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Popularization of Production Technology of Gobhi Sarson (*Brassica napus*) through Front Line Demonstration in Tribal Regions of Chamba District of Himachal Pradesh

Anurag Sharma[1*], Rajeev Raina[1], Manish Thakur[1] and Swati Sharma[2]

[1]Krishi Vigyan Kendra Chamba, Saru, District Chamba, H.P. (176 314), India
[2]Dept. of Soil Science, Dr. Y. S. Parmar University of Horticulture and Forestry, Nauni, Solan, H.P. (173 230), India

Corresponding Author

Anurag Sharma
e-mail: anuragiias@gmail.com

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Abstract

The study was carried out during 2017–18 at farmers' field in three villages (Lohani, Bhatkar and Pundrenka) under Chamba district of Himachal Pradesh, India. Front line demonstration of gobhi sarson (*Brassica napus*) was conducted on an area of 10 ha with active participation of 64 farmers with high yielding improved technologies composed of HPN3 variety, integrated pest management (IPM) and integrated nutrient management (INM). The results revealed the increase in average yield under front line demonstrations by 2.16% as compared to the farmer's practice. Improved technology gave higher net return of Rs. 10908 -ha^{-1} with benefit cost ratio 0.49 as compared to local check (INR 7600 ha^{-1}, benefit cost ratio 0.44).

Keywords: Gobhi sarson, front line demonstration, improved technology

1. Introduction

Gobhi sarson (*Brassica napus*) is a new emerging oilseed crop having limited area of cultivation. Gobhi sarson is a long durationcrop (more than 155 days) confined to Punjab, Himachal Pradesh and Haryana (Kumar et al., 2009). Among the *rabi* oilseed crops, gobhi sarson (*Brassica napus* L.) is a high yielding oilseed crop suitable for high fertile soils under assured irrigation conditions. Moreover, it contains higher oil content (41–45%) of good quality having high recovery of essential fatty acids i.e. oleic, linoleic and linolenic acid. *B. napus* is a hybrid evolved from *B. rapa* (syn. *B. campestris*) and *B. oleracea* (wild mustard) through crossbreeding (OECD, 1997). All parts of the rapeseed plant are utilized: seeds are used for the production of oil for human nutrition, or for biodiesel; leaves are consumed as vegetables (mainly in Asia) and as animal fodder; oilseed cake and rapeseed meal (after hexane extraction), being by-products of oil processing, are used as protein-rich animal feed; dried stalks are used as domestic fuel. *B. napus* or rapeseed is mainly cultivated because its seeds yield about 40% oil. Oil content (%) was determined by taking a sample of seeds of each plot of all the replications following the standard method (AOAC, 1960).

India is the third largest rapeseed oil producer in the world after China and Canada with 12% of world's total production. This crop accounts for nearly a third of the oil produced in India, making it the country's key edible oil-seed crop. Due to the gap between domestic availability and actual consumption of edible oil, India has to resort to import of edible oil with a projected demand for edible oil at more than 20 million tonnes in 2014–15. Gobhi sarson is the predominant crop grown during *rabi* season after paddy or maize on rainfed farms of the study area. Gobhi sarson requires relatively cool temperature of below 25 °C and adequate supply of soil moisture during the growing season. It is also grown in certain tropical and sub tropical regions as a winter crop. Indian mustard is reported to grow well in areas having 250 to 400 mm of rainfall and has an efficient photosynthetic response at 15–20 °C temperature. Sowing time is the most vital non-monetary input to achieve target yields in mustard. Sowing time also influences phenological development of crop plants through temperature and heat units. Sowing at optimum time gives higher yields due to suitable environment that prevails at all the growth stages of the crop.

Lack of suitable high yielding varieties as well as poor knowledge about production practices are described as main reasons for low productivity of gobhi sarson in the district. The productivity of gobhi sarson could be increased by adopting recommended scientific and sustainable management practices using a suitable high yielding cultivar. In order to get optimum yield of this crop, selection of variety, seed rate and seed treatment are the most important factors to

be followed by the farmers (Sharma et al., 2018). Taking into account above considerations, front line demonstrations (FLD) were carried out in a systematic manner on farmers' field to show the worth of a new variety and convincing farmers to adopt improved production management for enhancing productivity of Gobhi sarson. Efforts are being made by the KVK to motivate the farmers to grow these crops by organizing awareness camp *vis-a-vis* training programmes and field days.

2. Materials and Methods

Front line demonstrations on gobhi sarson was conducted in 2017–18 in Chamba district of Himachal Pradesh, India. The demonstrations were laid out in 3 villages namely Lohani, Batkar and Pundrenka of Chamba district. The farmers were selected through proper survey of the area in both seasons as suggested by Choudhary (1999). Seed of variety HPN3 was distributed among the farmers and sowing was done by broadcasting method. A total area of 10 ha was put under FLD. Regular visits by the KVK scientists to demonstration fields were ensured and made to guide the farmers. The critical inputs were duly supplied to the farmers by the KVK. Group meetings were organized at the demonstration sites to provide the opportunities for other farmers to witness the benefits of demonstrated technologies. Yield data were collected from control (Farmer's practice) and demonstration plots and cost of cultivation, gross income, net income and cost benefit ratio were computed and analyzed.

3. Results and Discussion

The data presented in Table 1 shows the comparison between the FLD and farmer's practice and it was noticed that Gobhi sarson variety HPN3 was high yielding and was grown under the guidance of KVK scientist. Farmers were not using plant protection measures and integrated nutrient management practices which were demonstrated under FLD plot.

Table 1: Comparison between demonstrated package and existing farmer's practice of Gobhi sarson production

Sl. No.	Intervention	Demonstrated package	Farmer's practice
1.	Farming situation	*Rabi*	Rainfed
2.	Variety	HPN3, high yielding	Local mixture
3.	Plant protection	IPM	Nil
4.	Nutrient management	INM	Nil

Nitrogen @120 kg ha^{-1} was applied and the dose was applied thrice. 60 kg ha^{-1} of nitrogen was applied at the time of sowing and 30 kg was applied 60 days after sowing and the rest dose was applied after 80-90 days of sowing. Phosphorous (60kg ha^{-1}) and Potash (40kg ha^{-1}) was applied at the time of sowing. Weeding was advocated as and when required.

The data presented in Table 2 revealed that the demonstrations on new technologies help the farmers in increasing the farm income. The net returns under the FLD plots increased over the farmers practice. The average yield 5.7 q ha^{-1} was recorded under the improved practices whereas average yield of 4.0 q ha^{-1} was recorded under farmers practice. Although both

Table 2: Economics of Gobhi sarson cultivation under FLD and Farmers' practice

S l . No.	Name of village	Area (ha)	No. of farmer's involved	Gross cost (₹ ha^{-1})		Gross return (₹ ha^{-1})		Net return (₹ ha^{-1})		B:C ratio		Yield enhancement due to technology	Productivity (q ha^{-1})	
				IP	FP	IP	FP	IP	FP	IP	FP		IP	FP
1.	Lohani	5	30	22171	18000	32974	26000	10802	8000	0.48	0.44	1.86	5.8	4.2
2.	Bhatkar	1.06	7	21657	16500	32764	24500	11107	8000	0.51	0.48	2.44	5.4	3.8
3.	Pund-renka	3.94	27	22000	16800	32825	23600	10825	6800	0.49	0.40	2.18	6.1	4.0
	Mean			21943	17100	32854	24700	10908	7600	0.49	0.44	2.16	5.7	4.0

IP: Improved practice (Demonstration); FP: Farmer's practice; Average selling price is ₹ 40-45 kg^{-1}

the yields under improved practices and farmers practices are low as compared to the reported productivity of 15.0 q ha^{-1} (CSKHPKV, 2016.) due to drought conditions prevailed during the growing season. The B:C ratio was also higher under the demonstrated plot as compared to the Farmer's practice. On an average, Gobhi sarson yield under front line demonstration was higher by 2.16% as compared to the farmer's practice. The results indicated that the demonstration has given good impact in terms of yield and income. The higher productivity of Gobhi sarson under improved technologies was due to sowing of latest high yielding crop variety and adoption of improved nutrient and pest management techniques.

4. Conclusion

Front line demonstration is one of the most important tools of extension to demonstrate crop management practices at farmer's field. By conducting FLDs, yield potential of oilseed crops can be increasedto a great extent. The production technology, including adopting high yielding varieties of Gobhisarson and fertilizer doses of NPK and FLDs are being adopted by the farmers to attain maximum benefits from their fields and KVKs are playing important popularising the improved practices through training programs and demonstration in the farmers filed.

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