RESEARCH NOTE

Impact of Frontline Demonstrations on Indian Mustard through Improved Technologies

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ABSTRACT

Indian Mustard is an important oilseed crop of Haryana. It is also one of the most important oilseed crops of Ambala district of Haryana. Krishi Vigyan Kendra, Tepla, Ambala conducted 37 frontline demonstrations of Indian Mustard. 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 Indian Mustard, an impact assessment of FLDs conducted by KVK, Ambala was assessed. The results were compared between FLD plots & control plots. The FLD on Indian mustard registered 14.80 percent higher yield over farmer's practice on an average. The highest yield (12.75 qt/ha) was recorded in 2009-10 in FLD, which was 21.75 percent more yield over the farmer's practice (10.00 qt/ha). Average extension gap was recorded 1.60 qt/ha and average technology gap was recorded 7.18 qt/ha. The technology index ranged from 22.96 percent to 64.14 percent. The results indicated that the frontline demonstration made a good impact on the farming community of Ambala district as they were motivated by the new agricultural technologies applied in the FLD plots.

***Key words**: Indian mustard; Frontline demonstration; Extension gap; Technology gap; Technology index;*

Indian mustard [*Brassica juncea* (L.)] Czernj & Cerson] is the most important oilseed crop. Indian mustard or brown mustard (rai) was originally introduced from China into north-eastern India, from where it had spread to Afghanistan via Punjab, eastern Afghanistan, together with the adjoining north-western India. It is predominantly cultivated in Rajasthan, Uttar Pradesh, Haryana, Madhya Pradesh and Gujarat. Its cultivation is also being extended to non-traditional areas of southern states like Tamil Nadu, Karnataka & Andhra Pradesh (*Anonymous, 2008*). Indian mustard is one of the important oilseed crops of Haryana. The lower yields of Indian mustard in Ambala region are attributed to the non-availability of improved cultivars, improper dose of fertilizer, non-application of secondary micronutrients, untimely control of pests & diseases etc. Among the different agronomic practices, date of sowing, crop geometry (row spacing), seed treatment, biofertilizer inoculation, plant population and crop management practices play an important role in determining the yield of mustard. The basic objectives of FLD are the speedy spread of new technology of mustard in Ambala district. Frontline demonstration (FLD) is the new concept of field demonstration evolved by the Indian Council of Agricultural Research (ICAR) in the inception of the Technology Mission on Oilseed Crops during mid-eighties. The field demonstration conducted under the close supervision of Scientists of the National Agriculture Research System (NARS) is called frontline 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 FLD is to demonstrate newly released crop production and protection technologies and its management practices in the farmer's field under different agro-climatic regions and farming situations. While demonstrating the technologies at the farmer's fields, the scientists are required to study the factors constraints of production and thereby generate production data and feedback in formation. FLDs are conducted in a block of two or four hactares land in order to have better impact of the demonstrated technologies on the farmers and field level extension functionaries.

METHODOLOGY

The present study was carried out by the Krishi Vigyan Kendra, Tepla, Ambala (Haryana) during *rabi* seasons from 2006-07 to 2010-11 at farmer's field of 10 adopted villages viz. Sambhalakha, Phulel Majra, Kardhan, Samlehri, Dhurala, Allahpur, Baragarh, Tamnauli, Gadauli & Saha of Ambala district. The area under each demonstration was 0.40 ha (i.e. 1 acre). In the demonstration, one control plot was also kept where farmer's practice was carried out. The improved package of practices viz., improved & recommended varieties, biofertilizer inoculation, recommended doses of fertilizers, secondary & micronutrients application, use of soil amendments like Gypsum, plant protection management were demonstrated on the farmer's field through frontline demonstration at different locations. Materials for the present study with respect to FLD & farmers practice are given in Table 1. Time to time monitoring of FLD plots were carried out by the KVK scientists and farmers were advised to carry out different operations like sowing, spraying, weeding, harvesting etc. Data were collected with the help of personal contact. The collected data were calculated and analyzed to draw the inferences.

Extension or Yield gap = Demonstration yield – Farmer's yield

Technology gap = Potential yield – Demonstration yield

$$\text{Technology index} = \frac{\text{Potential yield - demonstration yield}}{\text{Potential yield}} = 100$$

The technology demonstrated are mentioned in Table 1 and compared with local practices.

RESULTS AND DISCUSSION

Results of 37 frontline demonstrations conducted during 2006-07 to 2010-11 in 15 ha area of farmers field of 10 villages of Ambala district (Table 2) included the cultivation practice under FLD viz. use of improved & recommended varieties, biofertilizer inoculation of seed with Phosphate Solubilizing Bacteria (PSB) (2.5 packet per ha.), balanced application of fertilizer (60 kg N: 20 kg P per ha.), through urea & Single Super Phosphate (SSP), application of secondary nutrients like sulphur (12.5 kg per ha.), use of micronutrients like zinc in the from of zinc sulphate (25 kg per ha.), control of mustard aphid through endosulfan (1 litre per ha.) at economic threshold levels, control of alternaria blight of mustard by mancozeb (1.5 litre per ha.), application of soil reclamation material like gypsum (375 kg per ha.). The yield of Indian mustard ranged between 7.62 qt/ha to 12.75 qt/ha over the observation period, which was 1.60 percent to 25.12 per cent higher over farmer's practice (local check). On an overall basis, 14.80 percent increase in yield over local check was recorded. However, the variation in yield from site to site accounted for varying climate conditions & variation in agricultural practices followed. Similar reasons were provided by *Tomar et.al. (2003)* for variation in yield from location to location.

The extension gap, the difference between demonstration yield and farmer's yield ranged from 0.12 qt/ha to 2.75 qt/ha during the period of study. The lowest extension gap (0.12 qt/ha) was obtained in 2006-07 and the highest extension gap (2.75 qt/ha) was observed in 2009-10. Average extension gap was observed 1.60 qt/ha. The technology gap which is the difference between potential yield and demonstration yield, ranged between 3.80 qt/ha (2009-10) to 13.63 qt/ha (2006-07). On an average, technology gap under 5 years of FLD programme was 7.18 qt/ha. The technology gap observed may be attributed to dissimilarity in the soil fertility status, agricultural practices and local climatic

Table 1. Details of Mustard growing under FLD & existing practices

Operation	Existing Practice	Improved Practices Demonstrated
Use of Seed	Local Seed	Seeds of improved & recommended varieties
Fertilizer application	Application of DAP	Application of SSP, Water soluble fertilizer (N:P:K 13:0:45)
	No use of Potassium & Magnesium fertilizer	Use of Potassium & Magnesium in the form of K-Mag fertilizer
Soil reclamation	No Gypsum application	Gypsum application for soil reclamation
Secondary & micronutrients application	No Secondary & micronutrients application	Secondary nutrients like sulphur and magnesium and micronutrients like Zn application
Control of Mustard Aphid	No insecticide used	Spray of Endosulfan
Control of Alternaria blight	No fungicide used	Spray of Mancozeb M-45 & Propiconazole
Biofertilizer inoculation of seed	No Biofertilizer inoculation of seed	Biofertilizer inoculation of seed with PSB & Azatobacter

Table 2. Extension gap, technology gap and technology index of FLD on Indian Mustard

Year	FLD Variety	Local check variety	Area (ha.)	No. of FLDs	Technology used		Yield (qt/ha)		% increase in yield (qt/ha)	Ext. or Yield gap	Tech gap (qt/ha)	Tech. index (%)
					FLD	Local check	FLD	Local check				
2006-07	RH-30	Luxmi	4	10	X1	X2	7.62	7.50	1.60	0.12	13.63	64.14
2007-08	RH-30	Kesri-100	3	7	X3	X4	12.37	11.67	5.99	0.70	8.88	41.76
2008-09	JD-6	Luxmi	2	5	X5	X6	12.25	9.79	25.12	2.46	5.25	30.00
2009-10	RLC-1	T-59	2	5	X7	X8	12.75	10.00	21.75	2.75	3.80	22.96
2010-11	RLC-1	T-59	4	10	X9	X10	12.17	10.18	19.54	1.99	4.38	26.46
Mean			15	37			11.43	9.82	14.8	1.60	7.18	49.09

Note:

X1 = Seeds of improved & recommended variety, Application of SSP & water soluble fertilizer (N:P:K::13:0:45), -Bio-fertilizer inoculation of seed with PSB & Azatobacter

X2 = Local seeds, Application of DAP, No bio-fertilizer inoculation of seed,

X3 = Seeds of improved & recommended variety, Application of SSP, Gypsum application for soil reclamation, Spray of endo-sulfan to control aphid attack, Use of micronutrients in the form of ZnSO4 , Application of Mancozeb M-45 to control seed & soil borne disease.

X4 = Local seeds , Application of DAP, No gypsum use , No spray of endo-sulfan to control aphid, No use of ZnSO4, No application of M-45

X5 = Seeds of improved & recommended variety, Use of SSP.

X6 = Local seeds, Use of DAP.

X7 = Seeds of improved & recommended variety, Use of micronutrients in the form of ZnSO4 , Use of secondary nutrient in the form of sulphur, Spray of endo-sulfan to control aphid attack, Spray of propiconazole to control alternaria blight.

X8 = Local seeds , No use of ZnSO4, No use of secondary nutrient in the form of sulphur, No spray of endo-sulfan, No spray of propiconazole to control alternaria blight,

X9 = Seeds of improved & recommended variety, Use of micronutrients in the form of ZnSO4 , Application of secondary nutrient in the form of sulphur, Use of Potassium & Magnesium in the form of K-Mag fertilizer, Spray of endo-sulfan to control aphid attack.

X10 = Local seeds , No use of ZnSO4, No application of secondary nutrient in the form of sulphur, No use of Potassium & Magnesium in the form of K-Mag fertilizer, No spray of endo-sulfan.

conditions. The technology index showed the feasibility of evolved technology at the farmer's field. The lower is the value of technology index, more was the feasibility of the technology demonstrated *(Sagar & Chandra, 2004)*. As such, reduction of technology index from 64.14 per cent (2006-07) to 22.96 per cent (2009-10) exhibited the feasibility of technology demonstrated (Table 2).

CONCLUSION

The productivity enhancement under FLD over traditional method of Indian Mustard cultivation created greater awareness and motivated the other farmers to adopt appropriate production technology of Indian Mustard in Ambala district. The selection of specific technology like improved and recommended variety, biofertilizer inoculation of seed, proper dose of fertilizer, secondary & micronutrients application, plant protection measures, use of soil amendments material were undertaken in a proper way. These technologies were found to be the main reason for increase in yield and thus, it would be said that FLDs were the most successful tools for transfer of technology for productivity enhancement of Indian mustard.

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