Analysis of adoption of improved rice production technologies in Jeer local government area of Borno state, Nigeria

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Abstract

The study analysed adoption of improved rice production technologies in Jere Local Government Area of Borno State, Nigeria. Descriptive statistics such as frequencies and percentages were used to analyse the data. The study revealed that 98.12% of the respondents were male, 57.5% were within 41-50 years and most (33.12%) of the respondents had adult education. The study revealed that majority (56.25%) of the respondents was aware of the rice production technologies in the study area. Majority of the respondents tried rice production technologies with respect to high yielding varieties (77.50%), early maturing varieties (69.37%), use of weedicides (93.75%), broadcasting method (55.00%), manual harvesting (75.00%) and bagging (63.75%). The study revealed that unavailability of fertilizer was the major (96.25%) constraint affecting the adoption of rice production technologies by respondents. The study recommends that extension services should be strengthened with necessary inputs for improved adoption of rice production technologies by respondents.

Keywords: Adoption, Rice production technologies, Jere, Borno State, Nigeria

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1. Introduction

1.1. Background to the study

Rice is from the family, *Gramineae, Genus; Oryza and species:* sativa L. and Glaberrima. It was taken to West Africa in the early 19th century (Jirgi et al., 2009). Rice is the staple food for about half of the human race. It is the leading cereal crop which can be grown in the standing water of areas of flat, low-lying tropical soils. West African Rice Development Association (WARDA) (2003) projected growth in rice consumption for Nigeria as high as 4.5 percent per annum. In response to the growing demand for this staple food crop, governments at various periods actively interfered in the economy coming up with policies and programme to this effect. An estimate of locally produced rice for the year 2002 was 2.9 million tons (WARDA, 2003; Imolehin and Wada, 2000). Also, only about 67 percent of the 25 million hectares of land cultivated to various food crops were cultivated to rice between 2000 and 2002 (Obinna, 1991). Throughout the period, rice output increased, but decreased in 1991-1995 periods.

Rice yield could increase due to growers using improved rice varieties which have potential to improve nutrition, boost food security, foster rural development and support sustainable land care (Jirgi et al., 2009). Therefore, it was found imperative to study the adoption of rice production technologies in Jere Local Government Area of Borno State, Nigeria.

1.2. Statement of the problem

To obtain improvement in rice production the farmers need to adopt improved farming techniques. Poor adoption of rice techniques by farmers would eventually lead to high cost of production with corresponding low yield. But, if farmers adopt and apply the improved techniques well, there would be increased productivity. Hence, to promote adoption, there is a need to study the factors that affect adoption. Furthermore, there has not been any empirical study into the adoption of improved rice production technologies implied in Jere Local Government Area of Borno State, Nigeria. This study was, therefore undertaken to fill this gap in scientific knowledge in the study are

1.3. Objectives of the study

The main objective of the study was to analyse the adoption of improved rice production technologies in Jere Local Government Area of Borno State, Nigeria. The specific objectives were to:
  i.   identify the socio-economic characteristics of rice farmers in the study areas;
  ii.   determine the stages of adoption of improved production technologies among rice farmers; and
  iii.   examine the problems of adoption of improved rice production technologies in the study area.

2. Methodology

The study was conducted in Jere Local Government Area of Borno State, Nigeria. The data for the study were mainly collected from primary sources, involving 160 respondents in the study area. This involved the use of structured questionnaires for the literate farmers and interview schedules for the illiterate ones. The data collected was subjected to statistical analysis using descriptive statistics which involves the use of frequencies and percentages.

3. Results and discussion

3.1. Socio-Economic characteristics of respondents

The socio-economic characteristics of the respondents studied include; Gender, Age, Educational Level, Farming experience, Household size, Farm size, and source of land. These are presented in Table 1.The results indicated that majority (98.12%) of respondents were male and only 1.88% were female. The above data suggested that male farmers were mostly the ones engaged in rice farming activities. The participation of female in farming in the study area was minimal due to the fact that their cultural belief does not permit full participation of women in farming. In the same vein, Bandiera and Rasul (2002) reported that gender of the household had a negative influence on the intensity of farming activities. They added that, female headed households were less likely to farm than male headed household. According to the study of Asfair and Asefa (2004) on the role of education on the adoption of chemical fertilizer under different socio-economic environment in Ethiopia, it was reported that male headed households were more likely to get information about new technology and take risky business than female-headed households.

Table 1 also shows that majority (57.50%) of the respondents were within age range of 41-50years old, indicating that the people involved in rice farming were more than average in terms of age. Less participation was found among those with less than 31 years of age representing 1.25% only of the respondents. The implication could be that the level of productivity could be affected negatively. Table 1 further show that most of the respondents (47.50%) acquired formal education from primary and above. The results indicated a fair level of education among the rice farmers in the study area which could have a great impact on adoption of improved rice technology by making their behaviours and attitudes to be positive towards adoption.

Table 1 indicated that most (35%) of the respondents have farming experience within 11-20years. The result revealed that the respondents had a reasonable of experience. Asfair and Asefa (2004) reported that there was low level of adoption among older farmers and that was because they have got built up ideas and practices over time and found it difficult to change. Table 1 showed that most (43.75%) of the respondents had about 6-10 members in their households, while only 3.75% of the respondents had 16-20 members in their household. This indicated that most of the farmers has less members in their households and that could be the reason why hired labour had been patronized in the study area due to the fact that the respondents were engaged in manual source of labour.

Table1. Distribution of respondents by socio-economic characteristics (n=160)

Socio-economic Variable	Frequency(No.)	Percentage (%)
Gender		
Male	157	98.12
Female	3	1.88
Age in years		
Less than 31	2	1.25
31-40	32	20.00
41-50	92	57.50
51 and above	34	21.25
Educational level		
Primary	36	22.50
Secondary	31	19.38
Post Secondary	10	5.62
Adult Education	53	33.12
None	30	19.38
Farmingexperience (years)		
1-10	7	4.38
11-20	56	35.00
21-30	54	33.75
31-40	40	25.00
41 and above	3	1.88
Household size (Numbers)		
1-5	53	33.125
6-10	70	43.75
11-15	31	19.38
16-20	6	3.75
Farm size(Hectares)		
1-3	98	61.25
4-6	58	36.25
7-9	2	1.25
10-12	2	1.25
Source of farmland		
Purchased	19	11.88
Inherited	103	64.38
Rented	38	23.75

Source: field survey, 2010

Table 1 showed that majority (61.25%) of the respondents had 1-3 hectare(s) of land, while only 1.25% of the respondents had 7-9 hectares of land, 1.25% had 10-12 hectares of land. Agbamu (2006) lamented that, there exists a significant relationship between the adoption of new farm practices and size of land of farmers. Therefore, lack of adequate farm lands by the majority of the respondents in the study area caused hinder adoption of improved technology due to the fact that they have only but little land to strive for their consumption and commercial purposes and might not ready to take risks of trying any new production technology. Considering land as one of the main required factor in production, Abu et al., (2011) reported that small farm size could be a factor which prevents farmers from adopting innovation because of the inappropriateness of modern technologies to the economic realities of small scale farmers. Farm size amongst other socio-economic factors was also found to be related to adoption and intensity of use of agricultural technologies.

Table 1 also indicated farmland ownership in the study area which was classified into purchased, inherited and rented. The result shows that majority (64.38%) of the respondents in the study area acquired their land through inheritance, while only 11.88% of the respondents were through purchasing. The study supports that of Abu et al. (2011), who reported that the impact of socio-economic factors on the adoption of improved farm practices in Nigeria tends to be higher among farmland owners than tenants.

3.2. Stages of Adoption of Rice Production Technologies by Respondents

Table 2 shows that there were identified stages in the process of adoption of rice technologies by respondents; when respondents were aware of the improved technologies, when they decided to try the improved technologies on a small scale to test the compatibility of the technologies in their own situation or farm to when they decided to adopt or reject the technologies. The study revealed that majority (56.25%) of the respondents was aware of the rice production technologies in the study area. This implies that enough creation of awareness has been mounted and the sources of information could be effective among the respondents.

Majority of the respondents tried rice production technologies with respect to high yielding varieties (77.50%), early maturing varieties (69.37%), use of weedicides (93.75%), broadcasting method (55.00%), manual harvesting (75.00%) and bagging (63.75%). This implies that appreciable level of trial was being achieved by respondents. The respondents finally adopted rice production technologies which included the major ones; high yielding varieties, disease resistant varieties, early maturing varieties, use of weedicides, broadcasting method, manual harvesting and bagging method of storage.

3.3. Problem of adoption of rice production technologies by respondents

The problems of adoption of rice production technologies by respondents are presented in Table 3. The study revealed that unavailability of fertilizer was the major (96.25%) constraint affecting the adoption of rice production technologies by respondents. This could be in addition to the high price associated with fertilizer. This implies that adoption of rice production technologies among the respondents could be negatively

affected, especially where the farmland needs fertilizer for increased productivity. The second most important (95.63%) constraint of the respondents in adopting rice production technologies was lack of credit facilities. The implication could be that the respondents could not have the purchasing power for necessary farm inputs, which could reduce the level of adoption of rice production technologies among respondents. Other important constraints identified by respondents in adopting rice production technologies were; lack of awareness of improved technologies (50%), conservative attitudes of farmers (46%), unavailability of improved seeds (93.63%), poor extension services (47%), insufficient land for cultivation (91.75%), constraint of labour (76.25%), lack of processing facilities (56.88%), poor transportation system (89.38%) and high cost of chemicals (42.50%).

Table 2. Distribution of Respondents by Adoption Stages of Rice Technologies

Rice Production Technologies	*Aware (%)	*Tried (% of aware)	*Adopted (% of tried)
Improved rice varieties			
High yielding varieties	66.25	77.50	80.00
Disease resistant varieties	61.25	41.87	60.62
Early maturing varieties	93.75	69.37	77.50
Improved pest/disease control			
Bacterial control methods	60.00	23.75	40.62
Fungi control methods	61.25	20.00	30.62
Virus control methods	56.25	36.87	20.62
Rodent control methods	97.50	33.75	31.25
Birds control methods	98.75	64.37	56.25
Use of weedicides	98.125	93.75	77.50
Improved planting technologies			
Drill method	88.125	45.00	48.75
Broadcasting method	100.00	55.00	90.00
Improved harvesting techniques			
Manual harvesting	100.00	75.00	92.50
Combined harvester	92.50	1.25	2.00
Improved storage methods			
Silos	89.375	8.75	2.62
Bags	100.0	63.75	92.50
Rhombus	98.75	36.875	0.0

*Multiple responses   Source; Field Survey, 2010

Table 3. Distribution of respondents by Problems of Adoption of Rice Production Technologies

Problems	*Frequency(No.)	*Percentage (%)
Lack of awareness of improved technologies	80	50.00
Conservation attitude of farmers	73	46.00
Lack of credit facilities	153	95.63
Unavailability of improved seeds	121	93.63
Poor extension services	76	47.50
Insufficient land for cultivation	150	91.75
Constraint of labour	154	76.25
Lack of storage facilities	44	27.50
Lack of processing facilities	91	56.88
Poor transportation system	143	89.38
High cost of chemicals	68	42.50
Unavailability of fertilizer	154	96.25

* Multiple responses   *Source: Field Survey, 2010*

However, the least important (27.50%) constraint of adoption of rice production technologies by respondents was lack of storage facilities. This implies that the respondents preferred their traditional means of storage which could be effective in the study are area. Umar et al. (2009) observed that diffusion of high yielding innovations depends on availability of farm inputs such as fertilizer. Farmers may desire to adopt new practices but are constrained by the inability of the extension personal to reach the farmers. Other factors the tends to make farmers stick to old practice may be high cost of agricultural innovations, unavailability, risk involved ignorance of existence of new innovations plus the conservative attitudes of many farmers (Agbamu, 2006; Chinaka et al., 2007).

4. Conclusion

The study revealed that majority of respondents was aware of rice production technologies in the study areas. However, the study also shows that farmers, by and large, had medium level of adoption of rice production technologies. The respondents' level of adoption could be constraint by lack of credit facilities as attested to by majority of the respondents.

5. Recommendations

Based on the findings of the study, the following recommendations were made;

1) Extension agencies should mount education and enlightment programme on the significance and impact of the rice production technologies on socio-economic condition of farmers.

2) Concerned stakeholders should focus attention on crucial factors; such as the constraints identified by this study through concerted efforts while formulating development strategies and programmes for farmers in the study area.

3) Credit facilities should be provided at no collaterals with very low interest rates for improved adoption of rice production technologies in the study area.

4) The respondents should be encouraged to form cooperative societies. This could enable them to take advantage of policies and programmes of government and non-governmental organizations.

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