Adoption of Improved Rice Production Technologies in Lavun Local Government Area of Niger State

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ABSTRACT

The study aimed at assessing the adoption rate of rice production technologies in Lavun Local Government Area of Niger State. A total of 76 farmers were randomly selected from the study area. Data were collected using interview schedule. The data were analyzed using descriptive statistics such as mean, frequency distribution and percentages as while as adoption index. The result revealed that the age of the farmers ranged from 20 to 68 years while the farming experience of the farmers ranged from 2 to 58 years. Only 11.84% of the farmers acquired tertiary education. The result indicated that majority of farmers (52.60%) were medium adopters of the existing technologies with fertilizer ranking as first (86.84%) while land preparation (tillage) ranked as fifth (34.21%). Major constraints to technologies adoption were found to be their high cost and inadequate supply. It is recommended that more enlightenment campaigns should be carried out to educate the farmers and credit should be provided to enable farmers procure adequate technological inputs to enhance adoption and increased production.

INTRODUCTION

Nigeria is endowed with substantial natural resources. These include 68 million hectares of arable land, fresh water sources covering 12 million hectares and an ecological diversity ranging from the forest in the south to the Sahel Savanna in the north, which enable the country to produce a wide variety of crops, livestock, forestry and fishery products. Backed with oil wealth, Nigeria has the potential of becoming one of the strongest agricultural economies in Africa (Shaib *et al.,* 1997; Hamidu, 2001).

Agriculture occupies a key position in the Nigerian economy judging by its critical role in employment and revenue generation as well as in the provision of raw materials for industrial development and food security. Nevertheless, the nation's agricultural potentials are far from being fully realized and this has unpalatable implication for food security and sustainable economic development (Olomola, 1995).

Nigeria is blessed with suitable ecologies for different rice varieties which can be cultivated to increase rice production to meet the country's domestic demand and production of surplus for export (Anonymous, 1997). The country has a potential land area of between 4.6 to 4.9 million hectares for rice cultivation. However, only 1.7 million hectares is being used for rice production. The rice cultivable lands cut across five major ecologies (upland, inland, irrigated land, deep water/floating land and tidal mangrove land (Singh *et al.,* 1997). It has been stressed that the possession of suitable rice environments has not earned Nigeria her rightful position as one of the leading rice producers in the world.

Small-scale farmers, characterized by traditional methods of production that are inefficient, dominate rice production in Nigeria. To ensure self-sufficiency in rice production, thereby enhancing food security and poverty alleviation, Nigeria's small-scale farmers certainly need to adopt improved rice production technologies. The adoption of improved rice production technologies right from field to processing is an investment worth making to

Increase rice output in the national economy. This study attempts to assess the rate of adoption of improved rice production technologies in Lavun Local Government Area of Niger State.

The specific objectives are, to determine:

i. the socio-economic characteristics of rice farmers in the study area
ii. the adoption of rice technologies in the study area.
iii. the constraints encountered in the utilization of the rice production technologies in the study area.

METHODOLOGY

The study area

Lavun Local Government Area of Niger State is located in the Southern Guinea Savannah zone of Nigeria. The area experiences two distinct climatic seasons in a year (rainy and dry seasons). Average annual rainfall ranges from 1,000 – 1,500mm. The rainy season extends from April to November reaching its peak in August. Average monthly temperature ranges from 23^0C - 29^0C (NSADP, 1994).

Farming is the primary occupation of the people of the area, while fishing or vocational jobs like craft and arts are the complementary occupations. Major crops grown include rice, sugar cane, sorghum, millet, maize, cowpea, yam and melon. Livestock reared include goat, sheep and cattle.

Sampling procedure and data collection

The sampling frame used for this study was obtained from Agricultural Development Project zonal office located in the study area. In line with the project activities, rice farmers were randomly selected from the 2 extension blocks in the study area. From each block 4 cells were selected, at each cell 3 villages were selected and in each village 3 or 4 farmers were selected. In all, seventy-six rice farmers were selected from 24 villages.

The data were obtained from the farmers directly involved in rice production using interview schedule. Data were collected with the assistance of the extension agents attached to each of the villages/localities sampled.

Data analysis

The data were analyzed using descriptive statistics such as mean, frequency distribution and percentages while adoption index was employed to determine the rate of adoption of existing rice production technologies in the study area. The adoption index (AI) of each farmer ranges from 1 – 100% depending upon the farmer's degree of adoption of proven practices or technologies (Kushwaha and Sani, 1998). The adoption index model used is:-

$$z\ (AI) = \sum_{R=1}^{n}\left(\frac{AHr}{CAr} + \frac{HAr}{HRr} + \frac{FAr}{FRr} + \frac{MPTUr}{MPTRr} + \frac{LPTUr}{LPTRr}\right) X \frac{CAr}{GCA}$$

Z (AI) = Adoption Index of farmers
r = Rice
AHr = Area under High Yielding Varieties (HYV) of rice crop
CAr = Cropped area for HYV and local varieties of rice crop
FAr = Amount of Fertilizer applied for unit area of rice crop
FRr = Amount of fertilizer recommended per unit area of rice crop
HAr = Amount of Herbicide applied as plant protection chemicals/unit area of rice crop.
HRr = Amount of herbicide recommended for rice crop

MPTUr = Number of Milling/processing cycles used for rice.
MPTRr = Number of milling/processing cycles recommended for rice.
LPTUr = Number of Land preparation (tillage) used in rice farms
LPTRr = Number of land preparation (tillage) recommended for rice farms
GCA = Gross cropped area

Based on the adoption index, farmers were classified into three categories: Low adopters (1 – 40%), Medium adopters (41 – 60%) and High adopters (61 – 100%).

In a similar study, Kushwaha and Sani (1998) used the adoption index to determine the adoption rates of new technologies by different categories of small-scale farmers in Bauchi State.

RESULTS AND DISCUSSION

Socio-economic characteristics of rice farmers in Lavun L. G. A. Niger State

The results in Table 1 showed that the minimum, maximum and mean age of the farmers were 20, 68 and 39 years respectively. The mean age of the respondents indicated that majority of the farmers were young adults. Therefore, they will be able to take favourable decisions with regards to technology adoption. In a recent study, Tsoho (2004) reported that young farmers have higher aspiration to accept new technologies than old and conservative farmers that always seem to be more satisfied with their traditional farming methods.

In the traditional non-mechanized farming, the household size determines the amount of family labour for farm work. The data in Table 1 revealed that there were no farmers having more than 39 or less than 2 members in their households. Household sizes determine the proportion of food crops, which a farmer may decide to grow using technologies.

Table 1 further indicated that the mean year of experience in rice farming by the respondents was 22 years, with a minimum and maximum of 2 and 58 years, respectively. Majority of the farmers had long years of experience which is expected to affect adoption because it will enable farmers learn to overcome constraints faced in the past adoption process.

Table 1 also indicates that the mean farm size in the study area was 2.2 hectares, which implies that majority of the respondents, were small-scale farmers. The lesson to be drawn here is that, a situation where many farmers cultivated only small plots of land will not promote agricultural production beyond subsistence level. This is particularly worrisome in relation to technology adoption, which requires relatively large area of land.

Educational level of rice farmers in Lavun L.G.A., Niger State

Rogers and Shoemaker (1997) stressed that education is not only an important determinant of adoption of new technology but also an instrument for successful implementation of technologies for profitability. The study revealed that less than 12 percent of farmers had attained tertiary education while 22 percent attained secondary education. The result also revealed that one quarter of the farmers had never been to school (see Table 2). An educated farmer is expected to be more efficient in combining resources through the knowledge gained from information in literature or other media than non-educated farmers. This is because the former will find it easier to obtain information regarding technologies than the latter.

The awareness, trial and adoption of rice production technologies in Lavun L.G.A. Niger State

The result in Table 3 shows that improved rice varieties, fertilizer, agro-chemical and milling/processing technologies have the highest level of awareness (100% each), followed by land preparation (tillage) technology (67.00%). However, certain proportion of the farmers did not try the technologies after the awareness. Based on this, extension agents have responsibility not only of extending the technologies but also of monitoring the outcome, effects, impact or results during and after adoption.

On the whole, Table 4 reveals that majority of the farmers were medium adopters (52.60%) and low adopters (26.30%) of the existing technologies in the study area. This is attributable to newness of some varieties; as such some respondents are still skeptical about committing large hectares of land to their adoption. Other reasons that are responsible for small sizes of land under high yielding improved varieties are inadequate awareness, and high cost of supportive technology such as fertilizer.

The mean kilogram of fertilizer applied by the respondents was found to be 50kg as against 80kg recommended. This perhaps also explains why most of the farmers fall within low and medium adopter categories. The inadequate application of fertilizer is due to the high cost of fertilizer coupled with the distribution and delivery system, which does not favour the farmers as it is usually politicized.

Other problems observed in relation to the use of agro-chemicals include over diluting of chemicals with water by the respondents and the use of broom and table water containers for spraying the chemiçals. This, beside re-invention may result in resistance of weeds and pests to the chemicals. This finding corroborates the findings of Pingali (1994) who reported that farmers were unable to use agro-chemicals correctly because they are not adequately trained on how to use spraying equipments.

The mean number of milling cycles adopted by respondents was 1 as against 2 to 3 cycles recommended, depending on the required milling degree. The non-compliance of the respondents to the required milling cycles affects cleaning and the removal of foreign objects such as straw, stone and tree stump from the paddy. It also affects the separation of unhusked paddy from brown rice.

The use of tractor for required number of land preparation (tillage) is minimal in the study area as a result of high cost of owning or hiring a tractor. There is therefore, the need by the government to support development and adoption of these technologies to address problems of rice production in all its ramifications.

Major constraints in the utilization of rice production technologies

High cost of technologies tops the list of constraints (Table 5). The next two problems are inadequate technologies and the incidences of technological inputs coming very late. In a similar study, Baba and Etuk (1990) reported that high price and inadequate supply of fertilizer is a constraint to crop production resulting in under utilization of these inputs. A major inference to be drawn from the finding is that farmers generally lack adequate access to production inputs such as fertilizer, seed, agro-chemical and milling machines, because of their high costs.

CONCLUSION AND RECOMMENDATIONS

Conclusion

Available information from the study indicates that majority of the respondents are medium adopters of the existing technologies, which shows that the adoption of rice production technologies has not been optimized in the area. The mean kilogram of fertilizer applied by the respondents was found to be 50kg as against 80kg recommended. Agro-chemicals applied are over diluted with water while non-compliance of the respondents to the required milling cycles affects grain quality.

Recommendations

Enlightenment campaigns should be carried out in the area to educate both adopters and non-adopters alike on the numerous socio-economic benefits of improved rice production technologies.

Contractors in the distributing line should be eliminated. Farmers' cooperative societies, and other groupings should distribute and sell fertilizer directly to genuine farmers at subsidized rate.

Farmers should be given credit to enable them procure agro-chemicals and spraying equipments. Furthermore, farmers should be adequately trained on how to use spraying equipments.

Rice processing technologies are available in the country particularly in our Universities. Therefore, government should support entrepreneurs to commercialise these technologies to facilitate adoption of rice processing technologies.

Communities and associations should be encouraged to establish tractor-hiring services that will be easily accessible to farmers at affordable price while the government offers them the necessary financial and technical support.

TABLE 1: Socioeconomic characteristics of rice farmers in Lavun L.G.A, Niger State

Socioeconomic Characteristics	Minimum	Maximum	Mean	Standard Error of Mean
Age (year)	20	68	39.90	1.29
Farming	2	58	22.70	1.45
experience (year)	2	39	11.00	0.94
Household size	0.5	5.0	2.20	0.150
Farm size (ha)				

Source:- Field Survey Data (2004)

TABLE 2: Distribution of rice farmers according to educational level in Lavun L. G. A., Niger State

Educational level	Rice farmers	Percentage
Never been to school	19	25.00
Quranic only	12	15.79
Primary only	5	6.58
Quranic/Primary	6	7.89
Secondary	17	22.37
Tertiary	9	11.84
Adult classes	8	10.53
Total	76	100.00

Source: Field survey data (2004)

TABLE 3: Distribution of small scale rice farmers according to awareness, trial and adoption of rice production technologies in Lavun L.G.A, Niger State

Rice production technologies	Aware (n = 76)	Tried (n = 76)	Adopted (n = 76)
Improved seed	76(100.00)*	57(75.00)	57 (75.00)^{2**}
Fertilizer use	76(100.00)	66(86.84)	66 (86.84)^{1}
Agro-chemical use	76(100.00)	58(76.32)	53 (69.74)^{3}
Milling/processing	76(100.00)	44(57.89)	41 (53.95)^{4}
Tillage/land preparation	51(67.00)	34(44.74)	26 (34.21)^{5}

Source: Field survey data (2004)

* *Figures in paratheses are percentages*

** *Superscripts are rankings of adopted technologies*

TABLE 4: Adopter categories of small scale rice farmers in Lavun L.G.A. Niger State

Adopters category	Adoption index range	Number of rice farmers	Percentage
Low	1-40	20	26.30
Medium	41-60	40	52.60
High	61-100	16	21.10
Total		76	100

Source: Field survey data (2004)

TABLE 5: Distribution of farmers according to problems encountered in the utilization of rice production technologies

Problems encountered	Rice farmers n = 76	Percentage
Technologies too costly	56	73.70
Technologies come very late	48	63.20
Technologies inadequate	56	73.70

Source: Field Survey Data (2004)

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