

# Evaluation of the Adoption of Faro 44 (Certified Rice Seed) among Small Holder Farmers in Abuja, Nigeria

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**Abstract:-** The study evaluated the adoption of improved certified rice seeds (FARO 44) among local farmers in Abuja. The objectives were to describe the socio-economic characteristic of the respondents, evaluate the level of awareness of certified rice seeds (FARO 44) by the respondents, evaluate the adoption rate of certified rice seeds (FARO 44) by the respondents, determine farmers' perceptions on the use of certified rice seeds (FARO 44), and identify the constraints in adoption of certified rice seeds (FARO 44) by the respondents. Primary data was used for this study. Multi-stage sampling technique was used to select the respondents (small-holder farmers) needed for this study. A total of 270 rice farmers were sampled and used for the study. The data elucidated was analyzed using both descriptive and inferential statistics. From the result, 50.74% of the farmers were male, 58.51% of the farmers were below 50 years old with a mean age of 47.37 years. The majority of the farmers were married and educated with a mean household size was about 5.88 persons and below 5 years of experience in rice farming. The average farm size was 2.17 hectares, most (97.413%) of rice farmers in the study area had no access to credit facilities, and had no contact with an extension agent. About 58.74% of the smallholder rice farmers belong to a cooperative society. Majority (43.7%) of the respondents were highly aware of certified seeds, 72.59% of the respondents said got information from the annual field day of the National Agricultural Seed Council. The adoption rate was calculated to be 0.8444. 30.74% got their seeds from Seed Regulatory Council (National Agricultural Seed Council). The result of the logistic regression shows that farming experience and membership of cooperative society significantly affect the adoption of Faro 44 in the study area. The study concluded that most the respondents were highly aware of certified seeds, got information from annual field day of National Agricultural Seed Council, and the adoption rate was calculated to be 0.8444. Based on the findings of the study, it was recommended that the government through extension agents should ensure that relevant information are readily available to farmers, so that farmers will not have to wait annually to get concrete information about certified seed.

**Keywords:-** FARO 44, National Agricultural Seeds Council, certified seeds.

## I. INTRODUCTION

Rice (*Oryza sativa*) is a monocot plant of the family Gramineae. It's a staple food consumed by millions of households around the globe. Rice is the second largest produced cereal in the world after wheat (Kadiri *et al.*, 2014). Rice is a crop that cuts across regional, religious, cultural, national and international boundaries with very high demand. In Nigeria, rice cultivation is an age long enterprise providing employment opportunity and source of food to vast and diverse population of the country. Nigeria has about 84million hectares of arable land out of which a potential 5 million hectares that spreads across all the ecological zones is suitable for rice cultivation (AFDB, 2013). Nigeria has an ideal climatic condition which is akin to that of South East Asia where the crop is produced for export. The rice ecologies in Nigeria include rain fed upland, rain fed lowland, irrigated lowland and mangrove or tidal swamp ecology. Irrigated lowland accounts for 10-15% of national rice production. However, rain fed lowland and upland ecologies constitute 80-85% of the national cultivated rice land and contribute 73-80% of total rice production (Akintayo *et al.*, 2012).

Rice production in Nigeria is dominated by smallholder farmers who use traditional methods that are characterized by problems of low productivity (Tsado *et al.*, 2014). Productivity increase in the last four decades is centered on increasing the number of new varieties and a positive and increasing trend in the rate of adoption of modern varieties (Simtowe *et al.*, 2012).

Rice remains an important staple food in Nigeria. It has become a staple food in Nigeria such that every household; both the rich and the poor consume a great quantity (Godwin, 2012). Nigeria has not yet met its local demand in rice production despite effort by successive administration to ensure self-sufficiency in rice production. The local production falls short of the demand (Basorun and Fasakin, 2012) hence, leading to augmentation of shortfall through import. Rice import represents more than 25% of agricultural imports and over 40% of domestic consumption (FMARD, 2004). This continued importation of rice has lots of negative effects for the country among which are transfer of jobs to the country where the commodity is imported from, increasing pressure on foreign reserve and food insecurity. Despite decades of agricultural policies that promoted the adoption of hybrid seed as ways of improving

productivity in the agricultural sector, there have been low rate of adoption of improved seeds among smallholder farmers in Nigeria. According to the Agricultural Census of 2002/03, only 5.7% of farmers and 0.7% of paddy farmers in Africa use improved varieties of the crops together with fertilizer. The few farmers who use improved rice varieties with fertilizer obtain significantly higher yields than those who use unimproved varieties (Agricultural Census, 2002/03). One wonders why the adoption of improved seeds is still so low, despite the fact that suppliers of improved rice seeds have been increasing and there is high production of rice crops relatively in Nigeria. The probable answers to this overarching problem could be small farm sizes, risk exposure, low capacity to bear risks, low human capital, low availability of labour, land tenure, access to financial and produce markets, access to information, participation in off-farm activities, social capital, household characteristics and ecological and environmental factors. However, it is not known empirically whether any of these factors holds; even if some of them may hold, the extents to which they hold are not known. Therefore, the aim of the research was to evaluate the adoption rate of improved certified rice seed among local farmers in the Federal Capital Territory, Abuja, Nigeria.

Rice remains one of the most consumed staple foods in Nigeria. The importance of rice production in the Nigerian economy is also seen in its contribution to agricultural GDP and employment. Therefore, as Nigeria struggles to achieve accelerated growth in food production, increasing the output of rice has become an important goal. The strategic nature of rice has long drawn the attention of policy makers who view promoting domestic rice production as a means of reducing dependency on imports, lowering the pressure on foreign currency reserves, ensuring stable and low-priced sources of food for people, and generating employment and income for rice growers. Some of such policies to boost local production of rice in Nigeria are. The E-wallet system under Agricultural Transformation Agenda (ATA) inputs were distributed to farmers directly to increase production, also a ban on the importation of rice through land border in other to encourage local production. There are also efforts through public private partnership. However, to maximize productivity it is expedient that rice Farmers that are targeted used the improved seed technology completely hence the importance of a study for possible policy recommendations. There is need to investigate awareness and adoption rate of improved seed by rice farmers for purpose of expanding its production. The awareness and adoption rate study is very important for provision of information on how to improve rice output and enhance productivity of resources on farms. The findings of this study would provide additional empirical evidence on awareness and adoption rate of improved rice seed technology in the study area. The information from this study would also contribute to knowledge relevant to policy formulation that would create enabling environment for sustainable rice production in Abuja, Nigeria.

So far little work has been undertaken to study the awareness and adoption rate of existing rice production in Abuja with a purpose of identifying ways of improving production. In this study, efforts have been made to determine awareness and adoption rate using a special use index. Although there have been a number of studies to assess the adoption and accessibility of rice seeds by smallholder farmers, a high proportion of them have been focusing on adoption of improved seeds without looking at the awareness, e.g. adoption rates based on both certified seeds and recycled seeds from improved varieties was estimated at 94% Nkonya in Chijioke *et al.* (2019). Akintayo *et al.* (2012) argued that, for widespread adoption of improved varieties and chemical fertilizer by farmers, extension educators need to understand the factors affecting technology adoption.

#### A. Research Questions

The study was addressed by the following research questions:

- What are the socio-economic characteristics of the respondents?
- What is the level and sources of awareness of certified rice seeds (FARO 44)?
- What is the adoption rate and sources of certified rice seeds (FARO 44)?
- What are the farmers' perceptions on the use of certified rice seeds (FARO 44)?
- What are the constraints in adoption of certified rice seeds (FARO 44)?

#### B. Objectives Of The Study

The main objective of this study was to evaluate the adoption of improved certified rice seeds (FARO 44) among local farmers in FCT, Abuja. The specific objectives of the study are to:

- describe the socio-economic characteristic of the respondents.
- evaluate the level and sources of awareness of certified rice seeds (FARO 44) by the respondents.
- evaluate the adoption rate and sources of certified rice seeds (FARO 44) by the respondents.
- determine farmers' perceptions on the use of certified rice seeds (FARO 44), and
- identify the constraints in adoption of certified rice seeds (FARO 44) by the respondents.

#### C. Scope Of The Study

This study focused on the evaluation of the adoption of certified rice seed (FARO 44) in Federal Capital Territory Abuja with specific focus to describe the socio-economic, level of awareness, adoption rate, farmers' perception on the use of certified rice seeds (FARO 44), and the constraints faced by the respondents. In spatial terms, the study will focus on three (3) out of the six area councils of FCT. These are Gwagwalada, Kwali and Abaji Area Councils respectively. A total of 270 respondents were used for the study and the study employed both descriptive and inferential statistics to analyze the stated objectives.

## II. METHODOLOGY

### A. The Study Area

The Federal Capital Territory (FCT) of Nigeria is located between latitudes 8°25' and 9°25' North of the equator and longitudes 6°45' and 7° 45' East of Greenwich Meridian. The territory covers an area of 8,000 square kilometers and occupies about 0.87% of Nigeria. The territory is situated wholly within the region generally referred to as the North West geographical zone. It is bordered on all sides by four states namely Niger, Nasarawa, Kogi and Kaduna. The climate of the FCT is predominantly wet and dry season characteristics. Temperature in the FCT ranges between 30°C – 37.0°C yearly with maximum temperature in March. This study was conducted in Gwagwalada, Abaji and Kwali Area Council. Kwali is situated on the South-Eastern wings of the FCT. It is located within latitude 08100' North and longitude 0730' East. The average temperature and rainfall are 27.3 °C and 1256 mm per annum respectively. Crops grown in Abaji and Kwali are millet, sorghum, cowpea, groundnut, rice, eggplant among others. According to the United Nations, Abuja grew at the rate of 139.7% between 2000 and 2010, making it the fastest growing city in the world. As at 2016, the metropolitan area of Abuja is estimated at 6 million (Jaiyeola, 2016).

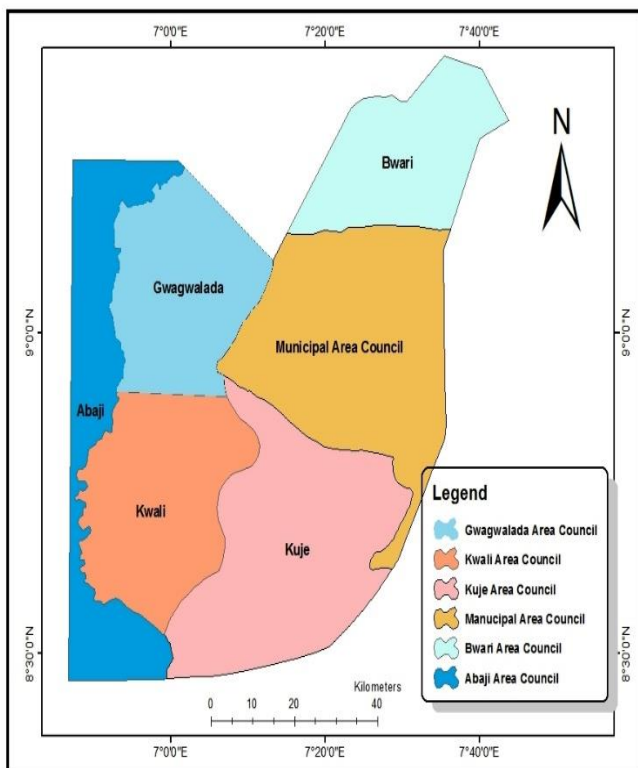


Fig 1: Map of FCT Showing Kwali, Abaji, and Gwagwalada Area Council

Source: Department of Land Use Administration, Kwali, Abaji, and Gwagwalada Area Councils (2018).

### B. Population of the Study

The population for the study was smallholder rice farmers in the Federal Capital Territory, Abuja, Nigeria.

### C. Sampling Technique and Sample Size

Multi-stage sampling technique was used to select the respondents for this study. In the first stage, the Federal Capital Territory was selected out of the 36 states of the federation. In the second stage, Abaji, Gwagwalada, and Kwali Area Councils were purposively selected because of the predominance of crop production among the small holder farmers in the area council. In the third stage, three (3) wards were randomly selected from the list of the wards in the area councils. In the fourth stage, two (2) villages were randomly selected from the list of all the villages in the selected wards. In the fifth and final stage fifteen (15) small holder farmers were randomly selected from the list of farmers obtained from Agricultural Development Project (ADP). The total number of respondents used for the study was 270.

S/N	Ward	Village	Sample Size
<b>ABAJI</b>			
1	Adagba	Kona mada	15
		Yaba	15
2	Ebaji	Nuku	15
		Yawule	15
3	Bandagi	Bago	15
		Dabala	15
<b>GWAGWALADA</b>			
1	Dobi	Dobi	15
		Paiko kore	15
2	Dukpa	Dukpa	15
		Wuna	15
3	Kutunku	Soho kutunku	15
		Kaida	15
<b>KWALI</b>			
1	Yangoji	Yangoji	15
		Yangoji kasuwa	15
2	Kilankw	Kilankwa 1	15
	a	Kilankwa 2	15
3	Pai	Pai 1	15
		Pai 2	15
<b>Total</b>	<b>9</b>	<b>18</b>	<b>270</b>

Table 1: Sampling Frame and Sample Size of the Study Areas

Source: Computed by the Author, 2020

### D. Method of Data Collection

Primary data was used for this study. Trained enumerators from Agricultural Development Program (ADP) were contacted for data collection using structured questionnaires. The questionnaires covered the following (A-E). Section A captured information on the socio-economic characteristics; Section B captured the level of awareness of certified rice seeds (FARO 44) by the respondents; Section C captured adoption rate of certified rice seeds (FARO 44) by the respondents; Section D captured farmers' perspectives on the use of certified rice seeds (FARO 44); Section E captured the constraints in adoption of certified rice seeds (FARO 44) by the respondents.

*E. Validity of the Instrument*

The questionnaire used for the study was subjected to face and content validation. The instrument was given to extension experts in the Department of Agricultural Extension and Rural Sociology. Observations were made and corrections were effected.

*F. Method of Data Analysis*

Descriptive statistics which include frequency, mean and percentage was used to actualize the objectives of the study while logistic regression was used to test the hypothesis of the study.

*G. Four Point Likert-Type Scales*

To ascertain the perception and constraint faced in adoption of certified rice seed (FARO 44) a Four-Point Likert-type scale was used to weigh the responses. The response options and values assigned were as follows: Strongly Agree = 4; Agree = 3; Disagree = 2 and Strongly Disagree = 1. Also, the values was added and divided by 4 to obtain 2.5, which was regarded as the mean. Perception or Problems with mean scores (MS) greater than or equal to 2.5 was regarded as "Significant" while Perception or Problems with mean responses lower than 2.5 was regarded as "Non-Significant". To ascertain the level of awareness in adoption of certified rice seed (FARO 44) a four-point Likert-type scale was used to weigh the responses. The response options and values assigned were as follows: No Awareness = 1; Low Awareness = 2; Medium Awareness = 3 and High Awareness = 4.

*H. Problem Confrontation Index*

Farmers were asked to rate their constraints of each problem on a four- point Likert scale. The Problem Confrontation Index is stated thus following Roy et al (2014).

$$PCI = \frac{P_n X_{0+P_1} X_{1+P_m} X_{2+P_h} X_{3+P_l}}{4} \dots \dots \dots (3.6)$$

P<sub>n</sub> = Frequency of the Farmers who rated the problems as Strongly disagree

P<sub>1</sub> = Frequency of the Farmers who rated the problems as Disagree

P<sub>m</sub> = Frequency of the Farmers who rated the problems as Agree

P<sub>h</sub> = Frequency of the Farmers who rated the problems as Strongly agree

This was used to achieve specific objective five (5).

**III. LOGISTIC REGRESSION**

Logistic regression is a statistical model that in its basic form uses a logistic function to model a binary dependent variable, although many more complex extensions exist. In regression analysis, logistic regression (or logit regression) is estimating the parameters of a logistic model (a form of binary regression). Mathematically, a binary logistic model has a dependent variable with two possible values, such as adopt/reject which is represented by an indicator variable, where the two values are labeled "0" and "1". In the logistic model, the log-odds (the logarithm of the odds) for the value labeled "1" is a linear combination of one or more independent variables ("predictors"); the

independent variables can each be a binary variable (two classes, coded by an indicator variable) or a continuous variable (any real value). The explicit form of the logistic regression is:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \dots + \beta_8 X_8 + \mu_i \dots \dots \dots \text{Eqn 3.7}$$

Where,

Y = Adoption Rate (1 = adopted, 0 = not adopted)

β = Regression Coefficients,

U<sub>i</sub> = Error Term,

X<sub>1</sub> = Gender

X<sub>2</sub> = Age

X<sub>3</sub> = Marital status

X<sub>4</sub> = Household size

X<sub>5</sub> = Farming experience

X<sub>6</sub> = Farm size

X<sub>7</sub> = Membership of cooperative society

X<sub>8</sub> = Extension contact

X<sub>9</sub> = Educational level

**IV. DEFINITION AND MEASUREMENT OF VARIABLES**

- **Age:** This refers to the number of years an individual attained from birth. It is a continuous variable. Respondents were asked to state their age in years as at the time of administering the questionnaires to them.
- **Household Size:** This means the total number of people in the house which includes the wives, children and dependents that reside within the same house. Respondents were asked to indicate the number of persons living in their household.
- **Educational Status:** This refers to the acquisition of knowledge and academic competencies of the farmers. Respondents were asked to state their highest level of academic qualification.
- **Farming Experience:** This refers to the long time a farmer stays in farming activities. Respondents were asked to indicate the number of years they have been involved in farming.
- **Farm Size:** This variable was used to measure the total size of land used for cultivation. The respondents were asked to indicate their farm size in hectare.
- **Gender:** This is gender of the household head; the head of household can either be male or female. Respondents were asked to state their gender.
- **Marital Status:** This is marital status of the farmer. The status could be married, single, widow or divorced. Respondents were asked to identify their marital status.
- **Access to Credit:** This was used to measure if the farmers have access to credit in the last cropping season. The respondents were asked to indicate whether they had access to credit or not.
- **Cooperative Membership:** This refers to cooperative society in which farmers belong. Respondents were asked to indicate if they belong to any cooperative society.



- **Farmers contact with extension agents:** This was measured as the number of extension visits in the last cropping season.

## V. HYPOTHESES OF THE STUDY

The following null hypothesis was tested:

H<sub>0</sub>: Socio-economic characteristics of the respondents do not significantly influence the adoption of certified rice seeds (FARO 44) in the study area.

## VI. RESULTS AND DISCUSSION

### A. Result

#### ➤ Socio-Economic Characteristics of the Respondents

Table 2 shows the result of the socio-economic characteristics of the farmers in the study area. From the result, 50.74% of the farmers were male, while 49.26% were female. Majority of the farmers (58.51%) were below 50 years old with a mean age of 47.37 years. This implies that most of the farmers were predominantly in their economically active age. Age is a vital component of any growing economy because it determines to a great extent the labor availability and its contribution to economic development. This also implies that farmers may be more productive and capable of pursuing multiple livelihood strategies and also, eager to try out new things such as technologies. This result is similar to the observations of Okere (2012) and Agbonika (2015) who found that the majority of the respondents were within the active age.

About (55.93%) of the farmers were married. This implies that couples were more involved in crop production in the study area. The high level of couples' involvement in crop farming may be due to the quest to find alternative sources of survival in the study area, it may also be due to the high demand for labor for cultural practices. This was also observed by Igbalajobi (2013) and Folorunso *et al.* (2018) in Plateau and Ondo States where it was reported that the majority of their respondents were married.

Majority of the farmers (73.33%) in the study area had formal education. This implies that the majority of the farmers (73.33%) had completed a minimum of 6 years of schooling. This may impact the adoption of innovation by the farmers because it may be relatively easier to introduce new technology to the literates in the study area. Education is also vital for peaceful co-existence between crop farmers and economic development. The result further suggests that majority of the respondents were literate and this can enhance their adoption of certified seeds. Oyekale and Idjesa (2009) emphasized that farmers with formal educational qualifications are more likely to adopt agricultural technological innovations more than those without or with little educational qualifications. The findings agree with the findings of Agbenyour (2014) who posited that educational level plays a good role in the adoption of new and innovative production methods and undertaking risks. The mean household size was about 5.88 persons. This depicts that on average the household size of crop farmers in the

study was about 6 persons. This size is relatively small as compared to what is expected of rural farmers in Nigeria.

Majority of the crop farmers (62.22%) in the study area had below 5 years of experience in rice farming. This suggests that the farmers were still at their early stage of adopting FARO 44 technology. Food and Agriculture Organization FAO (2002) and Sallawu *et al.* (2016) classified farmers with 14 years of farming experience as "experienced farmers" and supported by the findings of Sallawu *et al.* (2016) hence the farmers in the study area may not have the ability to make sound decisions as regards resource allocation and management of their rice farms. The average farm size was 2.17 hectares. This shows that the crop farmers were subsistence farmers. Farm size is a reflection of the production ability and incomes of the farmer. It is believed that an increase in farm size will result in increased food production.

From the result, most (97.413%) of rice farmers in the study area had no access to credit facilities. This means that the rice farmers in the study area may have to fund all their operating costs themselves. This result indicates that agricultural loans were not easily accessible to rice farmers in the study area. This agrees with Ahmed *et al.* (2015) who reported in their findings that majority of the sampled households did not have access to credit facilities. About 58.74% of the smallholder rice farmers belong to a cooperative society. This will aid them in pulling resources together for agricultural production. Membership of clubs, associations, or cooperative societies avail farmers the opportunity to obtain credit, receive inputs at subsidized or at cheaper rates; and to obtain important and recent information concerning their farming activities. This result is in line with the findings of Adeola *et al.* (2011). Also, majority (92.59%) of the rice farmers in the study area had no contact with an extension agent. According to Aba (2012), extension service is very essential to the improvement of farm productivity and efficiency among farmers.

#### ➤ Farmers' Level of Awareness of Certified Rice Seeds (FARO 44)

The results in Figure 2 show that majority (43.7%) of the respondents were highly aware of certified seeds. 13.70% of the respondents were not aware of certified seed in the study area. 16.30% and 26.30% were slightly and moderately aware of certified seed in the study area. This suggests that the activities of extension agents and National Agricultural seed council in the study area were yielding positive effect on farmers as 86.3% of the respondents have heard about certified rice seed.

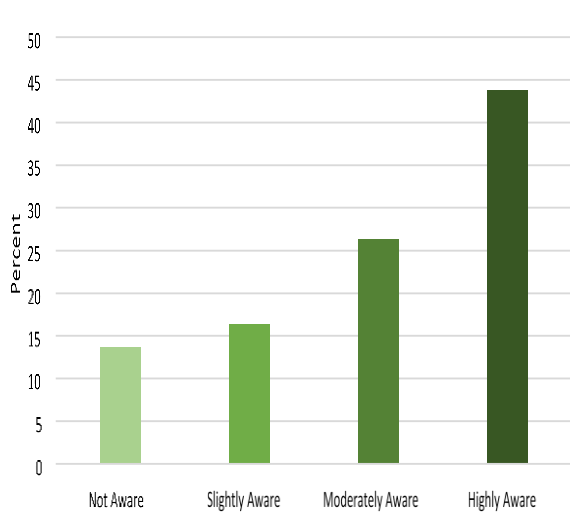


Fig. 2: Level of Awareness of Certified Seed

Source: Computed from Field Data, 2020

➤ Sources of Information of Certified Rice Seeds (FARO 44)

Figure 3 shows the various sources of information on certified seed by the respondents. From the results, the annual field day of the National Agricultural Seed Council was the major source of information about certified seed by the respondents. 72.59% of the respondents said yes to this source of information and had the highest positive response when compared to other sources. This suggests that the Annual field day of the National Agricultural Seed Council was a very relevant component of rice farming in the study area. It also suggests that the farmers in the study area had a level of trust in the information they get from the annual field day of the National Agricultural Seed Council.

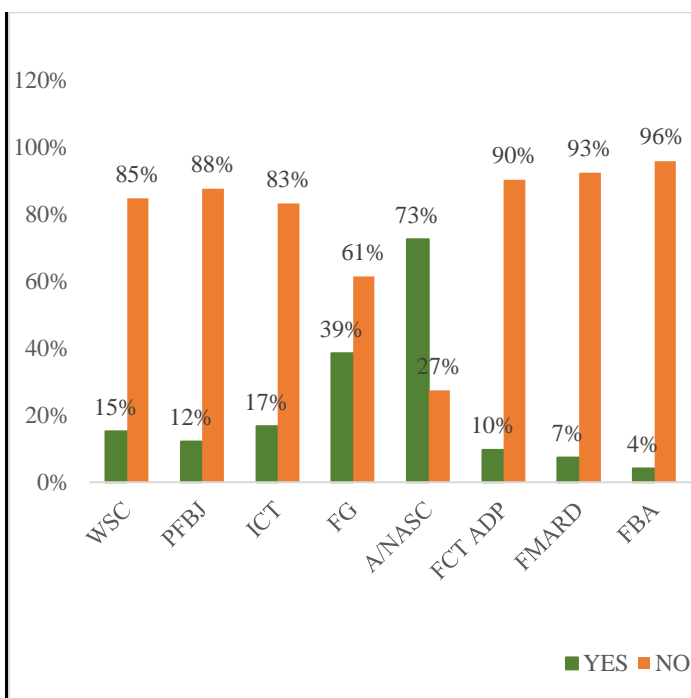


Fig. 3: Source of Information on Certified Seed

Source: Computed from Field Data, 2020

Legend	
WSC	Attendance of workshop/seminar/conferences
PFBJ	Publication/fliers/bulletin/journals
ICT	Information and communication electronic platform
FG	Farmers group and cooperatives
A/NASC	Annual field day of National Agricultural Seed Council
FCT ADP	FCT Agricultural Development Programme (FCT ADP)
FMARD	Ministry of Agriculture and Rural Development
FBA	Faith-based agricultural extension outfits

➤ Adoption Rate and Sources of Certified Rice Seeds (FARO 44)

Figure 4 shows the adoption rate of certified rice seeds (FARO 44) by the respondents in the study area. The adoption rate was calculated to be 0.8444. This suggests that the majority (84.44%) of the respondents are using certified seeds in their farms. The high adoption rate is expected and may not be farfetched from the programs of the National Agricultural Seed Production Council (NASC) around the area. These programs include high-way demonstration plots, Community based seed production programs, Seed Increase program (Variety Release and Demonstration), and Grow-Out test programs. All these programs are geared towards sensitization and awareness campaigns on the availability, benefit, and use of certified seed by farmers may have aided the adoption and use of certified seed in the area council. This result is in line with the findings of Agbenyour (2014) who reported that most farmers in their study adopted improved seed due to the benefit they stand to get.

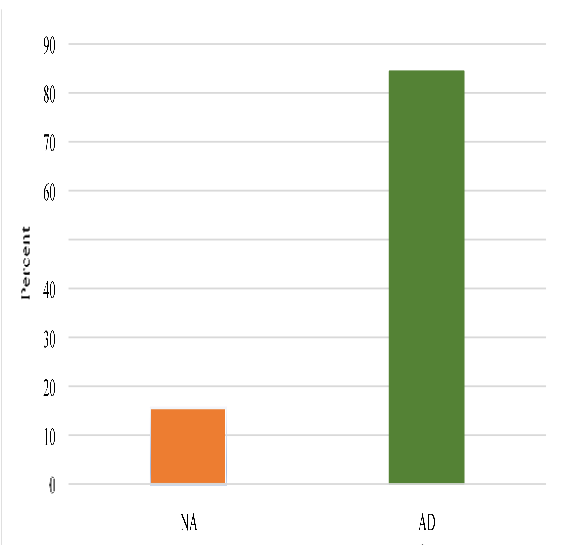


Fig. 4: Adoption Rate of Certified Seeds (FARO 44) by the Respondents

Source: Computed from Field Data, 2020

- NA: NOT ADOPTED
- AD: ADOPTED

Figure 5 shows the various sources of certified seed. From the table 30.74% got their seeds from Seed Regulatory Council (NASC), 27.04% got their seeds from Agrodealers'shops,20.37% got their seeds from certified seed producers, 11.85% got their seeds from Research institutes, and 10.00% got their seeds from the open market. This suggests that the activities of the National Agricultural Seed Production Council (NASC) in the study area influenced their vendor for purchasing certified seed.

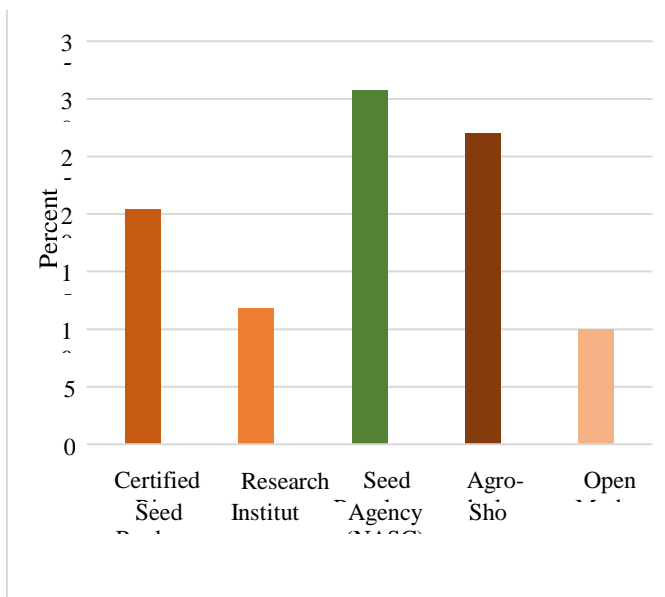


Fig 5: Source of Certified Rice seed

➤ *Farmers’ Perceptions on the Use of Certified Rice Seeds (FARO 44)*

The ranking of farmers' perception was done by using a four (4)-point scale to score the responses of the respondents and the scores are 4, 3, 2, and 1 which indicates strongly agree, Agree, Disagree, and Strongly Disagree respectively. Table 3 revealed the results of the farmers' perception of the use of the certified seed. The perception was ranked in the order of magnitude according to their mean value. The study shows that It has a high-quality assurance was ranked 1st as the perception with the highest mean score of 3.24. It gives a better yield than saved seeds was ranked 2nd based on the mean score of 3.23 as the second most perceived attribute of certified seeds. It is cleaner than the saved seeds were ranked 3rd based on the mean score of 3.22 as the third most perceived attributes of certified seed. It has high viability, when planted, bountiful produce will be harvested, It is the starting point to a successful harvest and income, Certified seeds require the minimal application of other inputs such as fertilizers and herbicides, It is high in genetic purity, germination, and vigor, It is free from diseases, damaged or immature seed, The yield of FARO 44 is better or superior to that of the local varieties, the threshing of FARO 44 is better or superior to that of the local varieties, From the results, FARO 44 can be said to have a high-quality assurance given purported attributes. The finding is in line with that of Agbenyour (2014) who reported similar perception of farmers about agricultural activities.

➤ *Constraints in Adoption of Certified Rice Seeds (FARO 44) by the Farmers*

Table 4 shows the problem confrontation index (PCI) which depicts the perception of farmers on each of the identified constraints faced by farmers. Weak market for the commercialization of certified seeds had a PCI of 846 and was rank 1st in the order of importance based on the perception of the farmers. Lack of public awareness of certified seeds had a PCI of 845 and was ranked 2nd in the order of importance based on the perception of the farmers. Poor marketing infrastructure and destination for certified seeds had a PCI of 845 was ranked 3rd in the order of importance based on the perception of the farmers.

These results are in line with the findings of Agbonika (2015). The perception of the farmers about the Weak market for the commercialization of certified is a major challenge for the use of certified seed as there as only a few registered marketing outlets. Also, there is a problem of a patent right as farmers tend to share their seed with fellow farmers in the subsequent farming season. Lack of public awareness of certified seed is an offshoot of lack of access to extension services. Due to the widening gap of Farmer to Extension Agent gap over the years, hence there will be a lack of adequate information on certified seeds. Extension agents are primary the first point of call for most small-scale farmers in Nigeria.

*B. Test of Hypothesis*

➤ *Logistic Regression*

Table 5 shows the result of the logistic regression analysis of the effect of socio economic characteristics of the respondents on the adoption of certified rice seed (Faro 44) in the study area. The result shows that Nagelkerke R2 has a value of 0.237 which means that 23.7% of the variations in the dependent variable can be predicted by the independent variable. The result shows that farming experience and membership of cooperatives were significant at 5% probability level.

➤ *Effect of Farming Experience on Adoption Rate*

The regression result reveals that farming experience (.011) was positive and significant at 5% probability. Hence, for a unit increase in farming experience, if every other variable is constant, there will be a 0.157 unit increase in the adoption rate of Faro 44 rice variety in the study area. This implies that the higher the farming experience of farmers the more likely they are to adopt the variety. This is in line with the assertions of Karunathilaka and Thayaparan (2016) that as farmers’ getting more and more experienced in paddy cultivation, there is a higher probability for them to adopt new types of technologies. Because, experienced farmers are less risk averse and willing to adopt an innovative technology that is perceived to come with high financial rewards and improve their lot.

➤ *Effect of Membership of Cooperative Society on Adoption Rate*

The result in Table 5 showed that membership of cooperative society (.010) was positive and significant at 5% probability. The result shows that for a unit increase in membership of cooperative society, assuming all other variables remain constant, there will be a 1.595 unit increase in the adoption of Faro 44 in the study area. This implies that being membership of cooperative society positively influences the adoption rate of Faro 44 in the study area. This is in line with the findings of Abebaw and Haile (2013) and Khonje *et al.* (2015) which stated that membership of cooperative society has a positive influence in the adoption of improved seed, fertilizer and pesticides.

The logistic regression analysis in Table 5 shows that farming experience and membership of cooperative society were significant at 5% level of probability. Therefore, the null hypothesis was rejected for those significant variables while the alternative hypothesis was accepted. However, age, marital status, household size, farm size, extension contact and educational level were not significant. Hence, the null hypothesis was accepted for those variables while the alternative hypothesis was rejected.

Variables	Frequency	Percentage	Mean
<b>Sex</b>			
Female	133	49.26	
Male	137	50.74	
<b>Age</b>			<b>47.37</b>
≤ 30	35	12.96	
31 – 40	62	22.96	
41 – 50	61	22.59	
51 – 60	61	22.59	
≥ 61	51	18.89	
<b>Educational Status</b>			
Non-Formal Education	72	26.67	
Primary	108	40	
Secondary	55	20.37	
Tertiary	35	12.96	
<b>Marital Status</b>			
Single	32	11.85	
Married	151	55.93	
Divorced	36	13.33	
Widow	51	18.89	
<b>Household Size</b>			<b>5.88</b>
≤ 5	143	52.96	
6 – 10	110	40.74	
11 – 15	13	4.81	
≥ 16	4	1.48	
<b>Rice Farming Experience</b>			<b>11.09</b>
≤ 10	168	62.22	
11 – 20	84	31.11	
21 – 30	11	4.07	
≥ 31	7	2.59	
<b>Farm Size</b>			<b>2.17</b>
≤ 2.2	168	62.22	
2.3 – 4.2	77	7.7	
4.3 – 6.2	19	7.04	
6.3 – 8.2	2	0.74	
≥ 8.3	4	1.48	
<b>Access to Credit</b>			
Access	7	2.59	
Non-Access	263	97.41	
<b>Member of Cooperative Society</b>			
Member	158	58.74	
Non-Member	111	41.26	
<b>Contact with Extension Agent</b>			
Contact	20	7.41	
Non-Contact	250	92.59	
<b>Total</b>	<b>270</b>	<b>100</b>	

Table 2: Socio-Economic Characteristic of the Respondents

Source: Computed from Field Data, 2020

S\N	Perceptions	Mean	Rank Order
1	It has a high quality assurance	3.24	1st
2	It gives better yield than the saved seeds	3.23	2nd
3	It is cleaner than the saved seeds	3.22	3rd
4	It has a high viability	3.21	4th
5	When planted, bountiful produce will be harvested	3.2	5th
6	It helps in boosting agricultural production	3.2	5th
7	It is the starting point to a successful harvest and income	3.2	6th
8	Certified seeds require minimal application of other inputs such as Fertilizers and herbicides	3.15	7th
9	It is high in genetic purity, germination and vigor	3.14	8th
10	It is free from disease, damaged or immature seeds	3.13	9th
11	The yield of FARO 44 is better or superior to that of the local varieties	3.04	9th
12	The threshing of FARO 44 is better or superior to that of the local varieties	3.04	10th
13	The tillering of FARO 44 is better or superior to that of the local varieties	3.03	11th

Table 3: Farmers’ Perceptions on the Use of Certified Rice Seeds (FARO 44)

Source: Computed from field data, 2020

S\N	Constraints	Strongly Disagree	Disagree	Strongly Agree	Agree	Percentages of Farmers	Rank
1	Weak market for the commercialization of certified seeds	2	52	528	264	6.85	1 <sup>st</sup>
2	Lack of public awareness of certified seeds	4	64	477	300	6.84	2 <sup>nd</sup>
3	Poor marketing infrastructure and destination for certified seeds	3	60	504	276	6.82	3 <sup>rd</sup>
4	Inconsistency in government policies and programs	3	52	531	256	6.81	4 <sup>th</sup>
5	Inadequate access to extension services	3	58	534	240	6.76	5 <sup>th</sup>
6	Insufficient personal and organizational involved in dissemination of certified seeds	3	68	528	228	6.69	6 <sup>th</sup>
7	High cost of certified seeds	4	68	528	224	6.67	7 <sup>th</sup>
8	Lack of technological capacity and low level of enterprise development	3	72	528	220	6.66	8 <sup>th</sup>
9	Lack of resources required to setup long term monitoring programs	3	72	528	220	6.66	8 <sup>th</sup>
10	Lack of adequate information on certified seeds, its potential and risks	8	68	507	236	6.63	9 <sup>th</sup>
11	Lack of proper guidelines and institutional support for commercial releases of certified seeds	4	62	567	184	6.61	10 <sup>th</sup>
12	Lack of scientific capacity to perform seed research	5	84	519	200	6.54	11 <sup>th</sup>
13	Socio-cultural beliefs and value system	9	76	516	204	6.51	12 <sup>th</sup>
14	Lack of proper understanding of certified seed by the farmers	2	68	507	224	6.48	13 <sup>th</sup>
15	Lack of proper guidelines and institutional support by the regulatory bodies to regulate certified seeds	4	96	519	180	6.47	14 <sup>th</sup>
<b>TOTAL</b>						<b>100</b>	

Table 4: Constraints in Adoption of Certified Seeds by the Respondents

Source: Computed from field data, 2020



	B	Std. Error	Wald	
Gender	-0.268	0.466	0.331	0.565
Age	-0.016	0.024	0.417	0.518
Marital status	-0.599	0.548	1.193	0.275
Household size	0	0.072	0	0.996
Farming experience	0.157	0.062	6.442	.011**
Farm size	-0.137	0.094	2.115	0.146
Membership of cooperative	1.595	0.62	6.628	.010**
Extension contact	19.106	10280.842	0	0.999
Educational level	-0.428	0.608	0.495	0.482
Constant	-18.381	10280.842	0	0.999

Table 5: Logistic Regression of the Effect of Socio Economic Characteristics of Respondents on the Adoption of Certified Rice Seed (Faro 44) in the Study Area

Nagelkerke R2 = 0.237

### C. Summary

The study evaluated the adoption of certified rice seeds (FARO 44) among local farmers in FCT, Abuja. The specific purpose of the study is to: describe the socio-economic characteristic of the respondents, evaluate the level and sources of awareness of certified rice seeds (FARO 44) by the respondents, evaluate the adoption rate and sources of certified rice seeds (FARO 44) by the respondents, determine farmers' perceptions on the use of certified rice seeds (FARO 44), and identify the constraints in adoption of certified rice seeds (FARO 44) by the respondents. The study was guided by one hypothesis: There is no significant relationship between the socio-economic characteristics of the respondents and the adoption of certified rice seeds (FARO 44) in the study area. A total of 270 rice farmers were sampled and used for the study. The study made use of both descriptive statistics and inferential statistics for data analysis.

From the result, 50.74% of the farmers were male, 58.51% of the farmers were below 50 years old with a mean age of 47.37 years. Majority of the farmers was married and educated with a mean household size was about 5.88 persons and below 5 years of experience in rice farming. The average farm size was 2.17 hectares, most (97.413%) of rice farmers in the study area had no access to credit facilities, and had no contact with an extension agent. About 58.74% of the smallholder rice farmers belong to a cooperative society.

Majority (43.7%) of the respondents were highly aware of certified seeds, 72.59% of the respondents said got information from the annual field day of the National Agricultural Seed Council. The adoption rate was calculated to be 0.8444. 30.74% got their seeds from Seed Regulatory Council (NASC). The perception of the farmers about the certified seed that was ranked first was that it has a high-quality assurance. The weak market for the commercialization of certified seeds had a PCI of 846 and was rank 1st in the order of importance based on the perception of the farmers. The logistic regression analysis revealed that farming experience and membership of cooperative society significantly affected the adoption of

Faro 44 at 5% level of probability. Therefore, the hypothesis was rejected for those significant variables while the hypothesis was accepted for non-significant variables (age, marital status, household size, farm size, extension contact and educational level).

## VII. CONCLUSION

From the foregoing it can be concluded that most of the respondents had a formal education, were male married, and had a mean age of farmers was 47.35 years; Majority of the respondents were highly aware of certified seeds, most of the respondents said got information from annual field day of National Agricultural Seed Council, and the adoption rate was calculated to be 0.8444. Most farmers perceive that certified seed had a high-quality assurance. The major problem faced by farmers in this area was the weak market for the commercialization of certified seeds. From the test of hypothesis, the socio-economic characteristics of the respondents affected the adoption of certified seeds FARO 44.

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