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Assessment of Adoption Gaps in *Gobhi Sarson* (B*rassica Napus* L.) Production Technologies in Amritsar and Tarntaran Districts of Punjab

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ABSTRACT

The present study was undertaken in Amritsar and Tarntaran districts of Punjab to analyze the status of *gobhi sarson* production technology, constraints in its cultivation and the possibilities of increasing production. A fundamental problem to overcome insignificantly increasing oilseed production is to change the prevailing perceptions of their status as a subsistence crop and to consider as a commercial crop. This will require aggressive on-farm demonstration of the viable technical options, to alleviate the gaps in technology of production of oilseed crops. It emphasizes dissemination of improved varieties and low-cost, environmental friendly crop husbandry techniques. Keeping this in view, front line demonstrations (FLDs) on g*obhi sarson*, existing technology v/s recommended technology were conducted during *rabi* 2010-11 and 2011-12 and have proved immensely useful in increasing the production and productivity of oilseed crops in the districts alongwith evaluation of adoption gaps. The improved practice produced 9.6 and 13.4 per cent more seed yield and 14.8 and 19.8 per cent higher net returns of *gobhi sarson* than the crop raised by farmers themselves in 2010-11 and 2011-12, respectively.

Key words: FLDs, *gobhi sarson,* production technology, seed yield, net returns**.**

INTRODUCTION

Rice-wheat is the most important cropping system of Punjab. The issue of crop diversification is, nowadays, getting very popular as the adverse impacts of rice-wheat system are being realized not only by the scientists but also by the farmers. In the state, rapeseed- mustard is cultivated on an area of 31 thousand hectares with productivity of 13.08 q ha^{-1} in the year 2010-11 (Anon., 2012). The crop is well adapted to our agro-ecological conditions and its cultivation can play a crucial role in crop diversification. In addition, *gobhi sarson* helps to control *Phalaris minor* due to its early sowing. Its water requirement is also less as compared to *rabi* cereals and has better adaptability on account of its peculiar growth habit and ability to sustain low temperature regime by restricting above ground plant biomass and prolonging the vegetative phase. Moreover, it ensures regular utilization of farm labour because of earlier maturity of the crop *i.e.* 15 days before wheat harvesting. This period can also be utilized for timely sowing of summer moong (cv SML 668 and SML 832), which usually takes 60 days for maturity and produces 10-12 q ha^{-1} grain yield.

Although cultivation of oilseed crops has been known traditional practice in the country but, this practice has declined in recent decades with the increased production of the major cereal crops like rice and wheat. Front line demonstrations (FLDs) have proved immensely useful in increasing the production and productivity of oilseed crops. The major objective of these FLDs is to demonstrate the productivity potentials and profitability of the latest and improved oilseed production technologies under farm conditions. These technologies include whole package, component technologies *viz*., improved cultivars, recommended dose of fertilizers, plant protection measures, thinning, method of sowing, irrigation, weed management, disease management etc. and cropping systems involving oilseeds. In view of this, an attempt has been made to review the progress pertaining to the productivity potentials and profitability of the technologies that are recommended for oilseed production and existing extension gaps in adoption of these improved production technology under field conditions.

METHODOLOGY

Two districts namely Amritsar and Tarntaran of Punjab selected for the study. These are situated at 30° 4' N Latitude and 75° 5' E Longitude with an average elevation of 234 metres. Both the districts have assured irrigation areas. The farmers were selected randomly from different blocks of the district for the study. Six frontline demonstrations (FLDs) were conducted during *rabi* 2010-11 and 8 FLDs during *rabi* 2011-12 on g*obhi sarson* cv. GSL-1 (recommended variety by PAU), at farmers field. All the required agri-inputs were supplied to all the farmers. The crop was raised following

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recommended package of practices for crops of Punjab.

RESULTS AND DISCUSSION

Frontline demonstrations (FLDs) conducted on g*obhi sarson*, clearly revealed its good scope in crop diversification. The seed of variety GSL-1 was identified as the most critical input. The demonstrations with recommended technology produced on an average 16.0 and 17.8 q ha^{-1} seed yield of *gobhi sarson* during 2010-11 and 2011-12, respectively, which was very close to its potential yield (18.7 q ha^{-1}).

The improved practice produced 9.6 and 13.4 per cent more seed yield (Table 1) and higher net returns of 14.5 and 19.4 per cent (Table 3) than the crop raised with existing technology during first and second year, respectively.

This was mainly attributed to more seed yield in improved practice as a result of application of sulphur containing phosphatic fertilizer, proper inter- and intra-plant spacing (45 x 10 cm) through thinning at 21-25 days after sowing. The gross returns obtained with recommended technology were ₹ 36,800/- and ₹ 58,740/- which were 9.6 and 13.4 per cent higher than that of existing technology in 2010-11 and 2011-12, respectively (Table 2). The net returns incurred with recommended technology was ₹ 17,749/- and ₹ 36,337/- during both the years respectively (Table 3).

The existing recommended technologies of *gobhi sarson* and gap between them are presented in Table 4. Farmers, in general, procured seed from unauthorized local seed shops. They do not have the habit to take seed from authorized seed like certified seed from Government approved agencies. They rely only on local dealers for every agri-input like seeds, fertilizers, insecticides, pesticides and other chemicals.

Besides all, farmers usually go for broadcast sowing of this crop rather than line sowing due to which not only intercultural operations get difficult but also, optimum plant population cannot be achieved which leads to undue competition between the plants. For application of phosphatic fertilizers, preference should be given to single super phosphate (SSP) than that of di-ammonium phosphate (DAP) because SSP contains sulphur, which is a desirable nutrient for oilseed crops.

As far plant protection measures are concerned, farmers use plant protection measures without taking care of the economic threshold levels (ETLs) which increases the cost of cultivation per unit area. Economic threshold level is the level below which the insect population will not cause any harm to the crop. So, considerable gaps were observed in almost whole crop production system, plant protection measures, *etc*.

Besides this, farmers in general purchased pesticides available with local companies without taking care of any brand name and status of manufacturing company. They just rely only on local shopkeepers for all inputs.

Considerable gap was observed in method of sowing, fertilizer application and plant protection measures, which definitely were the reasons for not achieving the potential yield of the crop.

Similarly, Roy *et al.* (2010) elicited that farmers usually followed broadcast method of sowing against the recommended line sowing and because of this, they applied higher seed rate than the recommended. They further observed full gap in case of irrigation and plant protection measures.

Table 1: Average yield and cost particulars of front line demonstrations (FLDs) and local checks in 2010-11 and 2011-12

Farmers	Block	District	Average Yield (q/ha)		
			Existing technology	Recommended technology	% increase
		2010-11			
S Kashmir Singh	Jandiala Guru	Amritsar	13.9	14.9	7.2
S Rajandip Singh	Majitha	-do-	15.6	17.2	10.3
S. Avtar Singh	Rayya	-do-	15.9	17.2	8.2
S. Gulab Singh	Ajnala	-do-	13.0	14.5	11.5
S. Roop Singh	Naushera Pannuan	Tarantaran	13.9	15.8	13.7
S. Darshan Singh	Chohla Sahib	-do-	15.1	16.3	7.9
Mean			**14.6**	**16.0**	**9.6**
		2011-12			
S. Manjit Singh	Jandiala Guru	Amritsar	17.3	19.5	12.7
S. Avtar Singh	Majitha	--do--	13.8	16.0	15.9
S. Dilbag Singh	Rayya	--do--	17.3	18.5	6.9
S. Preetam Singh	Ajnala	--do--	15.3	17.5	14.4
S. Roop Singh	Naushera Pannuan	Tarntaran	15.5	20.0	29.0
S. Baljit Singh	--do--	--do--	16.8	20.3	20.8
S. Joga Singh	Chohla Sahib	--do--	14.8	16.5	11.5
S. Kuldeep Singh	--do--	--do--	17.0	18.8	10.6
Mean			**15.7**	**17.8**	**13.4**

Table 2: Seed yield and net returns of *gobhi sarson* at different locations (2010-11 and 2011-12)

Farmers	Block	District	Gross returns (₹/ha)		Average Cost of cultivation (₹/ha)		Net returns (₹/ha)	
			Existing technology	Recommended technology	Existing technology	Recommended technology	Existing technology	Recommended technology
2010-11								
S. Kashmir Singh	Jandiala Guru	Amritsar	31970	34270	18078	19051	13892	15219
S. Rajandip Singh	Majitha	-do-	35880	39560	18078	19051	17802	20509
S. Avtar Singh	Rayya	-do-	36570	39560	18078	19051	18492	20509
S. Gulab Singh	Ajnala	-do-	29900	33350	18078	19051	11822	14299
S. Roop Singh	Naushera Pannuan	Tarantaran	31970	36340	18078	19051	13892	17289
S. Darshan Singh	Chohla Sahib	-do-	34730	37490	18078	19051	16652	18439
2011-12								
S. Manjit Singh	Jandiala Guru	Amritsar	57090	64350	21368	22403	35722	41947
S. Avtar Singh	Majitha	--do--	45540	52800	21368	22403	24172	30397
S. Dilbag Singh	Rayya	--do--	57090	61050	21368	22403	35722	38647
S. Preetam Singh	Ajnala	--do--	50490	57750	21368	22403	29122	35347
S. Roop Singh	Naushera Pannuan	Tarntaran	51150	66000	21368	22403	29782	43597
S. Baljit Singh	--do--	--do--	55440	66990	21368	22403	34072	44587
S. Joga Singh	Chohla Sahib	--do--	48840	54450	21368	22403	27472	32047
S. Kuldeep Singh	--do--	--do--	56100	62040	21368	22403	34732	39637

Price: ₹ 2300/q (2010-11) and ₹ 3300/q (2011-12)

Table 3: Economics of FLD on *gobhi sarson*

Particulars	2010-11		2011-12	
	Existing Technology	Recommended Technology	Existing Technology	Recommended Technology
Average yield (q/ha)	14.6	16.0	15.7	17.8
Increase in yield over existing technology (q/ha)	-	1.4	-	2.1
Average sale price (₹./q)	2,300	2,300	3,300	3,300
Total incremental income over existing technology (₹ /ha)	-	3,220	-	6,930
Gross returns (₹/ha)	33,580	36,800	51,810	58,740
Cost of cultivation (₹/ha)	18,078	19,051	21,368	22,403
Additional cost of cultivation from existing technology (₹/ha)	-	973	-	1,035
Net returns (₹/ha)	15,502	17,749	30,442	36,337

Table 4: Level of gaps in adoption of recommended technology in *gobhi sarson*

Item	Existing technology	Recommended technology	Adoption Gaps
Variety	GSL 1	GSL 1	-
Sowing implements	Broadcasted	Seed drill	Considerable
Seed rate (q ha^{-1})	3.75	3.00	Considerable
NPK level & application time	100 – 30 – 0 (Through urea and DAP) Half N and whole P_2O_5 at sowing and remaining N with first irrigation	100 – 30 – 0 (Through urea and SSP) Half N and whole P_2O_5 at sowing and remaining N with first irrigation	Considerable
Spacing	Broadcasting and no thinning to maintain plant to plant distance	45 X 10 cm maintained by thinning	Considerable
Irrigations	4	4	-
Weed control	Hoeing	Hoeing	-
Plant protection	More no. of sprays	On ET level of insects	Considerable
Average yield (q ha^{-1})	15.1	16.9	1.8 Considerable

CONCLUSION

It can be concluded that extension gaps in adoption of improved oilseed production technologies had been identified. In most of the cases, farmers did not follow the recommended practices for sowing and plant protection measures. Front line demonstrations were really helpful in creating awareness among the farmers and clearly exhibited recommend existing production technology. Transfer of technology should be strengthened in farmer participatory mode with involvement of multidisciplinary team of researchers.

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