuming and they are not favourably disposed to it, enhance its low adoption. In order to enhance increased yam production in the study area, there is

need to create more awareness among yam farmers on the benefits of the minisett technology. Also farmers need to be given adequate training on how best to use and apply the technology.

5. Recommendations

The government, through the State Ministry of Agriculture and its organ, the ADP should intensify her involvement in the provision of high quality extension education activities. Government, cooperate organizations or individuals may be involved in the offering of loans or credit to farmers. The quest to acquire western education through adult education programmes and their readiness to form cooperative societies for the purpose of ease of access to credit, information on best ways to get clean yam seed are also recommended.

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