Oryza Vol. 46. No.1, 2009 (71-74)

Impact of front line demonstration on the knowledge and adoption level of farmers in rice-based farming system

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ABSTRACT

The study was conducted to assess the impact of front line demonstrations on rice production technologies on the knowledge and adoption level of rice farmers. A comparison was also made with regard to the knowledge level of non-beneficiary farmers of the same villages. The study revealed that the mean knowledge of beneficiary farmers with respect to all technological aspects of scientific rice cultivation have increased by 44.78 per cent as compared to the non-beneficiary farmers. Maximum change in knowledge was found in aspects like 'seed treatment with fungicides' (55.00%). There were some areas where the non-beneficiary farmers also possessed quite enough knowledge namely 'number of seedlings per hill' (87.50%), 'suitable harvesting time' (85.00%), 'quantity and application of organic manure' (80.00%) and 'proper stages of crop for hand weeding' (80.00%). In contrast, they were quite poor in knowledge in areas like 'different considerations at the time of pesticidal applications' (22.50%), 'rouging methods' (27.50%), 'seed treatment' (30.00%), 'nursery management' (32.50%) and 'application of NPK in split doses, (30.00%). As many as 68.33 per cent beneficiary farmers were using the recommended seed rate and 63.33 per cent were using all the introduced rice varieties, in contrast, 61.67 per cent beneficiary farmers were not using 'seed/seedling treatment practice'. 'Unfavourable climatic conditions' like dry spell and heavy or erratic rainfall during the major field operations was cited by 91.67 per cent farmers as the major hindrance in adopting recommended practices like nursery management, water management, weeding, fertilizer and pesticides application.

Key words: *Front line demonstration, knowledge level, adoption, discontinuance, rice production technologies*

Indian Council of Agricultural Research (ICAR) introduced the concept of Front Line Demonstrations (FLDs) under the First Line Transfer of Technology programme during 1991-92. FLDs are the field demonstrations organized by Krishi Vigyan Kendras (KVKs), State Agricultural Universities (SAUs) and ICAR Institutes under the direct supervision of the scientists with a view to introduce already tested and proven technologies to farming communities.

Demonstrations are central to informal education as it is based on the principle of "seeing is believing" and could be a powerful tool to work with low literacy level farmer groups. Because, it provides a visual evidence of the superiority of the recommended technologies under farmers own condition. FLDs serve as platform to train farmers and field extension functionaries on crop production practices. Central Rice Research Institute and its KVKs regularly conduct FLDs on Rice and Rice-based farming technologies in adopted villages all over the country. In this context the present study was undertaken to know the impact of these demonstrations on the knowledge and adoption level of the rice farmers.

MATERIALS AND METHODS

The study was conducted in Cuttack district of Orissa. Two blocks namely, Tangi-Choudwar and Salipur were selected for this study. Five KVK adopted villages from each block were taken purposively. High yielding varieties (HYVs) of paddy seeds and partial quantity of chemical pesticides and fertilizers were given to the farmers as critical inputs under the demonstration programme. Sixty beneficiary farmers of FLDs conducted during wet seasons of 2002-03 to 2004-05 and sixty non-beneficiary farmers were selected as sample for collection of data.

The data were collected through personal interview by using a structured and pre-tested interview schedule after a gap of two years of conducting FLDs i.e., during January to March 2007. There were twenty items for assessing knowledge level of respondents on management of CRRI released HYV paddy varieties *viz*., Pooja, Sarala and Durga. Three point scoring was made (Complete Knowledge-2, Partial Knowledge-1 and No Knowledge-0) for measuring their knowledge level. Therefore, the range of knowledge score of a farmer ranges from 0 to 120. Extent of adoption of recommended technologies was measured in ten broad areas of farming practices.

RESULTS AND DISCUSSION

The mean knowledge of FLD beneficiary farmers with respect to all technological aspects of scientific rice cultivation have increased by 44.78 per cent (24.63/ 55X100) as compared to the non-beneficiary farmers of same villages (Table 1). Maximum change in knowledge was found in aspects like 'seed treatment with fungicides' (55.00%) followed by 'proper seed rate for transplanted and direct-seeded rice' (40.00%), 'rouging methods' (40.00%), 'nursery management' (37.50%), and 'different considerations at the time of application of pesticides' (37.50%) respectively.

It is noteworthy to mention that only seed treatment practice with recommended fungicides can reduce the chance of disease infestation significantly in later stages of the crop growth and thereby, can help in reducing the cost of fungicides as well as loss of crop yield. With the change in knowledge in seed rate, farmers can save seed cost in transplanted rice. Rouging practice is essentially required for getting good quality pure seeds. With the present national seed replacement rate being about 10-12 per cent, the change in knowledge in rouging will help in increasing seed replacement as farmers might opt for seed certification and quality seed production.

It is important to note that there were some areas where

Table 1. Comparison of the Knowledge Level of Beneficiary and Non-Beneficiary Farmers

Technological Aspects	Cumulative Knowledge score of Beneficiary Farmers (N=120)	Cumulative Knowledge score of Non-Beneficiary Farmers (N=120)	Difference in cumulative knowledge score (percentage) (N=120)
Selection of suitable varieties as per water level of field during peak season	102 (85.00)	84 (70.00)	18(15.00)
Using proper seed rate for transplanted and direct seeded rice	99 (82.50)	51 (42.50)	48(40.00)
Seed treatment with recommended fungicides	102 (85.00)	36 (30.00)	66(55.00)
Procedure for making pre-germinated seeds for wet nursery	102 (85.00)	93 (77.50)	9(7.50)
Wet and dry nursery preparation	84 (70.00)	57 (47.50)	27(22.50)
Management of nursery	84 (70.00)	39 (32.50)	45(37.50)
Seedling root dip treatment	93 (77.50)	54 (45.00)	39(32.50)
Appropriate age of seedlings for transplanting	99 (82.50)	63 (52.50)	36(30.00)
Quantity and application of organic manure	108 (90.00)	96 (80.00)	12(10.00)
Balanced dose of NPK fertilizers	84 (70.00)	45 (37.50)	39(32.50)
Application of NPK in split doses	78 (65.00)	42 (35.00)	36(30.00)
Number of seedlings $hill^{-1}$	114 (95.00)	105 (87.50)	9(7.50)
Spacing for transplanting	105 (87.50)	69 (57.50)	36(30.00)
Water management during and after transplanting	96 (80.00)	84 (70.00)	12(10.00)
Hand weeding twice at suitable crop stages	111 (92.50)	96 (80.00)	15(12.50)
Use of need based pesticides	72 (60.00)	51 (42.50)	21(17.50)
Different considerations at the time of pesticidal application	72 (60.00)	27 (22.50)	45(37.50)
Rouging at vegetative and reproductive stages for quality seeds	81 (67.50)	33 (27.50)	48(40.00)
Suitable harvesting time	111 (92.50)	102 (85.00)	9(7.50)
Proper moisture content for seed storage and milling	114 (95.00)	93 (77.50)	21(17.50)
MEAN KNOWLEDGE SCORE	**95.55 (79.63)**	**66 (55.00)**	**29.55(24.63)**

(Figures in the parentheses indicate percentages)

the non-beneficiary farmers also possessed quite enough knowledge namely 'number of seedlings hill^{-1}' (87.50%), 'suitable harvesting time' (85.00%), 'quantity and application of organic manure' (80.00%), 'proper stages of crop for hand weeding' (80.00%), 'procedure for making pre-germinated seeds for wet nursery' (77.50%), and 'suitable moisture content for seed storage and milling' (77.50%). In contrast, they were quite poor in knowledge in areas like 'different considerations at the time of pesticidal applications' (22.50%), 'rouging methods' (27.50%), 'seed treatment' (30.00%), 'nursery management' (32.50%) and 'application of NPK in split doses' (30.00%). These technological aspects warrant immediate intervention in the form of FLDs, farmer's field days, need-based training programmes and media exposure. Some of these findings are in conformity with the findings of Ray (1976), Bhat (1980), Manjunath (1980), Singh and Prasad (1986), Narayanaswamy and Eshwarappa (2000), Verma (2000), Das *et al* (2005), Saha *et al* (2006), Dani *et al* (2007) and Joseph and Padaria (2007).

With regard to the extent of adoption of recommended rice production technologies by beneficiaries, it can be noticed from Table 2 that as many as 68.33 per cent farmers were using the recommended seed rate and 63.33 per cent were using all the introduced varieties. When partial adoption (which means adoption of recommended practice with minor modification or dropping one component like one variety) was also taken into account, it was observed that 96.67 per cent farmers were using proper dose of manures and fertilizers, 91.67 per cent using proper seed rate, 90.00 per cent using introduced varieties and 83.33 per cent farmers were practicing proper method of transplanting. In contrast, 61.67 per cent beneficiary farmers were not using 'seed/seedling treatment practice', followed by 30.00 per cent 'scientific nursery management', 28.33 per cent 'water management practices' and 25.00 per cent were not using 'proper seed processing and scientific storage practices'. Majority of these findings are in consonance with the findings of Das *et al* (2005) and Joseph and Padaria (2007).

The beneficiary farmers were asked about the reasons for discontinuance or non-adoption of the FLD recommended technologies. The farmers cited eight reasons as given in Table 3. 'Unfavourable climatic conditions' like dry spell and heavy or erratic rainfall during the major field operations was cited by 91.67 per cent farmers as the major hindrance in using recommended practices like nursery management, water management, weeding, fertilizer and pesticides application etc. This necessitates training the farmers and making them aware and skilled about suitable alternative technologies to mitigate natural hazards also. The second most important reason was cited as the 'poor economic condition' to afford required labour and inputs like fertilizers, fungicides and pesticides.

It was to noted that 85.00 per cent farmers opined their 'deep rooted age-old habit of the traditional cultivation practices made them more comfortable and ease to handle, followed by their 'forgetfulness' of the

Table 2. Extent of Adoption of FLD Technologies by Beneficiary Farmers (N=60)

Technological Aspects	Full Adoption	Partial Adoption	Discontinuance/ Non-Adoption
Introduced varieties (Pooja, Sarala and Durga)	38 (63.33)	16 (26.67)	6 (10.00)
Proper seed rate	41 (68.33)	14 (23.33)	5 (8.33)
Seed and seedling treatment	14 (23.33)	9 (15.00)	37 (61.67)
Nursery bed preparation and management	18 (30.00)	24 (40.00)	18 (30.00)
Proper method of transplanting	18 (30.00)	32 (53.33)	10 (16.67)
Proper dose and use of manures and fertilizers	16 (26.67)	42 (70.00)	2 (3.33)
Water management in nursery and main field	12 (20.00)	31 (51.67)	17 (28.33)
Weeding Practices	17 (28.33)	29 (48.33)	14 (23.33)
Need based plant protection measures	21 (35.00)	26 (43.33)	13 (21.67)
Seed processing and storage	24 (40.00)	21 (35.00)	15 (25.00)

(Figures in the parentheses indicate percentages)

Table 3. Reasons cited by beneficiaries for Discontinuance/Non-adoption of Recommended Technologies (N=60)

Reasons for Discontinuance	Frequency	Percentage	Rank
Poor economic condition	53	88.83	II
Forgetting the recommended technologies	49	81.67	IV
Deep rooted habitual practice	51	85.00	III
Withdrawal of FLD programme in the village	48	80.00	V
Non-availability of technical guidance during post-FLD programme	43	71.67	VI
Technologies are not adaptable to farming situation	32	53.33	VII
Unfavourable climatic conditions during major field operations	55	91.67	I
Unsuitable land situation	22	36.67	VIII

recommended practices as reasoned by 81.67 per cent farmers. It indicates that continuous follow up and farmers-extension linkage is very much essential for sustainable rice production.

Hence, FLDs have significant impact on increasing knowledge and adoption level of farmers. Beneficiary farmers have become technical leaders and guides for the non-beneficiary neighbouring farmers. Therefore, FLDs should be conducted on all specific technologies in selected villages in addition to training programmes. Follow up technical guidance must be provided by the scientists/experts/extension officers to farmers at critical stages of crop management. Neighbouring non-beneficiary farmers should be invited to the demonstration sites by organizing field visits for wider adoption of recommended technologies.

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