



## Short communication

# Enhancing rapeseed (*Brassica napus* L.) productivity through frontline demonstrations approach in Ferozepur district of Punjab

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## Abstract

Frontline demonstrations were conducted in district Ferozepur on canola variety of gobhi sarson during the year 2018-19 with the objective to enhance production and productivity of canola gobhi sarson with economic benefits at farmer's field through improved production technologies. The results of the study revealed that GSC-7 canola gobhi sarson variety gave average yield of 22.5 q/ha as compared to 17.8 q/ha of local variety with an increase in yield of 26.4% over local variety. Moreover, the cultivation of canola gobhi sarson (GSC-7) under frontline demonstrations yielded additional gain of Rs. 19480/ha over farmer's practice.

**Keywords:** Front line demonstrations, productivity, rapeseed-mustard

## Introduction

Rapeseed-mustard is the third most significant group of oilseed crops with gobhi sarson as the most important crop of rapeseed group. Oilseed crops play an important role in the agrarian economy of India. Globally, rapeseed-mustard constitutes the third most significant group of oilseed crops. However, rapeseed-mustard occupies the second place after groundnut in edible oilseed crops of India contributing about 27.8 per cent in India's oilseed economy with 32 per cent of the total oilseed production in the country (Thakur and Sohal, 2014). Being the crop with low water requirement, rapeseed-mustard fits well in the traditional cropping pattern of rice-wheat. Additionally, low cost of production of rapeseed-mustard fetches higher return in the market and has potential to meet the domestic production of edible oils of the country. Although this group of oilseeds has wider adaptability for different agro-climatic zones of India, but variation exists in area, production and yield of rapeseed-mustard owing to various biotic and abiotic stresses coupled with India's domestic price support programme. The oil content in the rapeseed-mustard varies from 36-39 per cent (Yadav *et al.*, 2013). In comparison with rest of the edible oils, the rapeseed-mustard oil has the lowest amount of harmful saturated fatty acids but the adequate amounts of two essential fatty acids (linoleic and linolenic). Most of the Indian varieties of rapeseed-mustard under cultivation have high erucic acid (about 50%) and high glucosinolates (>100  $\mu$ moles/g defatted seed meal) which are undesirable.

In past few years, the concept of canola oil in rapeseed-mustard has gained importance of 'Canola' is a registered trade mark of Canadian Oil Association which denotes the seeds having less than 2% erucic acid in its oil and less than 30 micromoles of glucosinolates per gram of its deoiled meal making it suitable for human health as well as animal feed. Canola oil has the lowest level of saturated and highest level of mono and poly unsaturated fatty acids which are nutritionally desirable for human health. During the year 2017-18, the area and production of rapeseed-mustard in Punjab was 31.7 thousand hectare and 14.13 qt/ha, respectively (Anonymous 2018). Among rapeseed-mustard, gobhi sarson (*Brassica napus* L.) is the principle oil producing crop which is grown under irrigated conditions of North India including Himachal Pradesh, Jammu & Kashmir and Punjab. This crop grows best on well-drained, light to medium textured soils. Canola gobhi sarson was developed from breeding of rapeseed to overcome the undesirable effects of erucic acid and glucosinolates. The new high yielding canola type variety GSC-7 was released for general cultivation in the Punjab stated during 2014 by Punjab Agricultural University, Ludhiana.

The Frontline Demonstration (FLD) program in oilseeds is a noble outcome of "Technological Mission on Oilseeds" implemented in India (Choudhary *et al.*, 2009). The main objective of the Front Line Demonstration (FLD's) programme on rapeseed is to demonstrate and popularize the improved technologies on farmers' fields

for effective transfer of technology and filling the gap between recommended technology and indigenous technology for enhancing the productivity and farm income and also crop diversification. Amongst various methods of extension, Frontline Demonstrations (FLDs) are most important tool for transfer of latest technology to the farmers. Moreover, farmers are not much aware about canola gobhi sarson. So the KVK, Ferozepur conducted frontline demonstrations on canola gobhi sarson crop at farmers' fields under irrigated conditions with the objectives of increasing production of gobhi sarson and to create awareness regarding the health benefits of canola variety of gobhi sarson among farmers.

### Materials and Methods

The present studies on cluster front line demonstrations (CFLDs) were conducted in Ferozepur district (South-western region of the Punjab State) during the year of 2018-19. A total of 20 ha area was covered under FLD's on canola gobhi sarson with 50 frontline demonstrations in four blocks of the District. There were 17 demonstrations in Ferozepur block, 20 in ghall khurd, 6 and 7 in zira and guruharsahai blocks respectively. Before conducting FLDs, farmers were selected on the basis of their knowledge level. Also, the gaps in adoption of

recommended technology were found through personal interview of farmers selected for demonstrations. The selected farmers were guided to raise the gobhi sarson crop as per recommendations of the Punjab Agricultural University (Table 1). All the critical inputs including seed of canola gobhi sarson variety GSC 7 and recommended pesticides were provided by the Krishi Vigyan Kendra (KVK). To realize the integrated approach of demonstrations, regular monitoring visits on demonstration plots were conducted by KVK scientists. Valuable feedback was also taken from farmers to bring further refinement in research and extension programmes. Apart from this, various other extension activities like training programmes, exhibitions, group meetings and field days were organized at the demonstration sites to create awareness among the farming community about the advantages of demonstrated technologies. Different parameters were calculated to find out technology gaps (Yadav *et al.*, 2004)

$$\text{Extension gap} = \text{Demonstrated yield} - \text{Farmers' practice yield}$$

$$\text{Technology gap} = \text{Potential yield} - \text{Demonstration yield}$$

$$\text{Additional return} = \text{Demonstration return} - \text{Farmers practice return}$$

Table 1. Details of the practices followed for cultivation of gobhi sarson under front line demonstrations and farmer's practice

Particular's	Demonstration plots	Farmer's practice
Variety	GSC7	Un recommended local
Seed rate (Kg/ha)	3.75	5.25
Spacing	45X10 cm	Row to row-30cm
Time of sowing	10-30 October	November
Fertilizer dose	Urea-225 kg/ha, SSP-187.5 kg/ha	Urea, No use of SSP
Weed management	One or two hoeing	Use of Isoproturon 75 WP @ 1lit/ha
Plant protection measures	Spray of Actara 25 WG @ 100 g/ha	Application of un recommended and over dose of insecticides and fungicides

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

### Results and Discussion

#### Grain yield

The data on grain yield of demonstrated plots and farmer's practice is given in table 2. The data showed that average grain yield of demonstrated plots was higher from farmer's practice in all the blocks of Ferozepur district. The average yield of GSC 7 varied from 22.1-23.1q/ha in demonstration plots in comparison with yield of 17.5-18.1 q/ha in farmer's plots. The difference in yield of farmer's plots from demonstration plots showed the suitability of the variety

to all the areas of the district. Among all the blocks, the average yield of FLD plots was maximum in Ghall khurd block (23.1 q/ha) followed by Ferozepur (22.4 q/ha), Zira (22.3 q/ha) and Guruharsahai block (22.1 q/ha). Whereas, average yield from all the 50 FLDs of the district was 22.5 q/ha and of farmer's practice was 17.8 q/ha. The per cent increase in yield of FLDs was 26.4 % over farmer's practice. Meena *et al.*, (2012) have also reported per cent increase in yield of improved practices over farmer's practices in the extent of 26.8 % to 33.1 %. These results are also in conformity with the findings of other workers (Singh *et al.*, 2007, Katare *et al.*, 2011, Singh *et al.*, 2011, Dhaliwal *et al.*, 2018).

The higher yield of FLDs over farmer's practice may be attributed to various factors including adoption of full package of practices viz. timely sowing, application of balanced dose of fertilizers (N & P), weed management and need based plant protection measures. However, lesser yield of farmer's practice over FLD may be due to use of local or old varieties as compared to recommended high yielding varieties. Extension gap of 4.3-5.2q/ha in different blocks showed the need of education of farmers towards adoption of the improved production technology in gobhi rason. Extension yield gaps are the indicators of lack of awareness about improved and recommended farm technologies by the farmers (Kadian *et al.*, 1997; Vedna *et al.*, 2007). On the basis of these gaps, more of the extension programmes were scheduled for the next year. Technology gaps were also calculated separately for each blocks and these ranged from 0.4-1.4 q/ha. These gaps may be due to the variation in soil fertility status. Mitra and Samajdar (2010) have also recorded extension and technology gaps in the technology that can be managed through specific interventions to increase the productivity of the technology. The average value of 4.3 % of technology index indicated the feasibility of new variety at farmer's fields.

### Economic analysis

Rapeseed-mustard is important Rabi crops of Punjab and there are chances of increase in area in the future due to high yielding varieties and good market price. So the economics of the FLD programme on canola was

calculated (table 3). The total returns from demonstrated plots were Rs. 94395/ha as compared to Rs. 74655/ha in farmers plots. The additional input cost in demonstration plots was due to fungicides and fertilizer applications. The net returns ranged from Rs 76905-81070/ha in FLDs in comparison with Rs. 57788-60420/ha in farmer's practice. The average net returns from demonstration and check plots were Rs. 78510/ha and Rs. 59030/ha respectively. The average additional gain in demonstration plots was Rs. 19480/ha. Similar findings of higher net returns from demonstration plots were also reported by Singh *et al.* (2014), Yadav *et al.* (2016), Meena and Dudi (2018).

### Conclusion

Cultivation of canola variety GSC-7 on scientific lines with all the recommended practices starting from sowing till harvesting brought higher productivity as well as higher returns in plots of front line demonstrations in all the blocks of the Ferozepur. So frontline demonstrations proved helpful in increased productivity of rapeseed (GSC-7) in the district and convinced the farmers towards its cultivation. Apart from this, technology gap was also reduced due to use of scientific methods of cultivation. Meanwhile, more of the extension programmes will be carried out to cover the extension gap and create the mass awareness.

### References

Anonymous. 2018. Package of practices for crops of Punjab.

Table 2. Grain yield and gap analysis of frontline demonstrations on rapeseed

Block	No. of FLDs	Avg. yield (ha)		% increase over farmers practice	Extension gap (q/ha)	Technology gap (q/ha)	Technology index
		FLDs	Farmer's practice				
Ferozepur	17	22.4	18.1	23.8	4.3	1.1	4.6
GhallKhurd	20	23.1	17.9	29.1	5.2	0.4	1.7
Zira	6	22.3	17.6	26.7	4.7	1.2	5.1
Guruharsahai	7	22.1	17.5	26.3	4.6	1.4	5.9
Average		22.5	17.8	26.4	4.7	1.0	4.3

Table 3. Economic analysis of frontline demonstrations on rapeseed

Block	Total returns (Rs. /ha)		Input cost (Rs./ha)		Net return (Rs/ha)		Additional gain (Rs. /ha)
	FLDs	Farmer's practice	FLDs	Farmer's practice	FLDs	Farmer's practice	
Ferozepur	94080	76020	15817	15600	78263	60420	17843
GhallKhurd	97020	75180	15950	15665	81070	59515	21555
Zira	93660	73920	15857	15525	77803	58395	19408
Guruharsahai	92820	73500	15915	15712	76905	57788	19117
Average	94395	74655	15885	15625	78510	59030	19480

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