

Front line demonstrations on cotton production technology : An impact assessment

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ABSTRACT : Front line demonstration (FLD) is one of the most powerful tools for transfer of technology. Keeping in view of an effective extension approach of FLD for dissemination of cotton technology, an impact assessment of FLDs conducted by CAZRI, Krishi Vigyan Kendra in Pali district of Rajasthan was assessed. It was found that the level of knowledge of beneficiary farmers regarding different practices of cotton production was higher than non beneficiary farmers ranging from 05.27 Mean Per cent Score (MPS) of soil treatment to 27.45 MPS of plant protection measures. The difference in adoption level between beneficiary and non beneficiary farmers ranging from MPS 02.25 to MPS 19.78 the highest and significant difference was observed in adoption of high yielding varieties (MPS 19.78) followed by physiological practices (MPS 12.68) and field preparation (MPS 10.69), respectively. The lowest difference was found in irrigation management (MPS 02.25) followed by disease management (MPS 03.89). The overall difference in adoption level of different practices of Cotton Production Technology (CPT) between beneficiary and non beneficiary was 08.60 MPS. From the study, it was clear that adoption of CPT was more among the beneficiary as compared to non beneficiary respondents. The mean per cent scores of all the attitude statements ranged from 58.66 to 90.12 which indicated the favourable to most favourable attitude of the respondents towards different aspects of frontline demonstrations on cotton conducted by CAZRI, KVK.

Key words: Adoption, attitude, cotton production, frontline demonstration, knowledge

Cotton plays a key role in the National economy in terms of direct and indirect employment and income generation in the agricultural and industrial sectors. Textiles and related exports of which cotton alone comprised nearly 68 per cent and accounts for nearly 34 per cent of total foreign exchange earning of our country which at present is around 13 billion dollars with a potential for a significant increase in the coming year. Cotton is cultivated in three distinct agro-ecological regions (north, central and south) of the country (Rai and Singh, 2012). Front Line Demonstration (FLD) is the 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 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 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 objectives 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 hectares land in order to have better impact of the demonstrated technologies on the farmers and field level extension functionaries. A cotton crop is one of the major commercial crops of India. Under the All India Coordinated Research Project on Cotton (AICRPC), the technologies developed through research activities are demonstrated under actual field conditions of the farmers through front line demonstrations.

Realizing the importance of Front Line Demonstrations in transfer of technologies, Central Arid Zone Research Institute, Krishi Vigyan Kendra, Pali have regularly been conducting FLDs on cotton since 2001 at farmers' fields in different villages of Pali district of Rajasthan with the objective of convincing farmers and extension functionaries together about the production potentialities of the cotton technologies for further wide scale diffusion. Keeping in view of an effective extension approach of FLDs for dissemination of cotton technology, it was thought that impact of FLDs conducted by CAZRI, KVK was to be assessed. Therefore the present study reported in 2011 or 2012 was undertaken with the following specific objectives:

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

MATERIALS AND METHODS

The frontline demonstrations on cotton were conducted by several organizations in Rajasthan including CAZRI, ARS, RRS and KVK but due to paucity of time and proximity, study

was confined to FLDs conducted by CAZRI, KVK in Pali district of Rajasthan. Present study was carried out during *kharif* 2011 and 2012 at five villages namely; Kusalpura, Atbara, Rampura, Charwas and Nimaj villages of Pali district, where FLDs were conducted during preceding two years were selected. A sample of 120 respondents was taken comprising 60 beneficiaries and 60 non beneficiaries 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 (60 non beneficiary farmers), 60 farmers were selected randomly from the locality adjacent to CAZRI, KVK 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 analyzed in terms of mean per cent scores, ranks, etc. in the light of objectives of the study.

RESULTS AND DISCUSSION

Level of knowledge of beneficiary and non beneficiary farmers about cotton production technology (CPT) : It is assumed that the knowledge of respondents to large degree depends upon the extent of exposure given to him about the technology. The frontline demonstrations conducted on cotton crop by CAZRI, KVK, Pali was supposed to have imparted knowledge of cotton production technology to the farmers, where the FLDs were conducted on their farm. Therefore, efforts were made to assess the knowledge level of beneficiaries as well as non-beneficiaries regarding improved cotton production technologies. The knowledge of the respondents with regard to improved package of practices was measured in terms of mean per

cent scores (MPS). As many as twelve practices were included to assess the knowledge as given in Table 1. The data in Table 1 show that both types of respondents possessed maximum knowledge regarding time of sowing and high yielding varieties of cotton crop. Similarly, they possessed less knowledge regarding the physiological practices and weed management aspects of cotton cultivation. The findings confirm with the findings of Dhand *et al.*, (2005), The mean per cent scores (MPS) of the knowledge of beneficiary farmers varied from 40.87 to 96.31, while in case of non beneficiary farmers, the mean per cent scores varied from 20.23 to 80.12, respectively. 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 and storage, field preparation, irrigation management, seed rate and spacing, fertilizer application, seed treatment, soil treatment and plant protection measures were found to be 90.66, 80.34, 78.90, 75.89, 73.56, 70.37.04, 55.03 and 53.10 MPS, respectively. In case of non beneficiary farmers, knowledge regarding harvesting/threshing and storage, field preparation, irrigation

management, seed rate and spacing, fertilizer application, seed treatment, soil treatment and plant protection measures were found to be 73.11, 70.00, 70.14, 65.34, 65.71, 60.11, 52.06, 45.76 and 25..65 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 cotton production was higher than non beneficiary farmers regarding from 5.27 MPS of soil treatment to 27.45 MPS of plant protection measures. The overall difference in knowledge level of beneficiary and non-beneficiary farmers was only 15.36 MPS which was non significant as per the criterion followed by AICRPC. The finding is in accordance with the findings of Kapadia *et al.*, (2012) and Wasnik *et al.*, (2013) 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 cotton production technology to them, resulting in

Table 1. Level of knowledge of respondents about improved cotton production technology (N=120)

S. No	Cotton production technology	Maximum score	Beneficiary N=60		Non beneficiary N=60		Difference
			MPS	Rank	MPS	Rank	
1	High yielding varieties	10	94.22	II	78.98	II	15.24
2	Field preparation	04	80.34	IV	70.00	V	10.34
3	Soil treatment	04	55.03	IX	49.76	IX	5.27
4	Seed treatment	04	70.37	VIII	52.06	VIII	17.77
5	Time of sowing	04	96.31	I	80.12	I	16.19
6	Seed rate and spacing	04	75.89	VI	65.34	VI	10.55
7	Fertilizer application	08	73.56	VII	60.11	VII	13.45
8	Irrigation management	03	78.90	V	70.14	IV	8.76
9	Weed management	05	40.87	XII	23.00	XI	17.87
10	Plant protection measures	15	53.10	X	25.65	X	27.45
11	Physiological practices	15	44.11	XI	20.23	XII	23.88
12	Harvesting/ threshing and storage	03	90.66	III	73.11	III	17.55
	Mean	-	71.11	-	55.71	-	15.36

MPS=Mean Per cent Score

increase of knowledge not only to beneficiary farmers but non beneficiary farmers also.

Level of adoption of improved cotton production technology (CPT) by beneficiary and non beneficiary respondents :

The level of adoption of beneficiary and non beneficiary farmers was measured for all thirteen practices of CPT. The study (Table 2) reveals that beneficiary respondents adopted high yielding varieties on their fields at the highest extent with MPS 90.22 followed by time of sowing with MPS 80.55 and harvesting/threshing and storage with MPS 78.00. The study shows that MPS pertaining to practices like irrigation management, seed rate and spacing and fertilizer application were 70.23, 69.43 and 66.01, respectively. This shows the high adoption of these practices by the beneficiary farmers. On the contrary, the practices such as seed treatment, pest management, disease management, physiological practices, weed management, soil treatment, and field preparation were found to least adopted with 63.88, 49.00, 47.89, 35.80, 33.45, 29.08 and 25.90 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 73.52 followed by high yielding varieties with MPS 70.40.

The study further indicates that the practices like harvesting/threshing and storage, irrigation management and seed rate and spacing were adopted to the extent of 68.78, 67.98 and 60.11 MPS, respectively. The fertilizer application, seed treatment, disease management, pest management, weed management, physiological practices, soil treatment and field preparation were found to be least adopted with 58.00, 55.43, 44.00, 41.59, 26.23, 23.18, 23.12 and 15.21 MPS, respectively. When difference in level of adoption of different aspects of MPS between beneficiary and non-beneficiary was observed, it was found that difference in adoption level between beneficiary and non beneficiary farmers ranging from MPS 02.25 to MPS 19.78. The highest adoption of high yielding varieties (MPS 19.78) followed by physiological practices (MPS 12.68), field preparation (MPS 10.69), seed rate and spacing (MPS 09.32), harvesting/threshing and storage

Table 2. Level of adoption of respondents about improved cotton production technology (N=120)

S. No	Cotton production technology	Maximum score	Beneficiary		Non beneficiary		Difference
			N=60		N=60		
			MPS	Rank	MPS	Rank	
1	High yielding varieties	05	90.22	I	70.44	II	19.78
2	Field preparation	05	25.90	XIII	15.21	XIII	10.69
3	Soil treatment	04	29.08	XII	23.18	XI	05.90
4	Seed treatment	04	63.88	VII	55.43	VII	08.45
5	Time of sowing	05	80.55	II	73.52	I	07.03
6	Seed rate and spacing	08	69.43	V	60.11	V	09.32
7	Fertilizer application	15	66.01	VI	58.00	VI	08.01
8	Irrigation management	10	70.23	IV	67.98	IV	02.25
9	Weed management	05	33.45	XI	26.23	X	07.22
10	Pest management	12	49.00	VIII	41.59	IX	07.41
11	Disease management	12	47.89	IX	44.00	VIII	03.89
12	Physiological practices	04	35.80	X	23.12	XII	12.68
13	Harvesting/ threshing and storage	06	78.00	III	68.78	III	09.22
	Mean	-	56.88	-	48.28	-	08.68

MPS=Mean Per cent Score

(MPS 09.22), pest management (MPS 07.41) and soil treatment (MPS 05.90). The lowest difference was found in irrigation management (MPS 02.25) followed by disease management (MPS 03.89). The overall difference in adoption level of different practices of CPT between beneficiary and non-beneficiary was 08.60 MPS which was considered as significant difference as per the criterion followed by AICRPC.

From the study, it was clear that adoption of CPT 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 cotton production technology for maximize their yield and profits. The findings confirm with the findings of Barar and Dangi (2007) and Godase *et al.*, (2011) and Singh *et al.*, (2013).

Attitude of beneficiary farmers towards different aspects of frontline demonstrations on cotton

Table 3 visualizes the attitude of beneficiary farmers towards different aspects of frontline demonstrations on cotton. Item wise analysis of the attitude measurement shows (Table 3) that the respondents have strongly agreed that “scientists/extension personnel possessed the latest knowledge about CPT” and it was assigned first rank with 90.12 MPS and showed strong disagreement with statement that “literature provided regarding CPT was not sufficient and understandable form” which got second rank with 87.00 MPS. The high MPS of the negative statements like “scientist/extension personnel were not cooperative and helpful to the farmers”, “training/field day/*kisan mela* and exhibition organized by CAZRI, KVK were not useful means of gaining practical knowledge” and “cotton production technology advocated through FLDs was not proved

Table 3. Attitude of beneficiary farmers towards different aspects of frontline demonstrations on cotton (N=120)

S. No.	Aspects	MPS	Rank
1	Scientists/extension personnel possessed the latest knowledge about CPT	90.12	I
2	The scientists/extension personnel were not cooperative and helpful to the farmers	83.45	III
3	Scientists/extension personnel were aware with problems of farmers in adopting new CPT and helping to overcome these problems in your areas	75.00	VIII
4	CPT demonstrated through FLDs was need based and location specific	76.15	VII
5	CPT advocated through FLDs was not proved beneficial to the farmers	80.33	V
6	CPT has not brought about a significant change in cultivation practices of the farmers	58.66	XV
7	CPT advocated through FLDs was cheap, trustworthy and can be afforded by farmers	69.56	X
8	CPT advocated was technically and ecologically sound and according to farmer's resources	70.45	IX
9	Short duration training programme organized during the programme was not sufficient to perform agricultural operation successfully	63.72	XIII
10	Technology has contributed significantly to increase the cotton production	78.00	VI
11	Risk of cultivation was minimized with the adoption of technology advocated in FLDs	59.22	XIV
12	Literature provided regarding CPT was not sufficient and understandable form	87.00	II
13	The FLDs really served as instructional laboratory for cotton growers and were helpful to build up confidence into cotton growers regarding improved technology	66.09	XII
14	Training/field day/ <i>kisan mela</i> and exhibition organized by the CAZRI, KVK was not useful means of gaining practical knowledge	82.44	IV
15	Scientists/extension personnel have visited regularly the beneficiaries' farm and provide immediate solution for their problem.	68.32	XI

MPS= Mean Per cent Score; N=Number of respondents

beneficial to the farmers” with 83.45, 82.44 and 80.33 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 cotton production” with 78.00 MPS. Other aspects like “CPT demonstrated through FLDs was need based and location specific (76.15 MPS)”, “scientists/extension personnel were aware with problems of farmers in adopting new CPT and helping to overcome these problems (75.00 MPS)”, “CPT advocated was technically and ecologically sound and according to farmer’s resources (70.75 MPS)” and “MPS advocated through FLDs was cheap, trustworthy and can be afforded by the farmers (69.56 MPS) were accorded seventh, eighth, 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 cotton growers and were helpful to build up confidence into cotton 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, thirteenth and fourteenth rank, with 68.32 MPS, 66.09 MPS, 63.72 MPS and 59.22 MPS, respectively. It was also to be noted that the aspects/statement “CPT has brought about a significant change in cultivation practices of the farmers” were awarded lowest MPS 58.66 with last rank i.e. fifteenth. The mean per cent rank score of all the statements ranged from 58.66 to 90.12 which indicated the favourable to most favourable attitude of the respondents towards different aspects of frontline demonstrations on cotton conducted by CAZRI,

KVK. The finding is supported by Kumar *et al.* (2006) and Kumar *et al.*, (2004) who reported that majority of respondents showed favourable attitude towards various activities of CAZRI, KVK including frontline demonstrations.

CONCLUSION

Study showed that the level of knowledge of beneficiary farmers and adoption improved cotton production technology was higher than non beneficiary farmers. The overall difference in knowledge level of beneficiary and non beneficiary farmers was only 15.36 MPS. It was found that difference in adoption level between beneficiary and non beneficiary farmers ranging from MPS 2.25 to MPS 19.78, respectively. 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 CPT between beneficiary and non-beneficiary was 08.68 MPS. Further, most of the beneficiary respondents had positive attitude towards FLDs. It can be said that there was positive impact of FLDs conducted by CAZRI, KVK on knowledge and adoption of cotton 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 demonstration newly released crop production and protection technologies and its management practices in the farmer’s 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 positivity 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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