

Frontline Demonstrations on Indian Mustard: An Impact Assessment

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ABSTRACT

Frontline demonstration (FLD) is one of the most powerful tools for transfer of technology. Keeping in view of an effective extension approach of FLDs for dissemination of mustard technology, an impact assessment of FLDs conducted by National Research Centre on Rapeseed-Mustard (NRCRM) in Bharatpur district of Rajasthan was assessed. The impact assessment was based on the comparison of beneficiary and non-beneficiary respondents with reference to increase in knowledge level of beneficiary farmers, extent of adoption of improved mustard production technologies and attitude of beneficiary farmers towards FLDs. It was found that the level of knowledge of beneficiary farmers regarding different practices of mustard production was higher than non-beneficiary farmers ranging from 1.11 MPS of soil treatment to 12.14 MPS of plant protection measures. The difference in adoption level between beneficiary and non-beneficiary farmers ranging from MPS 3.89 to MPS 40.50. The highest and significant difference was observed in adoption of fertilizer management (MPS 40.50) followed by seed treatment (MPS 37.50), use of high yielding varieties (MPS 26.00), seed rate and spacing (MPS 17.00), pest management (MPS 12.00), harvesting / threshing and storage (MPS 11.33) and soil treatment (MPS 10.00). The overall difference in adoption level of different practices of mustard production technology MPT between beneficiary and non-beneficiary was 14.22 MPS. The study also reported that most of the beneficiary respondents had their attitude in positive direction towards FLDs. The mean percent scores of all the attitude statements ranged from 62.00 to 85.33 which indicated the favourable to most favourable attitude of the respondents towards different aspects of frontline demonstrations on mustard conducted by NRCRM.

Key Words: Frontline demonstration; Mustard production technology; Impact; Knowledge; Adoption; Attitude;

Frontline Demonstration (FLD) is the new concept of field demonstration evolved by the Indian Council of Agricultural Research with the inception of the Technology Mission on Oilseed Crops during mid-eighties. The field demonstrations conducted under the close supervision of scientists of the National Agriculture Research System is called front-line demonstrations because the technologies are demonstrated for the first time by the scientists themselves before being fed into the main extension system of the State Department of Agriculture. Frontline demonstration (FLD) is one of the most powerful tools of extension because farmers, in general, are driven by the perception that 'Seeing is believing'.

The main objective of Front-Line Demonstrations is to demonstrate newly released crop production and protection technologies and its management practices in the farmers' field under different agro-climatic regions and farming situations. While demonstrating the technologies in the farmers' field, the scientists are required to study the factors contributing higher crop production, field constraints of production and thereby generate production data and feedback information. Frontline Demonstrations are conducted in a block of two or four hectares land in order to have better impact of the demonstrated technologies on the farmers and field level extension functionaries.

Rapeseed-Mustard group of crops is one of the

major oilseed crops of India. Under the All India Coordinated Research Project on Rapeseed-Mustard (AICRP-RM), the technologies developed through research activities are demonstrated under actual field conditions of the farmers through Frontline Demonstrations.

Realizing the importance of frontline demonstrations in transfer of technologies, National Research Centre on Rapeseed-Mustard (NRCRM), Bharatpur have regularly been conducting FLDs on mustard since 1998 at farmers' field in different village of Bharatpur district of Rajasthan and Agra and Mathura district of Uttar Pradesh with the objective of convincing farmers and extension functionaries together about the production potentialities of the mustard technologies for further wide scale diffusion. Keeping in view of an effective extension approach of FLDs for dissemination of mustard technology, it was thought that impact of FLDs conducted by NRCRM was to be assessed. Therefore the present study reported in 2006-07 was undertaken with the following specific objectives:

1. To study the increase in knowledge level of beneficiary farmers in comparison to non-beneficiary farmers
2. To assess the extent of adoption level of improved mustard production technologies by beneficiary farmers in comparison to non-beneficiary farmers
3. To study the attitude of beneficiary farmers towards FLDs

METHODOLOGY

The frontline demonstrations on mustard were conducted by several organizations in Rajasthan including NRCRM, ARS of SAUs and KVKs but due to paucity of time and proximity, study was confined to FLDs conducted by NRCRM in Bharatpur district of Rajasthan. For the purpose of the study, five villages namely Gadhijalimsingh, Barakhurd, Ludhawai, Ekta and Vijaypura villages of Bharatpur district, where FLDs were conducted during preceding two years were selected. A sample of 60 respondents was taken comprising 30 beneficiary and 30 non-beneficiary farmers. For selection of beneficiary farmers, a list of farmers where FLDs were conducted during preceding two years was prepared and for taking the equal

representation, six beneficiary farmers from each one of the selected villages making 30 beneficiary respondents were selected randomly. For the other half of the sample (30 non-beneficiary farmers), 30 farmers were selected randomly from the locality adjacent to NRCRM where FLDs were not conducted by any organizations.

The data were collected through personal interview with the help of pre-tested schedule. The collected data were processed, tabulated, classified and analysed in terms of mean percent scores, ranks, etc. in the light of objectives of the study. Since these frontline demonstrations on mustard were conducted under the aegis of All India Coordinated Research Project on Rapeseed-Mustard (AICRP-RM), therefore to find out the significant difference between the beneficiary and non-beneficiary respondents, the criterion for releasing new variety/ technology adopted by All India Coordinated Research Project on Rapeseed-Mustard was followed. Ten or more than 10 per cent difference in yield of newly developed variety against the prevailing variety was considered as significant difference for releasing a variety under the AICRP-RM.

RESULTS AND DISCUSSION

Level of knowledge of beneficiary and non-beneficiary farmers about mustard production technology (MPT): It is assumed that the knowledge of a respondent to large degree depends upon the extent of exposure given to him about the technology. The front line demonstrations conducted on mustard crop by NRCRM, Bharatpur was supposed to have imparted knowledge of mustard production technology (MPT) to the farmers, where the FLDs were conducted on his farm. Therefore, efforts were made to assess the knowledge level of beneficiaries as well as non-beneficiaries regarding improved mustard production technologies. The knowledge of the respondents with regard to improved package of practices were measured in terms of mean percent scores (MPS). As many as twelve practices were included to assess the knowledge as given in Table1.

The data in Table1 show that both types of respondents possessed maximum knowledge regarding time of sowing and high yielding varieties of mustard

Table 1. Level of knowledge of respondents about improved mustard production technology (MPT)

S. No.	Mustard Production Technology	Maximum Score	Beneficiary Farmers		Non-beneficiary farmers		Difference
			MPS	Rank	MPS	Rank	
1	High yielding varieties	08	93.75	II	86.66	II	7.09
2	Field preparation	03	78.88	IV	74.44	IV	4.44
3	Soil treatment	03	52.22	X	51.11	IX	1.11
4	Seed treatment	03	67.77	VIII	58.88	VIII	8.89
5	Time of sowing	03	95.55	I	88.88	I	6.67
6	Seed rate and spacing	03	74.44	VI	70.00	VI	4.44
7	Fertilizer application	07	72.38	VII	65.71	VII	6.67
8	Irrigation management	02	75.00	V	73.33	V	1.67
9	Weed management	04	37.50	XII	33.33	XII	4.17
10	Plant protection measures	14	54.04	IX	41.90	X	12.14*
11	Physiological practices	14	40.00	XI	30.83	XII	9.17
12	Harvesting / threshing and storage	02	88.33	III	85.00	III	3.33
	Mean		69.15		63.33		5.82

* Significant difference

crop. Similarly, they possessed less knowledge regarding the physiological practices and weed management aspects of mustard cultivation. The mean percent scores of the knowledge of beneficiary farmers varied from 37.50 to 95.55, while in case of non-beneficiary farmers, the mean percent scores varied from 33.33 to 88.88. This indicates a little gap of knowledge between respondents of beneficiary and non-beneficiary.

The data further indicate that knowledge of beneficiary farmers regarding aspects like harvesting/threshing & storage, field preparation, irrigation management, seed rate & spacing, fertilizer application, seed treatment, plant protection measures and soil treatment were found to be 88.33, 78.88, 75.00, 74.44, 72.38, 67.77, 54.04, and 52.22 MPS, respectively. In case of non-beneficiary farmers, knowledge regarding harvesting/threshing and storage, field preparation, irrigation management, seed rate & spacing, fertilizer application, seed statement soil treatment and plant protection measures were found to be 85.00, 74.44, 73.33, 70.00, 65.71, 58.88, 51.11 and 41.90 MPS, respectively.

When difference was observed between beneficiary and non-beneficiary, it was found that level of knowledge of beneficiary farmers regarding different practices of mustard production was higher than non-beneficiary farmers ranging from 1.11 MPS of soil treatment to 12.14 MPS of plant protection measures.

The overall difference in knowledge level of beneficiary and non-beneficiary farmers was only 5.82 MPS which was non-significant as per the criterion followed by AICRP-RM. The finding is in accordance with the findings of Singh and Sharma (2005) Asiwal et al., (2008) and Kumawat (2008) who also reported that the average knowledge of beneficiary respondents was found to be higher than the non-beneficiary respondents. Although reasons of the non-significant difference of the present study might be that there were number of other extension educational programmes organized by different organizations and communication media used by farmers for providing knowledge about mustard production technology to them, resulting in increase of knowledge not only to beneficiary farmers but non-beneficiary farmers also.

Level of adoption of improved mustard production technology (MPT) by beneficiary and non-beneficiary respondents: The level of adoption of beneficiary and non-beneficiary farmers was measured for all thirteen practices of MPT. The study (Table 2) reveals that beneficiary respondents adopted high yielding varieties on their fields at the highest extent with MPS 94.66 followed by time of sowing with MPS 80.55 and fertilizer application with MPS 80.16. The study shows that MPS pertaining to practices like irrigation management, seed treatment and seed rate & spacing were 78.05, 75.83 and 75.33, respectively,

Table 2. Level of adoption of improved mustard production technology (MPT) by the respondents

S. No.	Mustard Production Technology	Maximum Score	Beneficiary Farmers		Non-beneficiary farmers		Difference
			MPS	Rank	MPS	Rank	
1	High yielding varieties	05	94.66	I	68.66	III	26.00*
2	Field preparation	05	15.33	XIII	10.66	XIII	04.67
3	Soil treatment	04	22.5	XI	12.50	XII	10.00*
4	Seed treatment	04	75.83	V	38.33	VIII	37.50*
5	Time of sowing	06	80.55	III	75.00	I	5.55
6	Seed rate and spacing	10	75.33	VI	58.33	IV	17.00*
7	Fertilizer application	20	80.16	II	39.66	VII	40.50*
8	Irrigation management	12	78.05	IV	74.16	II	3.89
9	Weed management	05	46.66	VIII	40.66	VI	6.00
10	Pest management	10	30.33	X	18.33	X	12.00*
11	Disease management	10	19.66	XII	13.33	XI	6.33
12	Physiological practices	04	33.33	IX	29.16	IX	4.17
13	Harvesting / threshing and storage	05	60.00	VII	48.66	V	11.33*
	Mean		54.79		40.57		14.22*

* Significant difference

which show the high adoption of these practices by the beneficiary farmers. On the contrary, the practices such as harvesting / threshing & storage, weed management, physiological practices, pest management, soil treatment, disease management and field preparation were found to be least adopted with 60.00, 46.66, 33.33, 30.33, 22.5, 19.66 and 15.33 MPS, respectively.

The extent of adoption of non-beneficiary farmers was also measured. The data reveal that non-beneficiary farmers had adopted time of sowing practices to the highest extent with MPS 75.00 followed by irrigation management with MPS 74.16. The study further indicates that the practices like use of high yielding varieties, seed rate & spacing and harvesting / threshing & storage were adapted to the extent of 68.66, 58.33 and 48.66 MPS, respectively. The weed management, fertilizer application, seed treatment, physiological practices, pest management, disease management, soil treatment and field preparation were found to be least adopted with 40.66, 39.66, 38.33, 29.16, 18.33, 13.33, 12.50 and 10.66 MPS, respectively.

When difference in level of adoption of different aspects of MPT between beneficiary and non-beneficiary was observed, it was found that difference in adoption level between beneficiary and non-beneficiary farmers ranging from MPS 3.89 to MPS 40.50. The highest and significant difference was observed in adoption of fertilizer management (MPS

40.50) followed by seed treatment (MPS 37.50), use of high yielding varieties (MPS 26.00), seed rate and spacing (MPS 17.00), pest management (MPS 12.00), harvesting / threshing and storage (MPS 11.33) and soil treatment (MPS 10.00). The lowest difference was found in irrigation management (MPS 3.89) followed by field preparation (MPS 4.67). The overall difference in adoption level of different practices of MPT between beneficiary and non-beneficiary was 14.22 MPS which was considered as significant difference as per the criterion followed by AICRP-RM. From the study, it was clear that adoption of MPT was more among the beneficiary as compared to non-beneficiary respondents. It might be due to that continuous touch of beneficiary respondents with scientists during conducting FLDs at their farm motivating them to acquire knowledge and skills for adopting improved mustard production technology for maximise their yield and profits. The finding is in conformity with those reported by *Kumawat (2008)* who found the higher adoption level among demonstrator than the non-demonstrator farmers. *Lakhera and Sharma (2002)* also reported that extent of adoption of improved mustard production technology was higher among participatory farmers than non-participatory farmers. Similar kind of finding was also reported by *Patel, et. al., (2009)* that adoption of improved mustard production technologies under real farm conditions through frontline demonstrations had

resulted in significant improvement in the extent of adoption, productivity and profitability of mustard growers in Banas Kantha district of Gujarat.

Attitude of beneficiary farmers towards front line demonstrations on mustard conducted by NRCRM:

Attitude of the respondents towards a programme plays a pivotal role in adoption and diffusion of any new practice. To measure the attitude of the beneficiary farmers, an attitude scale was developed containing 15 items, which were measured on five-point continuum viz. strongly agree, agree, undecided, disagree and strongly disagree with the weightage 5,4,3,2, respectively and 1 for positive statement and reverse scoring for negative statement. Mean percent scores for each of the items was worked out. On the basis of MPS obtained, the beneficiary farmers were grouped into three categories viz. most favourable (MPS 75 and above), favourable (MPS 60-74) and unfavourable (below MPS 60) on the basis of the criterion adopted as in case of evaluation of scholastic performance of student.

Distribution of the respondents according to the degree of the attitude towards FLDs: The data reported in Table 3 that out of 30 beneficiary respondents,

53.33 per cent were having favourable attitude towards FLDs. Only 13.33 per cent respondents expressed their unfavourable attitude towards FLDs, whereas 33.33 per cent beneficiary were having most favourable attitude towards FLDs. Hence, it may be inferred that most of the beneficiary respondents had their attitude in positive direction towards FLDs.

Table 3 Distribution of the respondents according to the degree of the attitude towards FLDs

Degree of attitude	No.	%
Unfavourable (MPS < 60)	4	13.33
Favourable (MPS 60-74)	16	53.33
Most favourable (MPS 75 & above)	10	33.33

Attitude of beneficiary farmers towards different aspects of frontline demonstrations on mustard:

Table 4 visualizes the attitude of beneficiary farmers towards different aspects of frontline demonstrations on mustard. Item wise analysis of the attitude measurement shows (Table 4) that the respondents have strongly agreed that “scientists/extension personnel possessed the latest knowledge about MPT” and it was assigned first rank with 85.33 MPS and showed strong disagreement with the statement that “literature provided

Table 4 Attitude of beneficiary farmers towards different aspects of frontline demonstrations on mustard

S.No.	Aspects	MPS	Rank
1	Scientists/extension personnel possessed the latest knowledge about MPT	85.33	I
2	The Scientists/extension personnel were not cooperative and helpful to the farmers.	81.33	III
3	Scientists/extension personnel were aware with problems of farmers in adopting new MPT and helping to overcome these problems in your areas.	74.00	VIII
4	MPT demonstrated through FLDs was need based and location specific	74.66	VII
5	MPT advocated through FLDs was not proved beneficial to the farmers	78.00	V
6	MPT has not brought about a significant change in cultivation practices of the farmers	62.00	XV
7	MPT advocated through FLDs was cheap, trust worthy and can be afforded by the farmers	70.66	X
8	MPT advocated was technically and ecologically sound and according to farmer’s resources.	71.33	IX
9	Short duration training programme organized during the programme was not sufficient to perform agricultural operation successfully.	68.00	XIII
10	Technology has contributed significantly to increase the mustard production	76.00	VI
11	Risk of cultivation was minimized with the adoption of technology advocated in FLDs	65.33	XIV
12	Literature provided regarding MPT was not sufficient and understandable form.	82.00	II
13	The FLDs really served as instructional laboratory for mustard growers and were helpful to build up confidence into mustard growers regarding improved technology.	68.66	XII
14	Training/ Field day/Kisan mela and exhibition organized by the NRCRM was not useful means of gaining practical knowledge	80.00	IV
15	Scientists/extension personnel have visited regularly the beneficiaries’ farm and provide immediate solution for their problem.	69.33	XI

regarding MPT was not sufficient and understandable form” which got second rank with 82.00 MPS.

The high MPS of the negative statements like “scientists/extension personnel were not cooperative and helpful to the farmers”, “training/field day/ *kisan mela* and exhibition organized by the NRCRM were not useful means of gaining practical knowledge” and “mustard production technology advocated through FLDs was not proved beneficial to the farmers” with 81.33, 80.00 and 78.00 MPS, and third, fourth and fifth rank, respectively showed strong disagreement of respondents to these statements. The respondents accorded sixth rank to statement “technology has contributed significantly to increase the mustard production” with 76.00 MPS.

Other aspects like “MPT demonstrated through FLDs was need based and location specific (74.66 MPS)”, “scientists/extension personnel were aware with problems of farmers in adopting new MPT and helping to overcome these problems (74.00 MPS)”, “MPT advocated was technically and ecologically sound and according to farmer’s resources (71.33 MPS)” and “MPT advocated through FLDs was cheap, trust worthy and can be afforded by the farmers (70.66 MPS) were accorded seventh, eight, ninth and tenth rank, respectively by the respondents which showed the favourable attitude to these aspects

Further, the statements like “scientists/extension personnel regularly visited the beneficiaries’ farm and provided immediate solution for their problem”, “FLDs really served as instructional laboratory for mustard growers and were helpful to build up confidence into mustard growers regarding improved technology”, “short duration training programme organized during the programme was not sufficient to perform agricultural operation successfully” and “risk of cultivation was minimized with the adoption of technology advocated in FLDs” were awarded eleventh, twelfth, thirteen and fourteenth rank, with 69.33 MPS, 68.66 MPS, 68.00 MPS and 65.33 MPS, respectively. It was also to be noted that the aspect/statement “MPT has brought about a significant change in cultivation practices of the farmers” were awarded lowest MPS 62.00 with last rank i.e. fifteenth. The mean percent scores of all the statements ranged from 62.00 to 85.33 which indicated the favourable to most favourable attitude of the

respondents towards different aspects of frontline demonstrations on mustard conducted by NRCRM. The finding is supported by *Kumar et. al.*, (2006) who reported that majority of respondents showed favourable attitude towards various activities of KVK including frontline demonstrations

CONCLUSION

Study showed that the level of knowledge of beneficiary farmers and adoption of improved mustard production technology was higher than non-beneficiary farmers. The overall difference in knowledge level of beneficiary and non-beneficiary farmers was only 5.82 MPS. It was found that difference in adoption level between beneficiary and non-beneficiary farmers ranging from MPS 3.89 to MPS 40.50. The highest and significant difference was observed in adoption of fertilizer management followed by seed treatment, use of high yielding varieties, seed rate and spacing, pest management, harvesting / threshing and storage and soil treatment. The overall difference in adoption level of different practices of MPT between beneficiary and non-beneficiary was 14.22 MPS. Further, most of the beneficiary respondents had positive attitude towards FLDs. It can be said that their was positive impact of FLDs conducted by NRCRM on knowledge and adoption of the mustard production technology. Therefore, it can be concluded that frontline demonstration conducted under the close supervision of scientists is one of the most important tool of extension to demonstrate newly released crop production and protection technologies and its management practices in the farmers’ field under different agro-climatic regions and farming situations. FLDs are playing important role in motivating the farmers for adoption of improved agriculture technology resulting in increasing their yield and profits.

Keeping in view of importance in transfer of technology, FLDs should be designed and conducted carefully and effectively and provisions should be made for other supportive extension activities such as field days, interaction meeting, etc. for speedy dissemination of demonstrated technology among farming community.

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