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Assessment of the Adoption of Yam Minisett Technology in Lafia Local Government Area of Nasarawa State, Nigeria

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ABSTRACT
This study assessed the adoption of yam minisett technology among rural farmers in Lafia, Nasarawa State, Nigeria. A random sampling technique was employed, in the selection of respondent. A total of 120 yam farmers were randomly selected and administered questionnaire. Both descriptive and inferential statistics were used in analyzing data generated from the study. Results of the study reveal that respondents had moderate awareness of yam minisett technology with an overall awareness percentage of 61. Age, farm size, irregular extension visits, high costs of technology were some factors that influenced adoption of the minisett technology. The effects of the adoption of minisett technology include increased income, skills, knowledge, productivity; reduction in cost of production and sustained food security. Radio and extension agents were the major sources of information. Awareness in the technology should be created among the farmers through the use of campaign, demonstration and small plot adoption trails (SPAT). Also farm credits should be granted to yam farmers to enhance their adoption of the technology were some of the recommendations proffered

INTRODUCTION

Yam (Dioscorea spp) is a staple food in Nigeria. Nigeria is also the world's largest producer of the crop. In fact, it has been observed that Yam production in Nigeria is declining substantially due to many factors, especially cost of planting materials and labour, which account for about 50% and 40% of the cost of production respectively (Nweke et al. cited in Okoro, 2008).

Efforts aimed at increasing its production should be given greater emphasis as Nigeria is yet to optimize its potentials in producing the crop. The development of the yam mini-sett technology is one of the efforts aimed at boosting the production of the crop. Considering the fact that the tuber is the planting material as well as the edible part, the mini-sett technology provides planting material so that the farmer would not worry about what to plant the next season. Yam minisett technology was developed by National Root Crop Research Institute, Umudike in 1982 to address the problem of access to quality seed yam and improved productivity of yam farmers.

Madukwe et al. (2000) identified activities in yam minisett technology to include the following nine technology items:

I. size of tuber for cutting: select healthy tubers without bruises. Use yam tubers of 20-25 cm length and 25 cm girth (500-750 g). Avoid tubers with bigger girth;

II. Cutting into minisett: cut each of the yam tubers into horizontal sections (discs), 2 cm thick. Secondly, vertically cut each 2 cm thick disc into 2, 3 or 4 pieces such that each minisett weighs 25-30 g;

III. Air drying: allow an interval of 4-5 minutes for ambient air to reduce mucilage on the cut surface to avoid the sett from absorbing the minisett dust;

IV. Application of minisett dust or insecticides: put the minisetts into a container with lid or in a polythene bag. Add the ministett dust (Apron plus or

Fernasan D insecticides – one packet of minisett dust, 10 g, is enough for 200 minisetts) and shake the container to ensure that the minisetts are evenly dusted;

V. Curing: spread the minisetts on a dry floor and plant a day later to allow curing of the cut surfaces;

VI. Spacing: plant minisett at a distance of 25 cm apart on one-metre ridges or beds. This gives 40,000 stands per hectare;

VII. Planting depth: open the soil up to 9 cm deep, drop a minisett and cover it, shallow planting leads to setts drying out or being exposed by rain;

VIII. Time of planting: plant a day after rain as rains becomes regular (May/June).

IX. Intercropping: plant yam 25 cm on the crest of the ridge. Mark out 12.5 cm before the first stand. Plant maize 1 m apart on two sides of alternate furrows. Mark out 50 cm before the first stand.

Yam minisett technology leads to increased yield, weed suppression due to *Adoption of yam (Discorea spp.) minisett...)*.

The mini-sett technology stands out as the most promising in multiplication of yam setts. It is a better alternative to the traditional practice of milking to produce seed yams for planting. Milking involves harvesting yams before full maturity, usually between June and September, making sure that the feeding roots are not destroyed. The feeding roots are then covered with earth, and the plant is left for about three to four months before harvesting, which would be in November/ December when the leaves wither. Milking leads to the production of several (3-6) small tubers suitable for seed yams. Milking is a traditional alternative to the mini-sett technique. However to establish 1 ha of yam farm 3 tons of yam seed yams are required. 1 ha of minisett can produce seed that can Plant 3.5ha. The seed from the hectare with traditional milking produce seeds that can plant 1.2 ha of land.

Despite these obvious advantages of minisett technology it has been observed that its use has not been sustained by farmers. Although, a lot of research has been done in some states of the federation by other researchers to assess the adoption of yam minisett technologies by farmers such as Agbarevo (2014) Evaluation of farmers adoption of yam mini-sett techniques in Cross River State, Nigeria, Agbarevo and Obinne (2009) Effect of adoption of improved yam production technologies on yam production in Nigeria and Okoronkwo (2006) in Ebonyi State. Ike and Inori, 2006; Maikasuwa and Ala, 2013 examined some determinants of yam production in particular regions of Nigeria little or nothing has been done to assess the adoption of yam mini-sett technology in Lafia, Nasarawa State. It is this research gap that prompted this study.

Objectives of the Study

The broad objective of this study was to assess the adoption of yam minisett technology among farmers in Lafia, Nasarawa State of Nigeria.

The specific objectives were to;

i. determine the level of adoption of yam minisett technology in the study area
ii. determine the factors that influence the adoption of yam minisett technology in the study area.
iii. determine the effects of adoption of yam minisett technology on production of yam in the study area.
iv. identify the sources of information to farmers on yam minisett technology in the study area

METHODOLOGY

This study was conducted in Nasarawa State north central Nigeria. Nasarawa state is located between latitudes 7^0 and 9^0N and longitudes 7^0 and 10^0 E. It shares boundaries with Benue state to the south, Kogi state to the west, the Federal Capital Territory (FCT) to the north-west; Kaduna and Plateau states to the north-east, and Taraba state in the south-east. Nasarawa state has a land area of 12,000 square kilometers and is divided into thirteen (13) Local Government Areas (LGAs). The 2006 population census pegs the state's population at 1,863,275. Agriculture is the dominant occupation of the inhabitants of Nasarawa state. Nasarawa state (the home of solid minerals) is blessed with numerous solid minerals such as Beryl, Tourmaline, Quartz, Columbite, Granite, Limestone, Barytes, Glass sand, Marble and Salt (Nasarawa state Government, 2008). Multistage sampling technique was used in selection of the respondents

Lafia in Nasarawa state was selected for this study because of its contribution to yam production. Six

council wards were purposively selected; they are Akurba, Adoji, Bakin Rigiya, Assakoi, Kwandere and Makama. Twenty respondents were randomly selected per ward to give a total of 120 respondents. Questionnaire was administered to these respondents to elicit response. The data were analyzed using descriptive such as frequency, percentage, likert scale and mean. The questions raised were structured on a four-point Likert-type rating scale of Strongly Agreed (4 points), Agreed (3 points), Strongly Disagreed (2 points), and disagreed (1points).

RESULTS AND DISCUSSION

Level of Adoption of Yam Minisett Technology in the study area.

The result in Table 1 shows that 61.3% of the respondents have adopted the yam minisett technology while 38.7% did not adopt the yam minisett technology. This result shows an average level of adoption of yam minisett technology in the study area. Studies by Agbarevo, 2009; Agbarevo & Obinne, 2008; Agbarevo & Obinne, 2009, Agbarevo & Nwachukwu, 2014 observed that adoption of agricultural technologies by resource–poor farmers has remained low. This is further corroborated by the finding of the study of Ogbodu 1995; Iwueke, 1990, and Okoro, 1999 who observed that In spite of the fact that the yam mini-sett can generate large quantities of yams with minimal inputs and less complication in technique, its rate and level of adoption by traditional yam farmers has been extremely low.

Low adoption of agricultural technologies has been attributed to a number of reasons. One reason why adoption has remained low is the cost of adopting the recommendations. Because the rural farmers are poor, they are not always able to purchase improved technological packages from research and extension workers. In this regard, Titilola cited in Agbarevo (2012) observed that low adoption should not always be attributed to unwillingness of farmers to adopt innovations but rather high cost of innovations. Moreover, the resource-poor farmers are unwilling to risk their small capital when the benefits expected from adoption have not been well demonstrated. Although adoption of improved technologies significantly affects tuber yield of crops (Udealor and Asiegbu, 2006), this would have to be well demonstrated in comparison with local varieties before farmers will adopt the improved varieties.

Poor adoption of the yam mini-sett technology was equally reported by Bolarinwa and Oladeji (2009), who observed that, in a sample of 342 farmers in three predominantly yam producing states in Nigeria, 74.0% had received information on the technology; while 71.0% who had adopted the yam mini-sett technology complained that most of the packages were not in line with their yam production practices.

The results of a study conducted by Okoro (2008) to determine the level of awareness and use of the technique in Nigeria encountered by the farmers showed that the technology has not been accepted by farmers in Nigeria. It reported that only about 46.6% of the respondents were aware of the mini-sett technique nationwide, while only about 22.4% were using the technique. About 24.2% of the respondents who were aware of the technique refused to use it due to low sprouting rate of mini-sett, which emerged as the greatest problem militating against the technique with 79% of the respondents nationwide complaining about the problem. Other problems reported by farmers included ignorance of technical details (39.7%), technique being labour intensive (38.3%), adverse weather (34.4%), lack of farm inputs (17.8%) and poor storage facilities (1.7%).

Table 1: Response on the Adoption of Yam Minisett Technology

Adopted	Frequency	Percentage (%)
Yes	73	61.3
No	46	38.7

Major Factors that Influence the Adoption of Yam Minisett Technology in the study area.

The result in Table 2 shows that the major factors that influence adoption of yam minisett technology were age which had the highest mean score of 3.109, 3.042 farm size, irregular visits of extension staff also had a mean score of mean score of 3.034, high cost of technology with mean score of 2.950, lack of storage facilities with mean score of 2.915, scarcity of farmland with mean score of 2.882, lack of improved varieties of yam with mean score of 2.731 while lack of adequate credit had the least mean of 2.672.The age of the farmers, farm size and irregular visits rated the highest factors that influence adoption, implying that as the age of the farmers, their farm size and extension visits increase, the tendency of farmers to adopt the yam minisett technology also increases. This is in consonance with the findings of Waziri et

al.(2014) who asserted that farm size, extension contact, income and credit influenced the adoption of yam minisett technology in Niger state Nigeria. Ironkwe et al.2009 also corroborated these findings that age, farm size and extension contact influenced the adoption of yam minisett technology in Enugu State.

Table 2: Distribution of Respondent according to Factors that Influence the Adoption of Yam Minisett Technology

Factors	SA (%)	A (%)	D (%)	S D (%)	Mean
Age	26.9	62.2	5.9	5.0	3.109
Farm size	27.7	52.9	14.3	5.0	3.042
Irregular visits by extension staff	23.5	62.2	9.2	5.0	3.034
High cost of technology	7.6	84.9	2.5	5.0	2.950
Lack of storage facilities	29.4	43.7	21.8	5.0	2.915
Scarcity of farmland	16.0	63.9	12.6	7.6	2.882
Lack of improved varieties yam	22.7	42.0	21.0	14.3	2.731
Lack of adequate credit	16.8	42.9	31.1	9.2	2.672

Effect of Adoption of Yam Minisett Technology

Results in table 3 show that the adoption of yam minisett technology increased incomes (mean score of 3.353). Increase in income ranked the highest effect, followed by enhancing value addition (mean score of 3.311), minimize 30% of harvested yam tuber seed and increased knowledge (3.252), increase skill (3.244), increase productivity, reduction in cost of production and reduction of cost of planting materials (3.219), reduction of poverty (3.210), and sustainable food security (3.177) as the least effect of adoption of the yam minisett technology. This agrees with the findings of Udealor and Asiegbu (2006) that adoption of improved technologies affects the yield of crops. Similarly Ezeh et al. (2008) corroborated this findings that adoption of minisett technology had significant impact on the farm size, seed yam yield and farm income of adopters in Abia State.

Table 3: The Distribution of Respondent according to the Effect of Adoption of Yam Minisett Technology.

Effects	SA (%)	A (%)	D (%)	S D (%)	Mean
Increase income	37.0	62.2	-	0.8	3.353
Enhanced value addition	36.1	61.3	-	2.5	3.311
Minimize 30% of harvested yam tuber seed	34.5	58.8	4.2	2.5	3.252
Increased knowledge	29.4	68.1	0.8	1.7	3.252
Increased skills	31.9	62.2	4.2	1.7	3.244
Increase productivity	23.5	75.6	-	0.8	3.219
Reduction in cost of production	26.9	68.9	3.4	0.8	3.219
Reduction of the cost of planting materials	33.6	59.7	1.7	5.0	3.219
Reduction of poverty	24.4	73.9	-	1.7	3.210
Sustainable food security	26.9	66.4	4.2	2.5	3.177
Sustainability of livelihood	33.6	64.7	0.8	0.8	3.111

Source: Field Survey 2017

The Sources of Information on the yam minisett technology in the study area.

The result in Table 4, show that 46.2% respondent indicate radio as their major source of information, extension agents 35.1%, friends and relatives 6.2%, cooperative society 5.8% television 3.4%, local leaders 1.9% while newspaper 1.4%. The major source of information about the yam minisett technology is radio. In other words majorities benefited from the radio broadcast and were informed on improved agricultural technologies as they listen to agricultural programmes. This agrees with Jiriko et al., (2016) who asserted that radio was a major channel of disseminating information agricultural information to farmers in Ofu Local Government area of Kogi State.

Table 4: The Distribution of Respondent according to the Sources of Information

Sources of information	N	Percentage
Radio	96	46.2%
Extension agents	73	35.1%
Friends/relative	13	6.2%
Cooperative society	12	5.8%
Television	7	3.4%
Local leaders	4	1.9%
Newspaper	3	1.4%
		100.0

Conclusion

The study revealed that adoption of minisett technology in the study area was above average (61%). The major Factors that influenced the Adoption of minisett technology were age of the farmers, farm size and extension contacts. Adoption of minisett technology improved the income of the farmers. Radio was a major source of information about minisett technology to the respondents.

Recommendations

According to the findings the following recommendation were made:-

1. More awareness on the technology should be created among the farmers by the relevant agencies through the use of Radio, extension campaigns, demonstration and small plot adoption trials (SPAT). This will increase the adoption of the technology; it will also increase their income.

2. Farm credits should be granted to yam farmers through the state government micro credit scheme (SGMCS) to enable them hire labour to enhance the adoption of the minisett technology.

3. Further research should be conducted on how to improve the sprouting rate of the minisett and make the technology compatible to the farming system of the respondents.

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