



ASSESSMENT OF ADOPTION AND UTILISATION OF SUPERIOR RICE GERmplasm BY SMALLHOLDER FARMERS IN FOUR RICE PRODUCING ZONES OF NIGERIA

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(Received 9 January 2020; Revision Accepted 20 February 2020)

ABSTRACT

Conservation and sustainable use of plant genetic resources is essential to the sustainable development of agricultural production and rural in production zones in Nigeria. This study, therefore investigated the utilisation of recently released superior rice germplasm among smallholder farmers in Nigeria. A post-crop varietal release impact assessment was conducted in Oyo, Ekiti, Kwara and Ebonyi states of Nigeria in 2019. Structured questionnaires were administered to 120 farmers using a simple random sampling technique. Result from the study revealed that rice farmers are mainly males, middle aged, married, with some form of education. They have medium (3-6 household member) household size with longer years of farming experiences. Inadequate capital and limited credit facilities, plant disease, birds and insect infestation are the major constraints encountered by the farmers. Result of the correlation analysis shows that there was no significant relationship between sources of planting materials and frequently planted varieties ($r = 0.100$ and $p = 0.786$). However, there was significant relationship between production constraints and frequently planted varieties ($r = 0.010$ and $p = 0.648$). It is recommended that more channels of credit facilities should be provided to rice farmers by governments at various levels to improve their level productivity.

KEYWORDS: Rice, adoption, genetic resources, utilisation, smallholder farmers

INTRODUCTION

Nigeria is endowed with abundant plant genetic resources with substantial potentials for agricultural production. It ranks first among the leading agricultural producers in the West Africa sub-region. Rice (*Oryza sativa* L.) is a cereal belonging to the family Gramineae, a large monocotyledonous family of some 600 genera and around 10,000 species. It is one of the leading food crops in the world and the most consumed staple food in Nigeria (Hawksworth, 1985). Rice is best grown in lands with moderately high water holding-capacity or swampy lands.

Rice is a major source of carbohydrates, minerals, and vitamins which provides energy in the human body.

Rice, wheat, maize are the three leading food crops in the world; together they directly supply more than 42% of all calories consumed by the entire human population (GRISP, 2013). The crop is third highest in global food production, after wheat and maize (Romain, 2001; FAOSTAT, 2012). In Nigeria, over sixty seven (67) improved rice varieties bred by national institutes, private seed companies and Africa Rice (a CGIAR Centre) have been released and registered by the National Crop Varietal Release Committee (NACGRAB, 2014). However, majority of the rice farmers source their seed for planting from saved seeds and closed relatives. Additionally, the extent of distribution and utilisation of these improved rice germplasm by smallholder farmers in Nigeria is relatively unknown. Therefore, this study

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seeks to focus addressing gaps in availability of quality planting materials for rice farmers, and enhance the utilisation and adoption of rice germplasm in the rice growing zones of the country. The following questions were answered by this study.

1. What are the selected personal characteristics of rice farmers in the study area?
2. What are rice farmer's sources of planting materials in the area?
3. What are the major production constraints of rice farmers in the area?
4. What are the frequently planted rice varieties by the farmers planted in the study area?

Hypotheses of the study

Ho1: There is no significant relationship between Sources of planting materials and frequently planted varieties.

Ho2: There is no significant relationship between production constraints and frequently planted varieties.

METHODOLOGY

The study was carried out in Oyo, Kwara, Ekiti and Ebonyi States of Nigeria located within forest and southern guinea savannah ecological zones of the country. The States surveyed constitutes part of rice producing states of Nigeria. The population for the study comprised all rice farmers in the four States. Two (2) Local Government Areas (LGAs) were randomly selected from each of the 4 states, making a total of eight (8) LGAs. A snow ball sampling technique was used to generate 15 rice farmers from each of the LGA to give a total of 120 respondents. The data for the study were collected through interview schedules with the rice farmers. The data collected were analyzed using both descriptive (frequency counts, percentages and means) and inferential statistics (chi-square). The independent variables for the study include selected personal characteristics, planting materials sources, and production constraints. The dependent variable is rice farmers planting varieties.

RESULTS AND DISCUSSION

SOCIO-ECONOMIC CHARACTERISTICS OF RICE FARMERS

Findings in Table 1 showed that 35.0% of the respondents were between the ages of 31years and 40years, while 5.8% of the respondents were above 60 years of age. The mean age was 33.5years. This implies that rice producers in the study areas were in their active

and productive age which tends to positively influence their performance on the field. The relatively young age might make the farmers more receptive to new techniques of farming (Eddy, 2000). The results also showed that majority (88.3%) of the respondents were male while the remaining 11.7% were female. Furthermore, results in Table 1 showed that majority (85.8%) of the respondents were married while only 14.2% were single indicating that marriage confers a sense of responsibility among the farmers in the areas. 37.5% of the respondents had secondary school education while 27.3% and 11.7% had primary and tertiary schools education which implies that the literacy level in this study area is relatively high. This might help the farmers in sourcing and adopting improved rice varieties and also aid extension works. Marriage and education are of significance as they influence an individual's preference for source of information explored and their varied information needs (World Bank, 2004; FAO, 2000). Household size implies the total number of people staying under a roof and being fed. Majority (71.7%) of the respondents had between 3-6 household, which should presumably result in increased production. Table 1 showed that less than half (43.3%) of the respondents cultivated between 2-5 acres of farmland. This shows that most of the rice farmers operated on a small scale enterprise. This result corresponds with the findings of Kolawole (2007) that agricultural practice in Nigeria is usually carried out by smallholder farmers scattered over wide expanse of land area. Also, more than half (51.7%) of the respondents had grown rice for more than 11 years which implies that farmers in the study area have had relatively longer period of farming experience. Finally, Table 1 revealed that 64.2% of the respondents were aware of recently released and registered rice varieties.

SOURCES OF PLANTING MATERIALS

The result of the findings in Table 2 showed the distribution of respondents according to the sources of planting materials. Less than half (38.3%) of the respondents got their planting seeds from the previously harvested materials and 28.3% of the respondents got their planting seeds from agro-input dealers, while only 6.7% of the respondents got their planting seeds from Agricultural Development Programme (ADP). This is an indication that rice farmers in the study area might not have access to improved seeds.

Table 1: Distribution of respondents by socio-economic characteristics (n= 120)

Variables	Frequencies	Percentages
(Age)		
≤ 20	8	6.7
21-30	31	25.8
31-40	42	35.0
41-50	23	19.2
51-60	9	7.5
Above 60	7	5.8
Gender		
Male	106	88.3
Female	14	11.7
Marital Status		
Married	103	85.8
Single	17	14.2
Divorced	-	-
Widow	-	-
Educational Attainment		
Non-formal education	28	23.3
Primary education	33	27.5
Secondary education	45	37.5
Tertiary education	14	11.7
Household Size		
<3	32	26.7
3-6	86	71.7
7-10	2	1.7
Above 10	-	-
Farm Size		
≤ 2 acres	30	25.0
2-5 Acres	52	43.3
5-8 Acres	22	18.3
8-11 Acres	11	9.2
Above 11 Acres	5	4.2
Farming Experience (Years)		
1-5	33	27.5
6-10	25	20.8
11 and above	62	51.7
Awareness of recently registered varieties		
Yes	77	64.2
No	43	35.8

Source: Field survey, 2018

Table 2: Distribution of respondents showing sources of planting materials (n= 120)

Sources	Frequencies	Percentages
Saved seed	46	38.3
Farmers/Relative	23	19.2
Agro-input dealer	34	28.3
Agricultural Development Programme (ADP)	8	6.7
Ministry of Agriculture	9	7.5

Source: Field survey, 2018

Major constraints facing rice farmers

Data in Table 3 revealed that 32.3% of the respondents agreed that inadequate capital and credit facilities are the major constraints in rice production as it is often the case among rural farmers as reflected by Oyesola *et al.*, (2010). Table 4 also indicates that disease, insect pest and bird infestation (31.7%) as other constraints

affecting the production of rice which is in agreement with the findings of Okelola *et al.*, (2007). Knowledge of technical know-how (3.3%) was reported as a mild constraint, while (1.7%) of the respondents indicated lack of storage facilities as major constrains as they alternatively spread their planting seeds on the floor of the room or store .

Table 3: Distribution showing respondents' constraints

Constraints	Frequencies	Percentages
Disease, pest, bird and insect infestation	38	31.7
High cost of input and production	29	24.2
Unavailability of pure lines	21	17.5
Poor transportation system	7	5.8
Lack of technical know-how	4	3.3
Inadequate capital and credit facilities	39	32.3
Flooding	7	5.8
Strenuous and laborious production and processing activities	18	15.0
Land tenure system	6	5.0
Lack of farm machinery and equipment	5	4.2
Unfavourable weather condition	11	9.2
Lack of storage facilities	2	1.7

Source: Field survey, 2018

Frequently planted rice varieties

Table 4 reflected that 39.2% of the respondents claimed to have planted local rice germplasm and 36.7% of the respondents claimed that they planted FARO 44, while

only 1.7% of the respondents planted FARO 57. This implies that even though farmers in the study area might be aware of the improved rice varieties but did not source or have little or limited access to it.

Table 4: Distribution of respondents showing frequently planted rice varieties (n= 120)

Varieties	Frequencies	Percentages
FARO 44	44	36.7
FARO 45	4	3.3
FARO 52	13	10.8
FARO 54	4	3.3
FARO 57	2	1.7
FARO 66	6	5.0
Local	47	39.2

Source: Field survey, 2018

Results in Table 5 showed that majority (94.2%) of the respondents claimed that they were planting lowland rice while only 5.8% were planting upland rice varieties. This implies that the farmers were putting lowland or

swampy lands hitherto not cultivated for other arable crops into use for sustainability of their farming enterprise.

Table 5: Distribution showing respondents' ecology cultivated

Ecology	Frequencies	Percentages
Lowland	113	94.2
Upland	7	5.8

Source: Field survey, 2018

Hypothesis One (Ho₁): There is no significant relationship between sources of planting materials and farmers frequently planted varieties. Result in Table 6 shows that frequently planted varieties is not dependent

on the sources of planting materials. This implies that the sources of farmers planting material do not have any effect on their choice of varieties.

Table 6: Results of Correlation Analysis

Variables	r-value	p-value	Remarks	Decision
Source of planting materials/planted varieties	0.100	0.786	NS	Accept Ho ₁
Constraints/planted varieties	0.010	0.648	NS	Accept Ho ₂

Source: Field survey, 2018

$p > 0.05$ = not significant (NS), $p < 0.05$ = significant

Hypothesis One (Ho₂): There is no significant relationship between constraints and farmers frequently planted varieties. Table 6 reveals that varieties planted by the farmers was not dependent on the constraints. This suggest that the challenges faced by the farmers do not affect their choice of varieties planted.

CONCLUSION

It is concluded that the rice farmers in the production zones evaluated are mainly males, middle aged, married, with some form of education, have medium household size, and have years of farming experiences. They are quite aware of improved and recently released varieties, even though they still plant local varieties, obtained their planting seeds from previously harvested seeds. Moreover, inadequate capital and limited credit facilities, and diseases, insect pest and birds infestation are the major constraints encountered by the farmers. Non-availability of improved varieties is regarded as a mild challenge. Finally, the choice of farmers planting varieties is neither affected by sources of planting materials or the production constraints.

RECOMMENDATIONS

1. It is recommended that credit facilities and incentives should be provided for smallholder farmers by government at various levels to enhance production of superior rice varieties in the zones.
2. Government, non-government organizations/agencies and community based organizations (CBOs) should assist in educating the rice farmers through virile and effective agricultural extension system and advocacy in facilitating adoption of improved and recently released varieties.
3. There should be synergy of activities among relevant stakeholders in agri-input value chain so as to make superior rice germplasm and varieties available to users of genetic resources and smallholder farmers in Nigeria

ACKNOWLEDGEMENTS

The authors are grateful for the support received from the Director/CEO of National Centre of Genetic Resources and Biotechnology (NACGRAB) and Rural Development Administration (RDA), Republic of Korea

through Korea-Africa Food and Agriculture Initiative (KAFACI) funded project on Improvement of Technology on Conservation of Genetic Resources.

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