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Adoption of upland rice technologies and its correlates

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ABSTRACT

The adoption behaviour of upland rice growers and their different socio-economic characteristics related to their adoption level were analysed in two selected districts viz., Angul and Dhenkanal of Orissa. The findings of the study revealed that majority of the upland rice growers exhibited medium level of adoption trend and 25 per cent of the farmers adopted rice+pigeon pea mixed cropping, as it was an age old practice. It was done to utilize the available moisture in the field to get more yield with assured economic return in the event of loss of rice crop due to drought. The big farmers were found to adopt more technologies compared to the small farmers, owing to more urban contact, extension contact, mass media exposure, risk preference and total knowledge on upland rice cultivation technologies. Further, the study also revealed major constraints in upland rice cultivation. The important constraints as perceived by them were heavy rain at the time of harvesting, more damage of crop due to gundhi bug attack during dough stage, non-availability of improved agricultural implements etc.

Key words: *Adoption behaviour, upland rice technologies, socio-economic characteristics*

Agriculture plays an important role in the economic development of a country like India. It contributes 40 % to gross national production and 60 % of the total exports. About 75 % of Indian population is sustained on agriculture area. Majority of the agriculture area is dry land only. Rice is the major food crop of the people of India. The Eastern India, comprises of eastern U.P, Eastern M.P, Assam, Bihar, West Bengal and Orissa. This is the largest rice growing region in the country and accounts for about 63.3% (26.8 million ha) of India's rice area. About 78.7% (21.1 million ha) of the rice area in this region is rainfed. Under rainfed upland condition, rice is grown in an area of 6.2 million ha. So, it is very important to give emphasis on upland rice cultivation, which can add substantially to the total rice production of the country to meet the growing demand of population increase. A good number of high yielding varieties suitable for upland ecosystem along with their production technologies have been developed by the rice researchers and are being adopted by the farmers. Therefore, this study was aimed to analyze the adoption behaviour of upland rice growers and their different socio-economic characteristics related to their adoption level. It would be very much helpful in developing suitable strategies in the dissemination process of recommended upland rice cultivation technologies in order to increase agricultural production.

MATERIALS AND METHODS

The study was conducted in two purposively selected districts viz. Angul and Dhenkanal of Orissa. Fourteen technologies which had major share of the technologies for upland rice cultivation were selected for the study. Data were collected randomly from 250 upland rice growers comprising of 125 each of small and big farmers from five villages of the two selected districts. In consultation with field level functionaries and reviewing the related literatures fifteen independent variables were selected. They were age, educational status, farming experience, social participation, extension agency contact, mass media exposure, urban contact, material possession, scientific orientation, economic motivation, risk preference, awareness knowledge, how-to-do knowledge, principle knowledge and total knowledge. Appropriate statistics were used to analyze and interpret the data.

RESULTS AND DISCUSSION

The adoption behaviour of upland rice production technologies by the rice growers was analyzed using percentage. The data in Table 1 show that 100 per cent of both big and small farmers had adopted fully the practice like "Sowing of seeds across the slope on unbunded upland" (100%). Regarding practices which are less adopted by both categories of farmers were, use of herbicide for weed control (82%), furrow placement of fertilizer (80%), use of improved implements (weeder) for weed control (74%) and "rice pigeon pea intercropping". The rice-pigeon pea intercropping technology was adopted by the farmers to the tune of 30 per cent as it was an age old practice. The adoption of other recommended practices have been presented in detail in Table 1.

The data pertaining to distribution of respondents based on their level of adoption of recommended upland rice production technologies by the rice growers is depicted in Table 2. The result showed that 48.0 % of big farmers belonged to medium adoption category. In contrast to this a 28 % of small farmers belonged to low level of adoption category. However, a significant association between these two categories of farmers was found. Hence, it can be concluded that the adoption behaviour of both small and big farmers was quite dissimilar. The findings are in conformity with the findings of Pochaiah *et. al.* (1997). Further, it was found that more number of farmers (44.0%) belonged to medium level of adoption when the pooled sample was considered.

In order to find out the relationship between the socio-economic characteristics of the farmers with their adoption behaviour, zero order correlation coefficient was worked out and presented in Table 3.

It could be observed from the table that urban contact, extension agency contact, mass media exposure, risk preference and total knowledge on upland

Table 1. Adoption of specific recommended practices of upland rice production technologies by the rice growers

Practices/Adoption	Big farmers (n=125)				Small farmers (n=125)				Total farmers (N=250)			
	Adopted		Not Adopted		Adopted		Not Adopted		Adopted		Not Adopted	
	f	%	f	%	f	%	f	%	f	%	f	%
Use of recommended seeds of upland high yielding varieties	125	100.0	0	0.0	90	72.0	35	28.0	215	86.0	35	14.0
Construction of bunds across the slope before sowing seeds	105	84.0	20	16.0	70	56.0	55	44.0	175	70.0	75	30.0
Use of organic materials to enrich the nutrient status of soil	120	96.0	05	04.0	100	80.0	25	20.0	220	88.0	30	12.0
Soil treatment for termite control	90	72.0	35	28.0	60	48.0	65	52.0	150	60.0	100	40.0
Sowing of seeds across the slope in unbunded upland	125	100.0	0	0.0	125	100.0	0	0.0	250	100.0	0	0.0
Seed treatment with fungicide before sowing	120	96.0	05	4.0	80	64.0	45	36.0	200	80.0	50	20.0
Use of recommended dose of fertilizer	125	100.0	0	0.0	105	84.0	20	16.0	230	92.0	20	8.0
8.Furrow placement of fertilizer	40	32.0	85	68.0	10	8.0	115	92.0	50	20.0	200	80.0
9. Split application of fertilizer	110	88.0	15	12.0	80	64.0	45	36.0	190	76.0	60	24.0
Use of herbicide for weed control	40	32.0	85	68.0	5	4.0	120	96.0	45	18.0	205	82.0
Use of improved implements (weeder) for weed control	50	40.0	75	60.0	15	12.0	110	88.0	65	26.0	185	74.0
Use of insecticide at appropriate time for insect pest control	125	100.0	0	0.0	110	88.0	15	12.0	235	94.0	15	6.0
Use of fungicide at appropriate time of disease control	125	100.0	0	0.0	110	88.0	15	12.0	235	94.0	15	6.0
Rice/Pigeon pea inter cropping	60	48.0	65	52.0	15	12.0	110	88.0	75	30.0	175	70.0

f = Frequency %= Percentage

Table 2. Adoption level of different categories of farmers in adopting upland rice production technology

Adoption Category	Big farmers		Small farmers		Total farmers		X^2 Value
	f	%	f	%	f	%	
Low	15	12.0	35	28.0	50	20.0	10.02**
Medium	60	48.0	50	40.0	110	44.0	
High	50	40.0	40	32.0	90	36.0	
Total	125	100.00	125	100.00	250	100.00	

** Significant at 0.01 level of probability.

Table 3. Zero order correlation between adoption and socio-economic characteristics of upland rice growers

Socio-economic Characteristics	'r'- value		
	Big farmers	Small farmers	Total farmers
Age	0.01	0.02	0.01
Educational status	0.02	0.16	0.12
Farming experience	0.26	0.01	0.02
Social participation	0.10	0.16	0.13
Extension agency contact	0.13	0.13	0.43**
Mass media exposure	0.12	0.13	0.40**
Urban contact	0.16	0.19	0.39**
Material possession	0.01	0.04	0.10
Scientific orientation	0.07	0.08	0.04
Economic motivation	0.23	0.13	0.39**
Risk preference	0.21	0.07	0.28**
Awareness knowledge	0.52**	0.33*	0.63**
How-to-do knowledge	0.62**	0.26	0.64**
Principle knowledge	0.33**	0.28*	0.53**
Total knowledge	0.59**	0.32*	0.69**

* Significant at 0.05 level of probability ** Significant at 0.01 level of probability

rice cultivation technologies were having significant relationship with the adoption of upland rice production technologies. The other characteristics which showed non significant relationship have been presented in the table 3.

In addition, the socio-economic characteristics which has significant relationship with the two categories of farmers and pooled sample of farmers alone were discussed. It was found that awareness knowledge, how-to-do knowledge, principle knowledge and total knowledge showed positive and significant association with adoption behaviour of upland rice growers. As the knowledge is the pre-requisite for adoption, the knowledge level of upland rice grower irrespective of category had shown a positive and significant association with adoption behaviour.

The major constraints as perceived by the upland rice growers were identified as have been presented in Table 4.

It was found that the "weed problem" was perceived as the most important constraint by the upland rice growers. The other constraints in order of rank were low yield, heavy rain at the time of harvesting, more damage to crop due Gundhi bug attack, difficulty in availability of implements for weed control and nutrient loss in sloppy uplands causing low yield. The findings of the present study are similar to the findings of Tripathy *et al*. (1982), Kothikhane (1986), Phatke *et al.* (1992), Sawant and Patil (1997), Thakur *et. al.* (1998) and Bhairamkar *et. al.* (2003).

The findings revealed the adoption behaviour of upland rice growers in the study area. It may help

Table 4. Major constraints in upland rice cultivation as perceived by rice growers

Perceived Constraints	Big farmers (n=125)			Small farmers (n=125)			Total farmers(N=250)		
	f	%	Rank	f	%	Rank	f	%	Rank
Low yield	118	94.4	III	120	96.0	II	238	95.2	II
Weed problem	125	100.0	I	125	100	I	250	100	I
Nutrient loss in sloppy land	100	80.0	VI	90	72.0	V	190	76.0	VI
Heavy rain at the time of harvesting	120	96.0	II	115	92.0	III	235	94.0	III
More Gundhi bug damage.	110	88.0	IV	120	96.0	II	230	92.0	IV
Difficulty in availability of implements for weed control.	102	81.6	V	105	84.0	IV	207	82.8	V

to develop a strategy for increasing the productivity of upland rice. At the same time the socio-economic characteristics substantially influencing the adoption of upland rice technology must be taken into consideration while accelerating the pace of adoption in the study area. The extension functionaries should try to convince the farmers about the potentiality and advantages of recommended upland high yielding rice varieties as well as the production technologies. The Government also should take right steps to make available the inputs (both technical and material) and required services.

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