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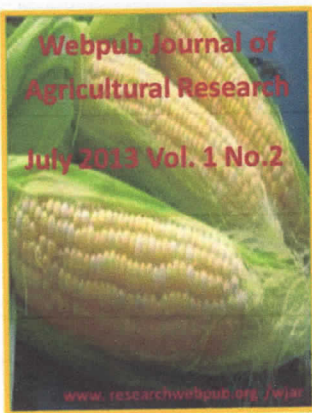Webpub Journal of Agricultural Research

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**Full Length Research Paper**

# Utilization of certified seeds among small holder rice farmers in Lavun local government area of Niger State, Nigeria

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### Abstract

The study examined the utilization of certified seeds among small holder rice farmers in Lavun Local government area of Niger State, Nigeria. Data used for the study were obtained using structured questionnaire administered to 80 randomly selected rice farmers. Descriptive statistics such as frequencies, percentages, means and 4-point Likert were used to describe the socio-economic characteristics of the farmers and the constraints faced by the respondents. The multiple regression model was used to determine the factors that influence the respondents' utilization of certified seeds. The study revealed that 41.2% of the respondents were between 41-50 years with the mean age of 44.6 years. All the respondents were male, 88.8% of the respondents were married, 77.5% had formal education, 70.0% of the respondent had above 20 years rice farming experience with a mean of 28.0 years, 45% of the respondents had household size between 6-10 persons with a mean household size of 11.2, and 46.2% of the respondents had farm size greater than 2.5 ha with a mean farm size of 2.7 ha. The respondents' major sources of certified seeds were other farmers and friends/relatives. Factors influencing the respondents' utilization of certified seeds, like farm yield, age, farming experience, education, credit access, labour and farmers' preference were found to have significant and positive influence on certified seed utilization by the farmers .The study also reveals that farmers were faced by some major constraints in their utilization of certified rice seeds, such as: irregular extension visit, inadequate credit, inadequate capital, high cost of certified seeds, inadequate training, poor supply of certified seeds, etc. the study recommended that more extension services should be made available to these farmers, certified seeds and other inputs should be subsidized and credit facilities should be readily available to the farmers to boost their capital and help them utilize more certified rice to increase rice productivity.

**Key words:** Certified seed, utilization, smallholder rice (*Oryza sativa*) farmers.

## INTRODUCTION

Nigeria is the most populous country in Africa, with a population of 140,003,542 people according to the National Population Census (NPC, 2006). Its domestic economy is dominated by agriculture, which accounts for about 40% of the Gross Domestic Product (GDP) and two-thirds of the labour force (Akande, 2001). Rice (*Oryza sativa*), is one of the major food crops cultivated by farmers in all agro - ecological zones of Nigeria and widely consumed by a large proportion of the population.

About the mid-1970s, rice consumption in Nigeria has risen tremendously than in other West African countries. At about 10% per annum due to changing consumer preferences, an average of 25 kg of rice is consumed annually per person. Domestic production has never been able to meet the demand, leading to considerable imports which today stand at about 1,000,000 metric tons yearly (USAID/MARKET, 2007). Demand is met both by locally produced and imported rice. Of the total demand

**Table 1.** Socio-economic characteristics of the respondents.

| Variables | Frequency | Percentage | Mean |
|---|---|---|---|
| **Age (years)** | | | |
| below 21 | 2 | 2.5 | |
| 21-30 | 3 | 3.8 | |
| 31-40 | 23 | 28.8 | 44.5875 |
| 41-50 | 33 | 41.2 | |
| above 50 | 19 | 23.8 | |
| | | | |
| **Marital status** | | | |
| Single | 5 | 6.2 | |
| Married | 71 | 88.8 | |
| Divorced | 3 | 3.8 | |
| Widowed | 1 | 1.2 | |
| | | | |
| **Education level** | | | |
| No education | 8 | 10.0 | |
| Primary education | 22 | 27.5 | |
| Secondary education | 23 | 28.8 | |
| Tertiary education | 17 | 21.2 | |
| Qur'anic education | 3 | 3.8 | |
| Adult education | 7 | 8.8 | |
| | | | |
| **Years of farming experience** | | | |
| 1-5 | 1 | 1.2 | |
| 6-10 | 4 | 5.0 | |
| 11-15 | 13 | 16.2 | 27.975 |
| 16-20 | 6 | 7.5 | |
| above 20 | 56 | 70.0 | |
| | | | |
| **Household size** | | | |
| 1-5 | 12 | 15.0 | |
| 6-10 | 36 | 45.0 | |
| 11-15 | 16 | 20.0 | 11.175 |
| 16-20 | 4 | 5.0 | |
| above 20 | 12 | 15.0 | |
| | | | |
| **Farm size (ha)** | | | |
| 0.01-0.50 | 1 | 1.2 | |
| 0.51-1.00 | 2 | 2.5 | |
| 1.01-1.50 | 15 | 18.8 | 2.68875 |
| 1.51-2.00 | 7 | 8.8 | |
| 2.01-2.50 | 18 | 22.5 | |
| Above 2.50 | 37 | 46.2 | |
| | | | |
| **Total** | 80 | 100 | |

Source: Field survey (2012).

of 5 million tonnes in 2006, imports account for 1.6 million tonnes. The imports are procured on the world market with Nigeria spending annually over US$300 million on rice imports alone (CARD, 2009). According to Tiamiyu et al. (2010) and Akande (2001) the country ranks first among the major rice - importing countries in Africa and

**Table 2.** Distribution and ranking of respondents' sources of certified seeds.

| Seed sources | Frequency* | Percentage | Rank |
|---|---|---|---|
| Own production | 10 | 12.5 | 4th |
| Fellow farmers | 70 | 87.5 | 1st |
| Friends / relatives | 18 | 22.5 | 2nd |
| Open market | 8 | 10 | 5th |
| Research institute | 16 | 20 | 3rd |
| ADP | 3 | 3.8 | 6th |
| Cooperative | 1 | 1.2 | 7th |

Source: Field survey (2012), *multiple response.

second after Philippines in the world. Certified seed has the potential to generate increase in rice yield and make Nigeria self-sufficient in rice production (Awotide et al., 2011). Certified seeds are seeds that are pure (of the chosen variety), full and uniform in size, viable (ensure more than 80% germination) and free from weed seeds, seed-borne diseases, pathogens, live insects, or other matter (Dugje, 2008).

These kinds of seeds have played a vital role in augmenting agricultural production in developing countries like India (Surry, 1997). Increased competitiveness in production among farmers, high market integration, increased productivity of labour and land, diversification of crops, change in consumption pattern and health, increased food security through increased farmers access and food supply, asset creation or building, increase farmers income, could lead to overall poverty reduction of farming household, farmers can crop several times within a planting period due to relatively shorter growing period of these certified seeds, reduces cropping hazards brought about by diseases and pests due to their genetic configuration, cheaper cost of food due to increased supply are among the many benefits of certified seeds (Emana et al., 2010; Awotide et al., 2011). However, farmers' access to this seed is a function of many factors that has not been well documented in Nigeria (Awotide et al., 2011). The utilization of certified seeds by farmers for growing cereal crops (e.g. rice (*O. sativa*), cowpea (*Virgina unguiculata*), and maize (*Zea mays*) is slow in Nigeria. The low uptake is due to constraints in both the supply and demand for seeds (Takeshima and Sheu, 2009). Awotide et al. (2011) opined that certified seed has the potential to generate increase in rice yield and make Nigeria self-sufficient in rice production. Dugje et al. (2008), out lined the sources of seeds available to farmers: their own saved seeds, seeds producers within their communities, including neighbours, relations, and friends, the open market, including commercial seeds/grain, research Institutes/Agricultural Development Projects (ADP).

Oladiran (2010) grouped seed sources in Nigeria into informal and formal sectors. He opined that operations in the informal seed sector are usually unregulated. In this sector farmers usually source seeds from their own savings, other farmers, relatives, friends and local markets. Formal seed system on the other hand, is well organized and produces certified seeds. It is composed of the public and private sectors.

Dugje et al. (2008), Awotide et al. (2011) and Emana et al. (2010), outlined the benefits of certified seeds utilization by farmers: Good seeds lead to better germination (over 80%), reduce the need for replanting, give more uniform plant stand and thus make harvesting easier, give more vigorous early plant growth which helps the plant to compete better with weeds and resist insect pests and disease attacks, and are pest/disease/drought tolerant or resistant, they give higher yields, increased competitiveness in production among farmers, high market integration, increased productivity of labour and land diversification of crops, change in consumption attitude and increased food security, increase farmer's income, cheaper cost of food stuffs and food security. Yield levels of more than 3 ton/ha are achievable with the use of certified seeds, pesticides and adequate fertilizer application (Ajala, 2005). The way out of low productivity is the adoption of certified seeds with other packages that go with the technology (Omolehin, 2008). However, production and use of certified seeds depends on the availability of the certified, high yielding and well adapted varieties. This is important since quality of seed is one of the primary requirement for establishing food security to farmers and the nation at large (Muhammed, 2002; Emana et al., 2010).

One of the problem militating against the use of certified seeds by farmers is the non availability of these certified seeds since their production were originally done by the few big commercial farms that are unable to produce enough to go round all the rice farmers. The exclusive production of seeds by big farms also made small farmers to consider certified seed as foreign activities that are not made for their type of farming activities and participation (Omolehin, 2008). If this is not properly looked into and corrected, our rice production capacity will remain low and could gradually decrease if not rapidly and will drastically affect farmers productivity and consequently National food availability and security.

It is against the background that the researcher seeks to ascertain the determinants of the use of certified seed by smallholder rice farmers. The specific objectives of the study are to: identify the socio-economic characteristics of the respondents, farmers sources of certified seeds, factors affecting smallholders' rice farmers' utilization of certified seeds and constraints associated with the utilization of certified seed and respondent's perception of the constraints.

## MATERIALS AND METHODS

The study was conducted in Luvun Local government area of Niger state, Nigeria. It is located between latitudes 9°12'00"N and longitude 5°36'00"E, the postal code of the area is 912 with an area of 2,835 km$^2$ (Wikipedia, 2012). The climate and ecological conditions of the area is favourable with mean rainfall of 762 – 1016 mm annually. The temperature is about 82°F or 27.78°C (Wikipedia, 2012). The inhabitants of the Local Government Area are subsistent farmers. The major crops produced are millet (*Pennisetun glaucun*), rice (*O.sativa*), maize (*Z. mays*), Sorghum (*Sorghum bicolor*), cassava (*Manihot esculenta*), groundnuts (*Arachis hypogaea*) and sweet potatoes (*Ipomea batata*). Doko development area of Lavun Local Government was purposively selected owing to their large scale rice production. Four districts namely: Doko, Gaba, Mambe and Jima districts were randomly selected from Doko development area. 20 rice farmers were also randomly selected from each of the four districts, giving a sample size of 80 respondents. Primary source of data was used for the study, through a well structured questionnaire / interview schedule. The following analytical tools were used, descriptive statistics, four point Likert scale and linear multiple regression to achieve the objectives, and Pearson's correlation analysis was used for testing the hypothesis.

### Linear multiple regression model

**Implicit form:** $Y=f(X_j)$

**Explicit form:** $Y=\alpha+\beta_j X_{ij}+U$

Where Y= dependent variable, $\alpha$= intercept, $\beta_j$= coefficients of estimates, $X_{ij}$ = independent variables, U = error term (Gujarati, 2004).

### Definition of variables

**Dependent variable:** Y = Quantity of certified rice seed utilized (kg)

**Independent variables:** $X_1$=Farm yield (kg), $X_2$= Age of farmer (years), $X_3$= Years of experience (years), $X_4$= Level of education (years), $X_5$= Access to credit (1 for yes, 0 otherwise), $X_6$= Area of cultivated land / Farm size (ha), $X_7$= Labour (man days), $X_8$= Farmer's preference (1 for certified seed, 0 otherwise).

## RESULTS AND DISCUSSION

**Age**: The age distribution reveals that about 41.2% were between the ages of 40- 50 years and 28.8% were between 31-40 years. The mean age of the respondents was 44.6 implying that the respondents were still in there active and productive age.

**Marital:** Table 1 reveals that majority of the respondents (88.8%) were married and 6.2% were single This implies that the majority of the respondents may not have to spend much on labour because they may have enough coming from family labour thus reducing the cost of hiring labourers, thereby saving cost of production.

**Educational status:** The level of education of the respondents reveals that only 21.2% were educated to tertiary level. 28.8% had secondary education, 27.5% had primary education. 8.8% and 3.8% had adult and qur'anic education respectively, while 10% were without any form of education. Access to formal education makes it easier for the farmers to accept and adopt modern ways (innovation and technologies) of agricultural production. Technical know-how as a major constraint can be alleviated or minimised if illiteracy level of the farmers are addressed appropriately.

**Rice farming experience:** The result shows that majority (70.0%) of the respondent had above 20 years of rice farming experience while 16.2% had experience between 11-15 years; this result signifies that the respondents were experienced in the production of rice in the study area. This could lead into profitable agricultural production.

**Household size:** Majority (45.0%) of the respondents had household size of 6-15 persons, 20% had between 11-15 persons, 15% had between 1-5 persons and above 20 persons while 5% had between 16-20 persons with a mean household size of 11.2 persons. Larger family size could supply more labour to the farmers thus reducing cost on labour.

**Farm size:** 46.2% of the respondents had farm size greater than 2.5 hectares, 22.5% had between 2.01-2.50 ha, 18.8% had between 1.01-1.50 ha, 8.8% had between 1.51 - 2.00 ha and 3.7% had between 0.01-1.00 ha. The mean farm size was 2.7 ha. The mean farm size is not surprising since the study is focused on small-holder rice farmers.

Majority (87.5%) of the rice farmers' source of certified seeds was other farmers thus ranking 1$^{st}$, friends / relatives ranked 2$^{nd}$ (22.5%), research institute ranked 3$^{rd}$ (20%), their personal production ranked 4$^{th}$ (12.5%), open market, ADP and cooperatives ranked 5$^{th}$ (10%), 6$^{th}$ (3.8%) and 7$^{th}$ (1.2%) respectively (Table 2). This result implies that there are more contact farmers than extension agents since majority (87.5%) attested that their source of certified seed was from other farmers and just few through official sources (research institute and ADPs).

As revealed in Table 3, factors like farm yield, age, farming experience, education, credit access, labour and farmers' preference had significant and positive influence on certified seed utilization. Farm yield and education

**Table 3.** Multiple regression result showing factors influencing utilization of certified by the respondents (exponential function as lead equation).

| Variables | Coefficients | t-value |
|---|---|---|
| Constant | 6.9469 | 401.82*** |
| Rice output (kg) | 0.0000 | 4.22*** |
| Age (years) | -0.0010 | -2.36** |
| Farming experience (years) | 0.0010 | 2.44** |
| Education (years) | 0.0019 | 3.80*** |
| Credit access | 0.0192 | 2.29** |
| Farm size (ha) | 0.0056 | -1.11$^{ns}$ |
| Labour (man-days) | -0.0001 | -1.71* |
| Farmers' Preference | 0.0236 | 2.50** |
| F-value | 29.11*** | |
| $R^2$ | 0.7664 | |
| Adj. $R^2$ | 0.7400 | |

Source: Data analysis (2012).*** - 1% level of significance, ** - 5% level of significance,* - 10% level of significance.

**Table 4.** Ranking of factors hindering respondents' utilization of certified seeds.

| Constraints | Frequency* | Percentage* | Rank |
|---|---|---|---|
| High cost of certified seeds | 60 | 75.0 | 4th |
| High cost of inputs | 48 | 60.0 | 8th |
| Unavailability of inputs | 30 | 37.5 | 11th |
| Poor supply of certified seeds | 55 | 68.8 | 6th |
| Irregular extension visits | 72 | 90.0 | 1st |
| Not a member of cooperative | 15 | 18.8 | 13th |
| Little farming experience | 20 | 25.0 | 12th |
| Small farm size | 35 | 43.8 | 10th |
| Inadequate training | 58 | 72.5 | 5th |
| Poor technical knowledge | 48 | 60.0 | 8th |
| Low returns | 54 | 67.5 | 7th |
| Inadequate credit | 68 | 85.0 | 2nd |
| Inadequate capital | 62 | 77.5 | 3rd |

Source: (Field survey, 2012), * - multiple response.

were significant at 1%; age, farming experience, credit access and farmers' preference were significant at 5%; while labour was significant at 10%. All other factors were positively significant except for age and labour that were negatively significant. Indicating that an increase in those factors will positively and significantly lead to an increase in the farmers' utilization of certified seeds and an increase in those factors which were negatively significant will lead to a decrease in the farmers' utilization of certified seeds. The coefficient of determination ($R^2$) has a value 0.7664 indicating that 76.64% of the variation in the farmers' utilization of certified seeds was accounted for the variations in the explanatory variables.

Table 4 reveals that the challenges faced vary from farmer to farmer. Majority (90.0%) identified irregular extension visit as a problem, thus ranking 1st among the factors hindering their utilization of certified seeds.

Inadequate credit ranked 2nd (85.0%), inadequate capital ranked 3rd (77.5%), high cost of certified seeds ranked 4th (75.0%), inadequate training ranked 5th (72.5%). This implies that smallholder rice farmers faced serious problems in utilizing certified seed which is usually responsible for their low productivity.

Table 5 reveals that all the constraints identified were perceived important by the farmers, except for low returns, not a member of cooperative and little farming experiences which were perceived as not important. This implies that smallholder rice farmers faced serious problems in certified seed utilization.

## Test of hypothesis

Hypothesis for this study was tested using the Pearson's correlation analysis (Table 6). The null hypothesis ($H_0$)

**Table 5.** perception of respondents about the constraints.

| Constraints | Perception frequency | | | | Weighted sum | Weighted mean | Overall perception |
|---|---|---|---|---|---|---|---|
| | Very important | Important | Slightly important | Not important | | | |
| High cost of certified seeds | 20 | 50 | 10 | 0 | 250 | 3.125 | Important |
| High cost of inputs | 40 | 33 | 7 | 0 | 273 | 3.4125 | Important |
| Unavailability of inputs | 15 | 30 | 20 | 15 | 205 | 2.5625 | Important |
| Poor supply of certified seeds | 42 | 30 | 8 | 0 | 274 | 3.425 | Important |
| Irregular extension visits | 50 | 30 | 0 | 0 | 290 | 3.625 | Important |
| Not a member of cooperative | 0 | 5 | 35 | 40 | 125 | 1.5625 | Not Important |
| Little farming experience | 0 | 2 | 30 | 48 | 114 | 1.425 | Not Important |
| Small farm size | 20 | 32 | 20 | 7 | 223 | 2.7875 | Important |
| Inadequate training | 11 | 27 | 42 | 0 | 209 | 2.6125 | Important |
| Poor technical knowledge | 43 | 27 | 10 | 0 | 273 | 3.4125 | Important |
| Low returns | 20 | 13 | 17 | 10 | 163 | 2.0375 | Less Important |
| Inadequate credit | 60 | 15 | 5 | 0 | 293 | 3.6625 | Important |
| Inadequate capital | 20 | 60 | 0 | 0 | 260 | 3.25 | Important |

Source: (Field survey, 2012).

**Table 6.** Pearson's correlation analysis showing the relationship between respondents' utilization of certified seeds and farm yield.

| | | Utilization of certified seeds (kg) |
|---|---|---|
| **Farm yield (kg)** | Pearson Correlation | 0.717[**] |
| | Sig. (1-tailed) | 0.000 |
| | N | 80 |

**. Correlation is significant at the 0.01 level (1-tailed).

which stated that there was no significant relationship between the yield of the farmers and their utilization of certified seeds is rejected because the result shows that there was a significant and positive relationship between farmers yield and the utilization of certified seeds at 1% level of significance.

## CONCLUSION AND RECOMMENDATIONS

Majority of the respondents were still in their active age and were literate. Factors like farm yield, years spent in school, age, farming experience, credit access, farmers' preference and labour were among the factors affecting the respondents' utilization of certified rice seeds. The respondents were faced with some constraints in their utilization of certified rice seeds such; inadequate extension contact and high cost of inputs. It was recommended that smallholder rice farmers in the study area should be empowered so as to contribute their quota to rice production, more extension services and

Certified seeds should be made available to these farmers, credit facilities and other farm inputs should be subsidized and made readily available to these farmers.

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