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Impact of cluster front line demonstration on mustard productivity in Lalitpur district of Uttar Pradesh

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Abstract

Mustard [*Brassica juncea* (L.) Czern & Coss] is one of the most important oilseed crop of Bundelkhand region of Uttar Pradesh, India. KrishiVigyan Kendra, Lalitpurconducted 135 Cluster Front Line Demonstrations (CFLDs) on mustard during Rabi season of 2019-20 to 2020-21. The front line demonstration (FLD) is one of the most powerful tools for transfer of technology. The critical inputs were identified in existing production technology through meetings and discussion with farmers. Prevailing farmers practices were treated as control for comparison with recommended practices. An average yield of mustard were 14.7 q/ha and 15.3 q/ha during 2019-20 and 2020-21, respectively under demonstrated technology however under farmers practices the average yield were 12.0 q/ha and 11.2 q/ha during respective years and the average yield of two year was reported 15.0 q/ha over farmers practices (11.6 q/ha). On the basis of average of two years, net returns from CFLD practices were Rs 38816/ha as compared to Rs 25533/ha in farmers practices. An average BCR were 2.95 in recommended practices as compared to 2.4 in farmer's practices.

Keywords*: Bundelkhand, cluster front line demonstration, mustard, productivity, technology*

Introduction

Mustard [*Brassica juncea (*L.) Czern & Coss] is one of the first domesticated crop in *Rabi* season. It is widely cultivated in tropical and sub-tropical areas of the world. Globally, it is mainly cultivated in India, Canada, China, Pakistan, Poland, Bangladesh, Sweden and France. Mustard is group of crops comprising rapeseed (toria, brown sarson and yellow sarson). The mustard seed gives edible oil which is used as cooking medium in north India. Oil content in mustard varies from 30 to 49 per cent. India is the fifth largest rapeseed-mustard producer in the world after China and Canada with 16 per cent of world's total production. The major mustard growing states in India are Rajasthan, Uttar Pradesh, Haryana, Madhya Pradesh, Gujarat and West Bengal. Indian mustard is an important oilseed crop of Indian subcontinent contributes more than 80 per cent of the total rapeseed-mustard production in India (Meena *et al*., 2014; Meena *et al*., 2015). In Lalitpur district, mustard was sown in 5321 ha with total production 4188 mt and productivity 7.87 tonnes during 2018-19 (Agriculture Department, Lalitpur). The productivity of mustard is very low in the district due to use of old varieties and traditional cultivation practices. KrishiVigyan Kendra Lalitpur had done intensive efforts on training about scientific cultivation of mustard and demonstration of new varieties. The present study was conducted to increasing the productivity of mustard in Lalitpur district through cluster frontline demonstrations (CFLDs).

Materials and Methods

The study was carried out in the Lalitpur district of Bundelkhand region and lies at 24^0 41' N latitude and 78^0 24' E longitude. Cluster Frontline demonstrations (CFLDs) were conducted during *Rabi* season of 2019-20 and 2020-21. In this study, KVK conducted 135 frontline demonstrations on mustard on farmers field in different blocks namely Bar, Jakhora and Birdhaof the district.During two years of study, in area of 65 ha was covered under Cluster front line demonstration. The list of farmers was prepared through awarenessprogramme and group meeting. The critical inputs were provided to selected farmers along with technological interventions were taken as per prescribedpackages and practices for mustard crops (Table 1). The sowing was done in the first fortnight of November. The spacing was 45 cm x 15 cm apart and the seed rate of mustard was used 5 kg/ha. The fertilizers were given as per recommended dose per hectare. Thinning and first weeding was done at 15-20 DAS and second weeding was done at 45-50 DAS. Monitoring of FLD sites were done by scientists at every stage of crop and needful suggestion was given to farmers. The crop was harvested at perfect maturity stage. The grain yield, per cent yield increase, gap analysis, input cost, net return and BCR parameters were recorded (Table 2 and 3). Further technology index, technology gap, extension gap and B:C ratio were calculated using the following formula as given by Samui *et al*., (2000).

Table1:Comparison between farmers practices and technological interventions

Particulars	Farmers practices	Technological Interventions
Farming situation	Irrigated	Irrigated
Improved variety	Local/old Variety	RH 749
Seed rate	6 kg/ha	5 kg/ha
Time of sowing	First fortnight of November	Second fortnight of October
Method of sowing	Broadcasting	Line sowing (45cm x15 cm)
Seed treatment	No seed treatment	Thiram @2 g/kg seed
Basal application of fertilizers	DAP 50 kg/acre and no use of sulphur	NPK (60-90:40:40) and 25 kg sulphur/ha
Thinning	No thinning	15-20 DAS
Weed management	No weeding	Two hand weeding
Control of insects pests and diseases	No control measures	Removal of disease infected plants, spraying of 0.2% Zineb for disease, spraying of Imidacloprid 17.8 SL @ 0.5 ml/l water for aphid control

Table 2: Grain yield and gap analysis of front line demonstration on mustard

Year	Variety	Area (ha)	Farmers (no.)	Yield (q/ha)			% over FP	Technology gap (q/ha)	Extension gap (q/ha)	Technology Index (%)
				Potential	RP	FP				
2019-20	RH- 749	10	25	24.0	14.7	12.0	32.2	9.3	14.0	38.7
2020-21	RH-749	55	110	24.0	15.3	11.2	26.8	8.7	12.8	36.2
Total/Mean		65	135	24.0	15.0	11.6	29.5	9.0	13.4	37.5

RP: Recommended Practices; FP: Farmers Practices

$$\text{Technology index} = \frac{\text{Potential yield} - \text{Demonstration Yield}}{\text{Potential yield}} \times 100$$

Technology gap = Potential yield - Demonstration yield

Extension gap = Demonstration yield - Yield under farmers practices

$$B:C = \frac{\text{Gross return (Rs/ha)}}{\text{Cost of cultivation (Rs/ha)}}$$

$$\% \text{ increased over famers practices} = \frac{\text{Improved practices} - \text{Farmers practices}}{\text{Farmers practices}} \times 100$$

Results and Discussion

Yield analysis

It is apparent from the data in Table 2 that selected variety of RH-749 has significant and beneficial effect on grain yield of mustard crop.The result of cluster front line demonstration at farmers field clearly reveal that average yield of mustard were 14.7 q/ha and 15.3 q/ha during 2019-20 and 2020-21, respectively under demonstrated technology however under farmers practices the average yield were 12.0 q/ha and 11.2 q/ha during respective years and the average yield of two years was reported 15.0 q/ha over farmers practice (11.6 q/ha). However, the per cent increases yield over farmers practices were 32.2 per cent and 26.8 per cent during 2019-20 and 2020-2021, respectively and average of per cent increases yield over farmers practices of two years was reported 29.5 per cent. The similar results were also observed by Singh (2013), G Lal (2015), Chaudhary *et al*., (2018) and Meena *et al*., (2019).

Gap analysis

Technology yield gap is the difference between the demonstration yield and potential yield. The gap of demonstrated plot were 9.3 q/ha and 8.7 q/ha during 2019-20 and 2020-21, respectively. The average technology gap of two years was reported 9.0 q/ha. This gap may be due to crop management practices, soil fertility status and climatic condition of area.Extension gap means the difference between yield under demonstration plot and farmer practice plot. On the basis of two years average, extension gap under demonstration plot was 13.4 q/ha. This emphasized the need to educate farmers for adoption of latest technology of mustard cultivation.The technology index shows the feasibility of the demonstrated technology at the farmer's field. The technology index were 38.75 and 36.25 per cent during 2019-20 and 2020-21, respectively. On an average technology index was observed 37.5 per cent in the district which shows the efficacy of good performance of technical

Table 3: Economics analysis of front line demonstration on mustard

Year	Yield (q/ha)		Economics of demonstration plot (Rs/ha)				Economics of farmers plot (Rs/ha)			
	Demo	Check	Gross cost	Gross return	Net return	BCR (R/C)	Gross cost	Gross return	Net return	BCR (R/C)
2019-20	14.7	12.0	19750	55632	35882	2.8	18000	42066	24066	2.3
2020-21	15.3	11.2	19450	61200	41750	3.1	17800	44800	27000	2.5
Average	15.0	11.6	19600	58416	38816	2.95	17900	43433	25533	2.4

interventions. This will accelerate the adoption of demonstrated technical interventions to increase the yield performance of mustard at farmers field.Similar finding were recorded byTiwari *et al*., (2017) Chaudhary*et al*., (2018) and Shivran *et al*., (2020).

Economic analysis

Economic analysis of cluster front line demonstration on mustard revealed that total net return from recommend practice were Rs 35882/ha and Rs 41750/ha during 2019-20 and 2020-21, respectively. The net returns in farmers practices were Rs24066/ha and Rs27000/ha during 2019-20 and 2020-21, respectively. On the basis of average of two years, net returns from CFLD practices were Rs 38816/ha as compared to Rs 25533/ha in farmers practices. An average BCR were 2.95 in recommended practices as compared to 2.4 in farmer's practices. Similar economic benefits owing to adoption of improved technology interventions were also reported by Balai *et al*., (2012), Choudhary and Suri (2014), Meena and Dudi (2018); Meena and Singh (2019) and Shivran *et al*.,(2020).

Conclusion

The present study revealed that RH-749, variety of mustard gave higher yield and net returns in recommended practices than farmer's practices. From the above findings it can be concluded from the study that wide gap between the demonstration plot and farmer plot yield were observed due to technology and extension gaps and lack of awareness of improved technologies of mustard cultivation.It requires collaborative extension efforts to enhance adoption level of crop specific technologies among the farmers for bridging technology and extension gaps.

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