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Impact of Front Line Demonstrations on Mustard Crop in Sirsa District of Haryana

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ABSTRACT

Krishi Vigyan Kendra conducts cluster demonstrations every year as per target assigned by ICAR. The study evaluates impact of 300 demonstrations on mustard crop in 120 hectare area conducted by KVK Sirsa since 2015-16 to 2017-18 in different villages of the district. The extension gaps in technologies were identified through farmers meetings and group discussions with the farmers. The findings indicated significant increase in the average yield of demonstrated plot (15.13%) over the farmer's practice plot of mustard crop. Average yield of demonstration plots was recorded higher by 18.18 per cent, 14.09 per cent and 13.13 per cent in years 2015-16, 2016-17 and 2017-18, respectively. The extension gap was 4.0 q/ha, 3.10 q/ha and 2.89 q/ha while technology gap was 2.0 q/ha, 2.90 q/ha and 2.11 q/ha during consecutive years respectively. During these three years, yield increase in demonstration plots expressed as additional income over check plots accounted for Rs. 7670/ha, Rs. 12350/ha and Rs. 11590/ha respectively during various years.

INTRODUCTION

Agriculture is an important sector of Indian economy as it contributes about 17 per cent to the total GDP and provides employment to over 60 per cent of the population (www.ccsniam.gov.in). The country is among the largest producers of oilseeds in the world which accounts for an estimated production of 32.10 MT with 26.21 thousand hectare of area in 2016-17 (Anon, 2017). Rapeseed and Mustard comes under the category of oilseeds. There oil is consumed as food oil and meal cake left after the extraction was utilized as cattle feed. The yield of these crops were lower in India (1121 kg/ha) as compared to other developed countries such as Germany (3811 kg/ha), France (3240 kg/ha), China (1834 kg/ha) and Canada (1769 kg/ha) as well as the world average (1849 kg/ha) (Kaur, 2020). Among the major oilseed producing states in the country, Haryana has the highest yield (1533 kg/ha) followed by Rajasthan (1170 kg/ha) while West Bengal (911 kg/ha) has the lowest yield.

Indian mustard is an important oilseed crop of Indian subcontinent contributing more than 80 per cent of the total rapeseed-mustard production in India (Meena et al., 2014; Meena et al., 2015). This group of oil seed crops offers higher return with low cost of production and low water requirement, so it has greater potential to increase the availability of edible oil from the domestic production. In Brassica, breeding programme is one of the most important objectives for improvement of seed quality. High yielding new varieties are also imperative to meet potential edible oil requirement of the country which is still increasing due to increase in population, increase in per capita consumption and slow increase in local production of oilseed crops (Shengwu et al., 2003). Productivity of crops per unit area could be increased by adopting improved practices in a systematic manner along with high yielding varieties (Ranawat et al., 2011; Rai et al., 2016).

Krishi Vigyan Kendra are grass root level organization meant for application of technology through assessment, refinements and dissemination of proven technologies under different micro farming situation in the district (Das, 2007). Cluster front line demonstrations were conducted on mustard during 2015-16, 2016-17 and 2017-18. The aim of these practices in general is to raise production through transfer of farm technology. The efforts were taken with planning, execution and follow up action of the oilseed production technology through front line demonstrations, the

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present investigation was therefore undertaken to access the impact of these demonstrations on mustard production technology in order to increase the yield and fulfilling objective of providing higher returns and nutritious feed to the farmers.

METHODOLOGY

Sirsa is situated at an elevation of 202 meters above mean sea level in the subtropical zone with average rainfall of 350-400 mm. The temperature raises around 48^0 C with dry desiccating winds and frequent dust storms during summers. Cluster Front Line Demonstrations on mustard (RH-749) have been organized every year since 2015-16 in different villages of the district. The villages were selected in different blocks on the basis of less sown area of mustard. The main aim of these demonstrations is to showcase advanced technologies so that adoption gaps should be minimized.

Before demonstrations, surveys in adopted villages were conducted and technology gaps were identified by following methods:

Extension gap = Demonstrated yield – Farmer's practice yield

Technology gap = Potential yield – Demonstration yield

Additional return = Demonstration return – farmer's practice return

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

$$\text{\% increase yield} = \frac{\text{Demonstration yield - Farmers yield}}{\text{Farmers yield}} \times 100$$

After identifying the gaps, group meetings were organized to make farmers aware about advanced technologies. In all 300 numbers of demonstrations were organized during various years *viz*. 2015-16, 2016-17 and 2017-18 at different locations of Sirsa district with a coverage of 120 ha. The recommended amount of fertilizers was applied and crops were sown in lines. Before sowing, pendimethalin @ 1L per hectare was applied (pre-emergence) to control the weeds. All the Clusters were monitored from time to time during entire cropping season and farmers were guided accordingly. At the end of cropping season yield and economics was calculated. A control *viz.*, farmer practice was run simultaneously to have an idea of impact of these techniques in increasing yield and improving income of farmers which was calculated in terms of economics.

RESULTS AND DISCUSSION

The results presented in Table 1 describes about the economic analysis of the demonstrations conducted during various years. The expenditure incurred on cultivation practices viz. land preparation, seed cost, herbicide, fertilizers and miscellaneous costs was slightly higher in demonstration. The average gross return of Rs. 79200/ha, Rs. 87850/ha and Rs. 93490/ha was obtained in the year 2016, 2017 and 2018 respectively. The average net return for respective years to the tune of Rs. 54770/ha, Rs. 55850/ha and Rs. 61490/ha during the study period. Further, it was also found that additional return of demonstration farmers ranged from Rs. 7670/ha to Rs. 12350/ha. This may be attributed to the use of improved technologies in demonstration plots. Benefit-cost ratio (BCR) was at par in all the years. While, the farmers participated in FLD got approximately Rs. 10536/ha additional income as compared to farmers practice. Similar findings were stated by Singh et al., (2019) in oilseeds, Sangwan et al., (2021) revealed that the B: C ratio was in range of 2.73 to 3.06 during their study period. These results corroborate with the earlier findings of Verma et al., (2012).

Analysis of gap

An extension gap of 4.0 q/ha, 3.10 q/ha and 2.89 q/ha during 2015-16, 2016-17 and 2017-18 was found respectively (Table 3). The average extension gap (the target was to reduce) was to be reduced with the help of different extension activities like training programmes on latest/improved production and protection technologies with high yielding varieties, awareness programmes, kisan gosthis on integrated pest and nutrient management etc. These programmes have the potential to help the farmers to adopt new and improved practices for crop production which lead to reduction in extension gap. The findings are also line with Singh et al., (2019), Kumar & Kispotta (2017) in moong bean. The existed technology gap was 2.00 q/ha, 2.90 q/ha and 2.11 q/ha in years 2015-16, 2016-17 and 2017-18, respectively. This gap may be attributed to prevailing micro farming situation i.e. variation in soil fertility, weather conditions at maturity of mustard crop, crop management practices etc. Therefore, there is an urgent need to recommend location specific crop management practices to pass over the potential demonstration yield. The similar findings were observed by Kalita et al., (2019) in moong bean and Chaudhary et al., (2018)

Table 1. Economic analysis of CFLDs and farmers' practice of mustard

Year	Average cost of cultivation (Rs./ha)		Average gross return (Rs./ha)		Average net return (Rs./ha)		Additional return	B:C Ratio	
	FLD	FP (Check)	FLD	FP (Check)	FLD	FP (Check)	(Rs/ha)	FLD	FP (Check)
2015	24430	22700	79200	69800	54770	47100	7670	3.24	3.07
2016	32000	30000	87850	73500	55850	43500	12350	2.74	2.45
2017	32000	30600	93490	80500	61490	49900	11590	2.92	2.63

Table 2. Yield, extension and technology gap analysis of CFLDs and farmers practice of mustard

Year	Yield (q/ha)			Increase over farmers practice (%)	Extension gap (q/ha)	Technological gap (q/ha)	Technology index (%)
	Potential	FLD	Farmers' practice				
2016	28.00	26.00	22.00	18.18	4.00	2.00	07.14
2017	28.00	25.10	22.00	14.09	3.10	2.90	10.35
2018	28.00	25.89	23.00	13.13	2.89	2.11	10.32

Table 3. Technological gap in CFLDs and farmers' practice of moong bean

Technology	Recommended Practice	Farmers' practice	% Gap
Variety	RH-749	Pvt Hybrid	60
Seed Rate	5 kg/ha	7.5 kg/ha	90
Seed Treatment	Carbendazim @ 2g/kg seed	No treatment	100
Fertilizers (kg/ha)			
N	80	No application	100
P	30	20 kg/ha	90-95
K	20	No application	100
Zn	10	No application	100
Weed Management	Pre-emergence application of pendimethalin @ 2.5 ltr/ha	60 per cent farmers use recommended practice	40
Disease Management	600g mancozeb in 200-300 l water	60 per cent farmers use recommended practice	40

in mustard. Technology index varied from 7.14, 10.35 and 10.32 per cent during 2015-16, 2016-17 and 2017-18, respectively. It indicates that there exists a gap between the generated technology in mustard cultivation at the research institution and its dissemination to the farmers. Similar findings were reported by Mitra & Samajdar (2010); Dhaka et al., (2010). Technology index can be reduced with proper adoption of demonstrated technical interventions to increase the yield performance of mustard crop.

The results indicated in Table 3 showed that there was 100 per cent gap in seed treatment by farmers. In adoption of improved variety and proper seed rate, the gap was 60 and 90 per cent respectively. While in case of weed and disease management a key concern to be addressed only 60 per cent farmers' used recommended practice. So there was an urgent need to minimize the gap by creating awareness among the farmers which could ultimately lead to increase in yield and returns. The results were corroborated with the earlier findings of Biyan et al., (2012); Sangwan et al., (2021); Dhillion (2016); Lathwal (2010).

CONCLUSION

The crop productivity and economic returns of mustard crop can be increased with the use of scientific production and protection technologies. The enhanced benefit cost ratio, explained the economic viability of the demonstrations and was convincing for the farmers to adopt the intervention imparted. This study observed that CFLD programmes were very effective in motivating and changing the attitude of other farmers to adopt improved cultivation practices and crop management. Moreover, extension agencies in the district need to provide proper technical support to the farmers through different educational and extension methods to reduce the extension gap for better oilseed production in the District.

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