



Analysis of yield gap through front line demonstration of mustard

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Abstract: Krishi Vigyan Kendra has conducted front line demonstration on recommended package of practices of mustard in different villages of Shajapur district to know the yield gap with farmers practices at farmer's field. Results of front line demonstrations conducted during 2008-09 to 2011-12 produced on an average 30.89% more yield of mustard as compared to local practices (14.25 q/ha). The average benefit cost ratio of demonstrations fields (3.04) also found higher than control plot (2.48) during the four year of study period. The extension gap, technology gap and technological index were found in the ranges between 3.06 – 6.00 q/ha, 2.40 – 9.34 q/ha and 9.60 – 37.36 % per cent, respectively. The specific cost also found 30.6% less in demonstrations field as compare to farmer practice. The trend of technology gap reflected the farmer's cooperation in carrying out demonstrations with encouraging results in subsequent years.

Key Words: Yield gap, FLD, Mustard, Shajapur

Introduction

The aim of the front line demonstration is to convey the technical message to farmers that if they use recommended package and practices then the yield of this crop can be increased than their present level. Adoption levels for several components of the improved technologies were low, emphasizing the need for better dissemination (Kiresur *et al.*, 2001; Sharma, 2003). Under front line demonstrations (FLD), introduction of improved technologies/package of practices is the one of the mandate of Krishi Vigyan Kendra along with conductance of long-term educational activity in a systematic manner in farmers' fields. Conducting of Front Line Demonstrations on farmer's field help to identify the constraints and potential of the rapeseed-mustard in specific area as well as it helps in improving the economic and social status of the farmers.

Oilseeds form the second largest agricultural commodity in India after cereals sharing 14% of the gross cropped area and accounting for nearly three per cent of gross national product and 10% value of all agricultural products. The continuous increase in import of oilseeds crops, mustard occupies a prominent position in Indian oilseeds scenario. The total area under rapeseed-mustard was 6.79 million hectares with a total production of 7.44 million tones, contributing 30.64% of the total production of oilseed in India (Anonymous, 2005). Indian mustard [*Brassica juncea* (L)] is the major oilseed crop grown in Madhya Pradesh during *rabi* season but its productivity of was 1034kg/ ha during 2008-09 (822 kg/ha in Shajapur district. Though rapeseed-mustard group of crops occupy prominent position in the state oilseeds scenario but vast yield gap exists between potential yield and yield under real farming situation.

The reasons for low productivity are poor knowledge about newly released crop production and protection technologies and their management practices in the farmers' fields. The technology development with regard to improved varieties and other inputs have played improved role in raising productivity (Singh 2008). Keeping the above point in view, the FLD,s on rapeseed-mustard using improved production technologies was conducted with the objective of showing the productive potentials of the new production technologies under actual farm situation.

Materials and Methods

Utilizing the information generated during Participatory Rural Appraisal (PRA), front line demonstrations were organized by the Krishi Vigyan Kendra, RVSKVV Shajapur during *Rabi* season from 2008- 2009 to 2011-12 (four consecutive years) in the farmers' fields in fifteen adopted villages *viz.*, Shajapur, Baihera, Jaihera, Batawada, Ranthbhawar, Panwadi and Bhadoni of Shajapur district of Madhya Pradesh. During these four years of study, an area of 20 ha was covered with plot size 0.40 ha (1 acre) under front line demonstration with active participation of 48 farmers in different villages were conducted. The study area receives an annual average rainfall of 1047.9 mm, of which about 92.3 per cent is distributed during June to September and only 7.7 per cent between October and May. The soil of the experimental fields is black cotton with pH ranging from 7.0 to 7.5.

The package of improved practices demonstrated encompassed a new variety (JM-2 and Pusa Agrani), integrated nutrient management (@ 75:50:30:25:: N:P₂O₅:K₂O:S kg/ha + PSB @ 5g/kg of seed), integrated pest management (Mancozeb 75%

WP for seed treatment as suggested by Chattopadhyay *et al.* (2003), Need based dimethiate @750 ml/ha in 500 litre water) to protect the crop against mustard aphids (*Lipaphis errysimii*) and timely sowing between 16 September to 15 October with row to row spacing of 30 cm using seed @ 4 kg per ha. An entire dose of P₂O₅, K₂O, sulphur and half dose of N was applied as basal before sowing. Remaining amount of N applied after the first irrigation. First irrigation was provided at 35 DAS and second at 60 DAS. Under farmers practice local variety, was sown without any seed treatment with fungicides and biofertilizers, using higher seed rate (6-7 kg/ha), improper use of fertilizer with broadcasting of DAP at 1st irrigation, and following injudicious use of insecticide and weedicide.

Before conducting FLDs, specific skill trainings were imparted to the selected farmers regarding different aspects of cultivation etc. was followed as suggested by Venkatta kumar *et al.*, (2010). Field days at demonstration plots were organized for the extension functionaries and farmers to disseminate the message at large scale. The demonstration farmers were facilitated by KVK scientists in performing field operations like sowing, spraying, weeding, harvesting etc. during the course of training and visits. The necessary step for selection of site and farmers, layout of demonstration etc. were followed as suggested by Choudhary (1999). The data output were collected from FLD plots as well as control plots (farmer’s practices) and finally the extension gap, technology gap, technology index along with the benefit cost ratio were worked out (Kadian *et al.*, 2004, Samui *et al.*; 2000, as given below :

Technology gap = Potential yield – Demonstration yield
 Extension gap = Demonstration yield – Farmers yield
 Technology index = {(Potential yield – Demonstration yield)/ Potential yield} x 100

Results and Discussion

Results of front line demonstrations conducted during 2008-09 to 2011-12 in 48 ha area on farmers’ fields produced on an average 30.89% more yield of mustard as compared to local

practices (14.25 q/ha). The data of table-1 indicated that the yield of mustard fluctuated successively over the years in demonstration plots, which might be due to the soil moisture availability and rainfall condition, climatic aberrations, aphid infestation as well as the change in the location of trails in each year. The maximum yield was recorded (22.6q/ha) during 2010-11 and minimum yield was recorded in year 2008-09 (15.66 q/ha) and the average yield of four years study period was recorded 18.61 q/ha over local practices (14.25 q/ha). The increase in per cent of yield was ranging from 21.4 to 41.8 during four years of study. The similar results of yield enhancement in mustard crop in front line demonstrations have been documented by Mitra *et al.* (2010) in tarai zone of West Bengal. The results are also in similar with the findings of Tiwari *et al.* (2003), Tomar *et al.* (2003), Singh *et al.* (2007) and Katare *et al.* (2011). The high yielding varieties has performed extremely well if we adopt improved production and protection technologies. The specific cost also found 30.6% less in demonstrations field as compare to farmer practice.

The extension gap ranging between 3.06 – 6.00 q/ha during the study period emphasizes the need to educate the farmers through various means for adoption of improved agricultural production technologies to reverse the trend. The trend of technology gap (ranging between 2.40 – 9.34 q/ha) reflects the farmer’s cooperation in carrying out such demonstrations with encouraging results in subsequent years. The technology gap observed might be attributing to the dissimilarity in soil fertility status and weather conditions. Mukharjee (2003) have also opined that depending on identification and use of farming situation, specific interventions may have greater implications in enhancing system productivity. Similar findings were also recorded by Mitra *et al.* (2010) and Katare *et al.* (2011). The technology index showed the feasibility of the evolved technology at the farmer’s fields. The lower the value of technology index, the more is the feasibility of technology. The wider gap in technology index (ranging between 9.60 – 37.36 %) during the study period

Table-1: Productivity, technology gaps, extension gaps, and technology index of mustard grown under FLDs and existing package of practices

Year	Area (ha)	No. of farmers	Grain Yield (q/ha)			% increase over FP	Technology Gap (q/ha)	Extension Gap (q/ha)	Technology Index (%)
			Potential	RP	FP				
1	2	3	4	5	6	7	8	9	10
2008-09	5	12	25	15.66	12.6	24.3	9.34	3.06	37.36
2009-10	5	12	25	16.87	11.9	41.8	8.13	4.97	32.52
2010-11	5	12	25	22.6	16.6	36.1	2.40	6.00	9.60
2011-12	5	12	25	19.3	15.9	21.4	5.70	3.40	22.80
Average			25.00	18.61	14.25	30.89	6.39	4.36	25.57

Table-2: Gross expenditure, specific cost, gross return, net return and B:C ratio of mustard grown under FLDs and existing package of practices

Year	No. of Demonstration	Gross Expenditure (Rs/ha)		Specific cost (Rs/kg)		Gross Return (Rs/ha)		Net Returns (Rs/ha)		B:C Ratio-	
		RP	FP	RP	FP	RP	FP	RP	FP	RP	FP
1	2	3	4	5	6	7	8	9	10	11	12
2008-09	12	20440	18580	11.86	14.75	50112	40320	29672	21740	2.45	2.17
2009-10	12	20860	19000	11.26	15.97	56514.5	39865	35654.5	20865	2.71	2.10
2010-11	12	21390	20540	9.09	12.37	79100	58100	57710	37560	3.70	2.83
2011-12	12	21670	20950	10.85	13.18	71410	58830	49740	37880	3.30	2.81
Average		21090	19768	10.77	14.07	64284	49279	43194	29511	3.04	2.48

in certain region, may be attributed to the difference in soil fertility status, weather conditions and insect-pests attack in the crop.

The benefit cost ratio of front line demonstrations have been presented in table-2 clearly showed higher BC ratio of recommended practices was than control plot i.e. farmers practice in all the years of study. The benefit cost ratio of demonstrated and control plots were 2.45 and 2.17, 2.71 and 2.10, 3.70 and 2.83, 3.30 and 2.81, during 2008-09, 2009-10, 2010-11 and 2011-12 respectively. These results were also supported by Singh *et al.* (2008) and Meena *et al.* (2012) who found that the improved technologies of mustard crop have significant effect in higher productivity of mustard. Hence, favorable benefit cost ratios proved the economic viability of the interventions and convinced the farmers on the utility of interventions. Similar findings were reported by Meena *et al.* (2012).

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