Ind. J. Extn. Educ. & R.D. 21 : 141-145, 2013

DISSIMINATION OF IMPROVED TECHNOLOGY OF MUSTARD THROUGH FRONT LINE DEMONSTRATIONS

Rajeev Bairathi*, A. K. Verma and R. S. Patodiya*****

ABSTRACT

Mustard possesses a good position in oilseed crops along with high yield potential in both rainfed and irrigation conditions. It contains 37-49 % oil content. Mustard is the major growing oilseed crop during *Rabi* in the district with low productivity i.e. less than 1400 kg/ha. The major reason behind low yield of mustard is wide gap between improved package of practices (IP) & farmers practice (FP). In order to identify the gap and performance of the FLDs conducted by Krishi Vigyan Kendra, Jhalawar, present study was undertaken. The major factors which were responsible for the lower yield of mustard was higher seed rate without treatment, delayed sowing time, defective method of sowing, imbalance use of chemical fertilizer, no or less plant protection measures, no weed management and use of old varieties**.** The yield under IP ranged from 1900 to 2330 kg/ha. The per cent increase in yield with IP over FP was recorded in the range of 16.40 to 18.75 %.

INTRODUCTION

India is the largest producer of rape seed and mustard in the world. Rape seed and mustard possesses about 18 % of the total oilseed production of the country. Mustard contains a wide range in oil percentage i.e. 37-49 percent. The seed & oil is used as condiment in the pickle and for flavouring curries and vegetables. The crop is being cultivated in over 6.0 million hectares of area spread over Uttar Pradesh, Rajasthan, Haryana, Punjab, Assam, Bihar, Gujarat, West Bengal; Productivity of Mustard widely varies from location to location. The yield levels of Mustard crop are highly fluctuating due to monsoon and infestation of insect pest especially cut worm and aphid. The Government of India and ICAR is operating various schemes for quick and effective transfer of technology to farmer's field. Among these schemes, Front line demonstrations (FLD's) is one, which emphasizes to increase production by supplying critical inputs alongwith improved packages of practices tested by the scientists of State Agricultural Universities (SAUs). Use of improved seed, recommended dose of fertilizer, plant protection and weed control measures, sowing time, seed rate and seed treatment are giving higher yield of Mustard as compared to the traditional practices and farmers practices. Keeping the above facts in view, present study was carried out with following objectives:-

1) To find out the barriers influencing the production gap of Mustard.
2) To assess the performance of FLDs conducted on mustard during study period.

Table 1: Detailed information of FLDs conducted during study period

S. No.	Year	Crop	Variety	Area (ha)	Numbers of FLDs	Name of villages
1.	2007-08	Mustard	Laxmi	20.00	40	Pitampura
2.	2008-09	Mustard	RGN-73	10.00	20	Bardguwaliya
3.	2009-10	Mustard	Bio-902	10.00	25	Bhopatpura and Chuna bhati
	Total			40.00	85	

* Associate Professor, Department of Extension Education, Rajasthan College of Agriculture, Udaipur.
** Subject Matter Specialist, Krishi Vigyan Kendra, Jhalawar, Rajasthan.
** Associate Professor, Krishi Vigyan Kendra, Rajsamand.

RESEARCH METHODOLOGY

During 2007-08 to 2009-10, total 85 Front Line Demonstrations were conducted in four adopted villages (Pitampura, Bardguwaliya, Bhopatpura and Chuna bhati) of Jhalawar district of Rajasthan (Table-1). To carry out Front Line Demonstration in Mustard, farmers were randomly selected from adopted villages of KVK, Jhalawar based on practices being adopted by the farmers.

Before laying down FLDs, PRA survey was conducted to identify the farmers practices (FP) and interventions were finalized on that basis. Major constraints were identified included the higher seed rate without treatment, delayed sowing time, defective method of sowing, imbalance use of chemical fertilizer, no or less plant protection measures, no weed management and use of old varieties in Jhalawar district. Keeping in view of above factors, farmers having varied size holdings from each village, were selected. The interventions viz. optimum seed rate with treatment, normal sowing time, sowing in lines, balance use of chemical fertilizer, use of plant protection measures, weed management and use of recent varieties were applied in the demonstrated fields alongwith control i.e. farmer's practice (Table-2).

Table 3: Characteristic of experimental site of Jhalawar district

Parameters	Jhalawar District
Latitude	23^0 4' to 24^0 52' N
Longitude	75^0 29' to 76^0 56' E
Altitude	258 meter above mean sea level
Annual rainfall (Average)	954.70 mm
Maximum temperature ^{0}C	43-48 ^{0}C
Minimum temperature ^{0}C	01-2.6 ^{0}C
Soil texture	Black shrink soil

Table 2: Intervention points for lower yield of Mustard and recommended solution.

S.No.	Intervention points	Solutions
1	Use of Recent varieties	Laxmi, RGN-73 and Bio-902
2	Seed rate, treatment & time of sowing	4 Kg /ha, treated with Mancozeb @ 2 g/kg seed and for white rust 6 gm/ha Apran 35 SD & Sowing in 2nd and 3rd week of October
3	Plant geometry & Method of sowing	R x P (30 cm x 10 cm) & by seed cum fertilizer drill
4	Fertilizers	80 kg N/ha and 40 kg P /ha
5	Hoeing & Weeding	Hoeing & weeding at 20-25 DAS and at same time thinning to maintain plant to plant distance 10 cm, Fluchloralin for pyaji @ 1.0 Kg a.i./ha at last ploughing.
6	Irrigation	Two irrigation (First at 30-40 DAS and Second at 70-80DAS) or One irrigation (45-50 DAS)
7	Plant protection measure	
	I) Painted bug & Saw fly	Dusting of Endosulfon 4% or Quanolphos 1.5 % or Mehyle Parathion dust 2% 20-25 kg/ha during morning and evening.
	II) Aphid	Dusting of Methyl Parathion 2% or Malathion 5% @ 20-25 kg/ha or Spray of Endosulphon 35 EC or Malathion 50 EC @ 1.25 liter/ha or Dimethoate 30 EC @ 0.875 liter/ha.
	III) Blight, smut and White rust	Spray of Mancozeb @ 1.5 kg/ha
	IV) Powdery mildew	Dusting of 20kg/ha sulphur or spray of 2.5 kg soluble sulphur

Above mentioned techniques (FLDs) were demonstrated in 0.4 and 0.5 ha area alongwith farmers practice. Mustard crop was sown during 2nd to 3rd week of October at all demonstration sites. Yield data were recorded by using crop cutting survey. Locality, average weather parameters and soil characteristics of the district are presented in Table-3.

The data on output of Mustard and input used per hectare were collected from the Front Line Demonstrations (FLDs) and farmers practices (FP). Technology gap, extension gap and technology index were calculated by collected data using the formulae as suggested by Samuel *et al*. (2000).

1. Technology gap = Potential yield (PY) – Demonstration yield (DY)
2. Extension gap = Demonstration yield (DY) – Farmers' yield (FY)
3. Technology index = Potential Yield(PY) – Demonstration Yield(DY) / Potential Yield(PY) x 100

RESULTS AND DISCUSSION

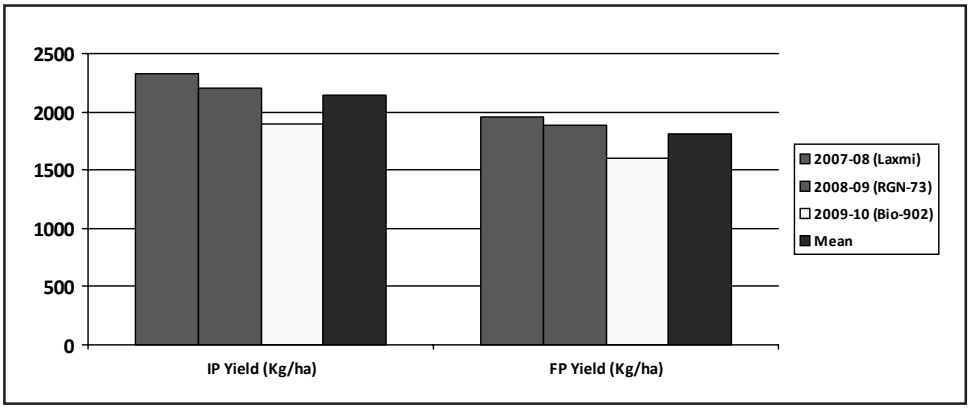
It is evident from table 4 and fig.-1 that the yield of demonstration plot ranged from 1900 to 2330 kg/ha and the per cent increase in mustard yield ranged from 16.40 to 18.75 per cent over farmers

Table 4 : Variety wise yield performance of mustard under FLDs (Improved practice - IP) and farmers practice (FP) of the Jhalawar district.

Year	Name of Variety	Yield (Kg/ha)		Cost of cultivation (₹/ha)		Gross return (₹/ha)		Net return (₹/ha)		% increase in yield over FP	Increase in net return over FP (₹/ha)
		FP	IP	FP	IP	FP	IP	FP	IP		
2007-08	Laxmi	1960	2330	42100	46250	49000	62910	6900	16660	18.57	9760
2008-09	RGN-73	1890	2200	42000	46000	46000	58000	4000	12000	16.40	8000
2009-10	Bio-902	1600	1900	42650	47500	44500	52500	1850	5000	18.75	3150
	Total	5450	6430	126750	139750	139500	173410	12750	33660	53.72	20910
	Mean	1817	2143	42250	46583	46500	57803	4250	11220	17.91	6970

FP : Farmers practice IP : Improved practice

Figure 1 : Variety wise yield performance of Mustard under FLDs (Improved practice- IP) and farmers practice (FP) of the Jhalawar district.



practice by adopting demonstrated varieties (Laxmi, RGN-73 and Bio-902). The overall average production and percentage increase in FLDs over famers practice (FP) during study period was 2143 kg/ha and 17.91%, respectively. It is also evident from data that highest net returns @ '16660 per hectare was found maximum by variety Laxmi followed by RGN-73 ('/ha 12000) and Bio-902 ('/ha 5000) with overall average '/ha 11220 during study period. These increments in outputs can be attributed to improved practices (IP) followed in FLDs conducted by the KVK, Jhalawar in the district. The level of yield is considerably low under farmer practice because of poor adoption of recommended package of practices depending upon the amount of risk involved in terms of cost, skill and knowledge about the recommended practices. Besides these, the factors responsible for the yield difference included timely sowing, appropriate plant geometry and use of better quality of inputs at appropriate time and scientific backup by the KVK scientists time to time.

The data given in table-5 depicted an average increase of 59.79, 79.52 and 85.62 percent over the average yield of the district, zone and state, respectively by different varieties. The data of table 5 also resulted the average technology gap and extension gap of 306.67 kg/ha and 797.67 kg/ha, respectively. Thus, the performance of Front Line Demonstrations further confirms that there is a wide gap between potential of front line demonstration and yield of farmers field (FP). This gap can be filled by dissemination of technology of mustard cultivation by various extension ways including the block/village demonstrations in larger area along with the timely supply of quality inputs and technical guidance. Similar findings were also recorded by Dhaka *et al.* (2010) and Chand Suresh *et al.* (2002).

Table 5 : Technology gap, extension gap and technology index of FLDs (improved practices - IP) and average yield of Jhalawar district, Zone and Rajasthan State.

S. No.	Particulars	Year			Total	Mean
		2007-08	2008-09	2009-10		
1.	Variety	Laxmi	RGN-73	Bio-902	-	-
2.	Average yield of FLDs (Kg/ha)	2330.00	2200.00	1900.00	6430.00	2143.33
3.	Average yield of district (Kg/ha)	1283.00	1377.00	1377.00	4037.00	1345.67
4.	% increase over average yield of district	81.61	59.77	37.98	179.36	59.79
5.	Average yield of zone (Kg/ha)	1262.00	1164.00	1152.00	3578.00	1192.67
6.	% increase over average yield of zone	84.63	89.00	64.93	238.56	79.52
7.	Average yield of state (Kg/ha)	0957.00	1266.00	1361.00	3584	1194.67
8.	% increase over average yield of state	143.47	73.78	39.60	256.85	0085.62
9.	Potential Yield (Kg/ha)	2450.00	2600.00	2300.00	7350.00	2450.00
10.	Technology gap (Kg/ha)	120.00	400.00	400.00	920.00	306.67
11.	Extension gap (Kg/ha)	1047	823	523	2393	797.67
12.	Technology Index	4.90	15.38	17.39	37.67	12.56

The technology index of the varieties shows the feasibility of the improved technology at farmers' field. The lower value of technology index indicates more feasibility of the technology. The data of table 5 also depicted that the lowest technology index was 4.90 i.e. for variety Laxmi. In case of other varieties, the adopted technology is not much easily feasible at farmers' level, so there is a need to evolve more feasible technology at farmers' level. These results are confirmed by the similar findings of Dhaka *et al.* (2010).

CONCLUSION

On the basis of above study, it was concluded that yield gap in mustard can be overcome, through the wide publicity of the improved practices mustard

cultivation by use of various extensions methodologies including Front Line Demonstrations as one of the most important method to show the result of improved practices.

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Received : Augut, 2013
Accepted : January, 2014