Oryza Vol. 48. No. 4, 2011 (370-374)

Extent of adoption of CRRI rice varieties for lowland and their appropriateness as perceived by growers

Lipi Das*, B.N. Sadangi, S.K. Mishra and M.K. Kar

Central Rice Research Institute, Cuttack-753006, Odisha

ABSTRACT

A study was conducted to examine the adoption of Central Rice Research Institute lowland rice varieties and their appropriateness in Khandaita cluster of Cuttack, Odisha. The study included a total of 100 rice farmers selected by random sampling. The findings on appropriateness of CRRI rice varieties for lowland indicated that rice variety Gayatri was the most appropriate with a score 2.81 among the four widely adopted varieties as perceived by the rice growers. High cost of labour(86%); non-availability of quality seeds at the time of sowing(94%); delayed monsoon at the time of sowing (96%) and lack of location specific technology (88%) were the major financial, infrastructural, agro-climatic and technology dissemination constraints experienced by the farmers, respectively in adopting recommended rice cultivation technologies

Key words : *rice varieties, appropriateness, constraints, grower*

India, in spite of its large scale adverse biotic and abiotic situations has gained momentum in food front of the world. Rice being a major crop under food security mission a lot of efforts are being made to transfer appropriate production technologies. However, increase in rice production is not proportionate with respect to increase in population. The problem is more on absorption of technologies rather than technology generation. A large number of recommended rice production technologies are either being adopted in piece meal or not at all. While during the period of 1950-60s, the reasons for non-adoption of technologies by the farmers were explained in terms of "farmers ignorance", in 1970-80s they were explained in terms of various "farm level constraints". However, during 1990s the explanation was shifted and it is now explained in terms of "lack of appropriateness of technology" (Das, 1996; Hansra 1996). One of the major factors limiting the enhanced rice production in the area/region is the inadequacy of information available on the adoption levels and the impact assessment of the technologies. The yield gap between the CRRI trials and the farmers' fields could be attributed to the adoption gap. In this regard, it is important to develop an evaluation procedure to study the adoption of CRRI rice varieties and their appropriateness in farmers' field conditions. The feed back of farmers on varieties and level of adoption of the technologies will be important to aid future research on rice. Keeping in view the above needs the study was undertaken to examine the adoption of CRRI rice varieties, their appropriateness and perceived constraints of the farmers in adopting of rice varieties.

MATERIALS AND METHODS

The study was undertaken in a purposively selected Khandaita cluster of Cuttack Sadar block of Cuttack district, Odisha where dissemination of rice varieties has taken place through different projects and agencies. The major land type of this area was shallow to semi deep lowland. The study included 100 rice farmers selected by random sampling. The appropriateness of the varieties was studied as per the selected four parameters i.e., social, economical, environmental and technological. For each selected parameter, farmer's response was taken. Scores were assigned accordingly and subsequently mean appropriate score was computed. The mean appropriate score of all the selected parameters for each individual were further averaged to arrive at overall mean appropriate score.

Based on the mean appropriate score three categories of appropriateness were developed *viz*. score > 2.4 - very appropriate, score 1.8-2.4 - somewhat appropriate and score < 1.8 - less appropriate. Further, the respondents were asked to indicate the coverage under different rice varieties in wet season of 2010. The total rice area of the respondents during the season was 71.84 hactares.

The following operational definitions were adopted for quantifying the social, economic environmental and technological appropriateness. The dimensions of above parameters were scored on a three point rating scale. Social appropriateness consists of dimensions *viz*., suitability for raw and parboiled rice, good taste, suitability for specific function and value addition. Similarly economical appropriateness refers to good market value, less cost of cultivation and profitability. Environmental appropriateness consists of dimensions viz., suitability to specific land situation, less use of pesticides and optimum production at low doses of fertilizer. Likewise, technological appropriateness refers to non-lodging, suitability for mechanical harvesting, easy to thresh and more yield.

RESULTS AND DISCUSSION

The data relating to the extent of adoption of CRRI rice varieties by the farmers revealed that majority (88%) of farmers adopted rice variety Gayatri followed by Pooja (83%), Varshadhan (25%) and Sarala (25%), respectively (Table-1). The extent of adoption of varieties in terms of area to the total area was found to be higher in case of Gayatri (48.64%) followed by Pooja (35.10%).

The findings of appropriateness of CRRI Rice varieties indicated that rice variety Gayatri was found to be most appropriate with score 2.81 among the four widely adopted varieties as perceived by the rice growers (Table 2). The variety Gayatri has got the highest appropriate score due to following perceived attributes viz., non-lodging, high yielding, high market value, suitable for raw and parboiled rice, less number of chaffy grains, tolerance to disease and pest and suitable for lowland water logging situation.

Table 2. Appropriateness of rice varieties as perceived by the rice growers (N=100)

Parameters of appropriateness	CRRI Rice Varieties			
	Gayatri	Pooja	Varshadhan	Sarala
Social appropriateness	2.25	2.25	2.25	1.50
Economic appropriateness	3.00	2.75	2.50	1.50
Environmental appropriateness	3.00	2.75	2.33	1.33
Technological appropriateness	3.00	2.80	2.40	2.40
Overal appropriateness score	2.81	2.63	2.37	1.68

The findings relating to perceived appropriateness of the rice variety Gayatri (Table-3) revealed that it was 'very appropriate' by majority of farmers (89%) followed by 11% as 'somewhat appropriate. Highest percentage (91.67) of large farmers perceived it as very appropriate followed by medium farmer and small farmer. Majority of large farmers (91.67%) perceived it as very appropriate followed by somewhat appropriate. Similar trend was observed for medium and small farmers (Table-3).

Regarding the perceived appropriateness of rice variety Pooja (Table-3), it was perceived to be 'very appropriate' by 85% of farmers. Highest percentage (90%) of medium farmers perceived it as

Table- 1. Extent of adoption of CRRI rice varieties by the farmers, Khandeita cluster, Cuttack, wet season 2010.

Name of Variety	Farmers adopted under different categories				Area under different variety (ha)	Extent of Adoption in terms of Area
	Small (n=58)	Medium (n=30)	Large (n=12)	Total (N=100)		
Gayatri	49 (84.48)	28 (93.33)	11 (91.67)	88 (88.00)	34.97	48.64%
Pooja	47 (81.03)	26 (86.67)	10 (83.33)	83 (83.00)	25.23	35.10%
Varshadhan	10 (17.24)	10 (33.33)	5 (41.66)	25 (25.00)	6.08	8.46%
Sarala	10 (17.24)	9 (30.00)	6 (50.00)	25 (25.00)	5.56	7.73%

Values in parentheses are percentage

Table-3. Distribution of farmers on different levels of appropriateness for rice variety Gayatri, Pooja, Varshadhan and Sarala, Khandeita cluster, Cuttack, wet season 2010.

Degree of appropriateness	Categories of Farmers															
	Gayatri				Pooja				Varshadhan				Sarala			
	Small (n=58)	Medium (n=30)	Large (n=12)	Total (N=100)	Small (n=58)	Medium (n=30)	Large (n=12)	Total (N=100)	Small (n=58)	Medium (n=30)	Large (n=12)	Total (N=100)	Small (n=58)	Medium (n=30)	Large (n=12)	Total (N=100)
Very appropriate	87.93	90.00	91.67	89.00	82.76	90.00	83.33	85.00	20.69	36.67	41.67	28.00	15.52	23.33	16.67	19.00
Somewhat appropriate	12.07	10.00	8.33	11.00	17.24	10.00	16.67	15.00	67.24	53.33	58.33	62.00	39.66	20.00	33.33	32.00
Less appropriate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.07	10.00	0.00	10.00	44.82	56.67	50.00	49.00

very appropriate followed by other two categories of farmers having percentage closed to each other.

In case of rice variety Varshadhan(Table-3), highest percentage (62%) of farmers perceived it as 'somewhat appropriate'. Majority of small farmers (67.24%) perceived it as somewhat appropriate followed by very appropriate (20.69%). Similar trend was also observed in case of other two categories of farmers.

Majority of the farmers (49%) perceived Sarala as 'less appropriate' for their situation (Table-3). Majority (56.67%) of medium farmers perceived it as less appropriate followed by very appropriate (23.33%), whereas 50 per cent of large farmers perceived it as less appropriate followed by somewhat appropriate (33.33%).

High cost of labour was perceived as the top most economical constraint as 86 per cent respondents agreed with it (Table 4). It might be due to non-availability and high demand of labourers in peak season. As many as 83 per cent opined that 'high cost of fertilizer and pesticides' was one of the most important constraint, which ranked second, whereas 'low price of paddy during the peak sale period' ranked third.

The major constraints in order of merit were 'non-availability of quality seeds at the time of sowing' (94%), 'non-availability of plant protection chemicals in the market at the time of application' (89%) and 'inadequate supply of chemical fertilizers in the market' (87%) (Table 5).

Similarly, the major agro-climatic constraint perceived by the respondents was 'delayed monsoon at the time of sowing' (96%). Sometimes delayed monsoon results in delayed starts of all agricultural operations. Due to delayed sowing of crops, sometimes crop may suffer during post flowering stage because of cesation of monsoon rain. The other agro-climatic constraints in order of importance were 'crop damage due to drought during crop maturity' (87%), 'occurrence of diseases/insects pest'(47%) and 'poor fertility of soil' (45%), respectively (Table-6).

Lack of location specific technology interventions and poor incentives from govt. and other agencies for adoption of technologies were perceived as the major constraints as 88 and 87 percent respondents agreed with it (Table 7). This indicates that the officials must not be co-operating in providing

Table 4. Perceived financial constraints in high yielding rice cultivation

Constraints	Category of the Farmers				Rank
	Small (n=58)	Medium (n=30)	Large (n=12)	Total (N=100)	
High cost of labour	54 (93.10)	27 (90.00)	5 (41.66)	86 (86.00)	I
Inadequate availability of credit	47 (81.03)	25 (83.33)	6 (50.00)	78 (78.00)	IV
Low price of paddy during the peak sale period	48 (82.75)	24 (80.00)	9 (75.00)	81 (81.00)	III
High cost of fertilizer and pesticides	51 (87.93)	27 (90.00)	5 (41.66)	83 (83.00)	II
High interest on crop loan	49 (84.48)	21 (70.00)	5 (41.66)	75 (75.00)	V

Values in parentheses are percentage.

Table 5. Perceived infrastructural constraints in high yielding rice cultivation

Constraints	Category of the Farmers				Rank
	Small (n=58)	Medium (n=30)	Large (n=12)	Total (N=100)	
Non-availability of quality seeds at the time of sowing	56 (96.55)	28 (93.33)	10 (83.33)	94 (94.00)	I
Non-availability of plant protection chemicals	54 (93.10)	25 (83.33)	10 (83.33)	89 (89.00)	II
Lack of mechanism to regulate labour supply	27 (46.55)	16 (53.33)	3 (25.00)	46 (46.00)	VI
Inadequate supply of chemical fertilizer in the market	53 (91.37)	26 (86.66)	8 (66.66)	87 (87.00)	III
Non-availability of improved agricultural implements	53 (91.37)	23 (76.66)	7 (58.33)	83 (83.00)	IV
Inadequate mechanism to control cattle grazing	51 (87.93)	25 (83.33)	5 (41.66)	81 (81.00)	V

Values in parentheses are percentage

necessary information on agriculture or government sponsored rural development schemes. It seems the stereotypic attitude of government officials might be playing the major role. Similarly the other important technology dissemination constraints perceived by the respondents in adopting recommended technologies were 'complex knowledge in use of plant protection chemicals' (79%) and 'lack of training programme on rice production technology' (62%), respectively.

Some of the findings are in conformity with the findings of Nayak *et. al.* (1996), Mandal *et. al.*(1999), Mandal *et. al.* (2000), Patra (1990), Rao and Singh (1990), Singh *et. al.*(1990) etc.

It could be concluded on the basis of findings that rice variety Gayatri was found to be most appropriate with score 2.81 among the four widely adopted varieties as perceived by the rice growers.

Table 6. Perceived agro-climatic constraints in high yielding rice cultivation

Constraints	Category of the Farmers				Rank
	Small (n=58)	Medium (n=30)	Large (n=12)	Total (N=100)	
Poor fertility of soil	29 (50.00)	13 (43.33)	3 (25.00)	45 (45.00)	IV
Delayed monsoon at the time of sowing	56 (96.55)	29 (96.66)	11(91.66)	96 (96.00)	I
Occurrence of diseases/insect pests	30 (51.72)	13 (43.33)	4 (33.33)	47 (47.00)	III
Crop damage due to drought during crop maturity	52 (89.65)	26 (86.66)	9 (75.00)	87 (87.00)	II

Values in parentheses are percentage

Table 7. Perceived agro-climatic constraints in high yielding rice cultivation

Constraints	Category of the Farmers				Rank
	Small (n=58)	Medium (n=30)	Large (n=12)	Total (N=100)	
Lack of location specific technology interventions	54 (93.10)	27 (90.00)	7 (58.33)	88 (88.00)	I
Complex knowledge in use of plant protection chemicals	49 (84.48)	24 (80.00)	6 (50.00)	79 (79.00)	III
Poor performance of recommended varieties	21 (36.20)	12 (40.00)	5 (41.66)	38 (38.00)	V
Lack of training programmes on rice production technology	35 (60.34)	20 (66.66)	7 (58.33)	62 (62.00)	IV
Poor incentives from govt. and other agencies for adoption of technologies	52 (89.65)	26 (86.66)	9 (75.00)	87 (87.00)	II

Values in parentheses are percentage

Regarding the constraints high cost of labour, non-availability of quality seeds at the time of sowing, delayed monsoon at the time of sowing and lack of location specific technology interventions were the major economical, infrastructural, agro-climatic and technology dissemination constraints faced by the farmers in adopting recommended rice cultivation technology.

REFERENCES

Das P 1996. Changing scenario of agricultural economy and future thrusts in extension. Jl. Extn. Edn.,7 : 1390-1397.

Hansra BS 1996. A peep into the future extension. Jl. Extn. Edn., 7 : 1386-1389.

Mandal BK, Saha S and Jana TK 1999. Growth and resource use in rice, greengram, blackgram and pigeonpea in different inter and mixed cropping system under rainfed upland situation. Oryza 36(4) : 358-363.

Mandal BK, Saha S and Jana TK 2000. Yield performance and complementarities of rice with greengram, blackgram and pigeonpea under different rice-legume association. Indian Jl. Agronomy 45(1) : 41-47.

Nayak BC, Mahalik PR, Paikaray RK and Khanda CN 1996. Effect of pigeonpea genotypes, plant population and sowing pattern in pigeonpea/rice intercropping under rainfed condition of Orissa. Int. Chickpea and Pigeonpea Newsletter. No.3, 79-80.

Patra SS 1990. Production and economics of upland rice + pigeonpea. Int. Rice Research Newsletter 15(3) : 35.

Rao MR and Singh M 1990. Productivity and risk evaluation in contrasting intercropping systems. Field Crops Res 23 : 279-293.

Singh CV, Singh RK, Tomar RK, Chauhan VS and Variar M 1990. Rice based intercropping systems for rainfed upland conditions of Chotnagpur plateau. Int. Rice Research Newsletter 15(3) : 36.