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Impact of Front Line Demonstrations on Productivity and Profitability of Mustard in Hills of Uttaranchal

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Abstract

Mustard is one of the most important oilseeds crop in India, which plays a major role in supplementing the income of small and marginal farmers of Champawat district in the hills of Uttarakhand. One of the major constraints of traditional mustard farming is low productivity due to non-adoption of recommended package of practices and improved varieties. To replace this anomaly, Krishi Vigyan Kendra Lohaghat (Champawat) under Govind Vallabh Pant University of Agricultural & Technology, Pantnagar (Uttarakhand) had conducted frontline demonstrations (FLDs) at adopted farmer's fields. Cultivation practices comprised under FLD viz., use of improved variety, line sowing, balanced application of fertilizers, timely weed management and control of insect-pest through insecticide -pesticides at economic threshold level showed that the yield of mustard increased from 15.16 to 17.37 percent over farmer's practice during the demonstration period from 2013-14 to 2015-16.The technology gap of 151 kg/ha as minimum during 2014-15 to maximum of 191kg/ha during year 2013-14 was observed.

Key words: Frontline demonstration, Technology gap, Extension gap, Technology index, Mustard

Introduction

Indian mustard [*Brassica juncea* (*L.*)] is predominantly cultivated in Uttaranchal, Uttar Pradesh, Rajasthan, Haryana, Madhya Pradesh and Gujarat. The total area in India was 6.30 million hectares along with 7.20 million tonnes of production. It is the major source of income especially even to the marginal and small farmers in Uttaranchal. The mustard production scenario in the country has undergone a sea change. The main contributors to such transformations have been availability of improved oilseeds production technology and its adoption, expansion of cultivated area, price support policy and institutional support, particularly establishment of technology mission on oilseeds in1986 (Hegde, 2004).The improved technology packages were also found to be financially attractive. Yet, adoption levels for several components of the improved technology were low, emphasizing the need for better dissemination (Kiresur *et al.*, 2001). Several biotic, abiotic and socio-economic constraints inhibit exploitation of the yield potential and these needs to be addressed. The state-wise yields obtained both under improved technology and farmers' practice ranges from 12 to 110% between states and the national average being 36%. The additional production that can be attained by exploiting the yield gap at national level is about 2 million tonnes (Kumar and Chauhan, 2005). Uttarakhand has the sizeable area (19000 ha) under mustard cultivation with total with the productivity level is low (1215 kg/ha) as compared to other states like Haryana (1738kg/ha) during 2014-15. Therefore, keeping the above point in view, the FLDs on mustard using integrated crop management technology was started with the objectives of showing the productive potentials of the new production technologies under real farm situation over the locally cultivated mustard crop.

Materials and Methods

The present study was carried out by the Krishi Vigyan Kendra, Lohaghat (Champawat) under Govind Vallabh Pant University of Agriculture & Technology, Pantnagar during *rabi* season from2013-14 to 2015-16 (03years) at the farmers' fields of different five villages of Champawat of Hills of Uttarakhand .In total 45 frontline demonstrations in 20 ha area in different villages were conducted. Materials for the demonstrations with respect to FLDs and farmers' practices were given in Table 1.

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Table 1: Details of package of practices followed in the Front Line Demonstration

S.No.	Inputs	Demonstration quantity/ha	Farmers practice quantity/ ha
1	Mustard variety	PT-303	PT-303
2	Seed rate	4.5 kg	5 kg
3	Seed treatment carbendazim	2 gm/ kg seed	—
4	Single Super Phosphate (SSP)	300 kg	—
5	DAP	—	100 kg
6	Urea	200 kg	150 kg
7	MOP	125 kg	—
8	Zinc sulphate (21%)	25 kg	—
9	Sulphur 90 DP(Granular)	30 kg	—
10	Beprofezin	1.0 lit	—
11	Redomil	1.50 kg	—
12	Weeding	Pendimethalin	Mannual

In case of farmers practice plots, existing practices being used by farmers were followed. In general, soils of the area under study were loam in texture and medium to low in fertility status.

The FLDs were conducted to study the gaps between the potential yield and demonstration yield, extension gap and technology index. In the present evaluation study, the data on out- put of mustard cultivation were collected from FLD plots, besides the data on local practices commonly adopted by the farmers of this region were also collected. In demonstration plots, a few critical inputs in the form of quality seed, balanced fertilizers, agro-chemicals etc. were provided and non-monetary inputs like timely sowing in lines and timely weeding were performed. Where, in farmers practice traditional practices prevailing in the area were maintained. The demonstration farmers were facilitated by KVK scientists in performing field operations like sowing, spraying, weeding, harvesting etc. during the course of training and visits. The technologies demonstrated are mentioned in Table 1 and compared with local practices. The satisfaction level of participating as well as neighboring farmers' for the performance of improved variety demonstrated was also assessed. The economic-parameters (gross return, net return and C: B ratio) were worked out on the basis of prevailing market prices of inputs and Minimum Support Prices of outputs.

Results and Discussion

Mustard Yield

The data (Table 2) indicated that the frontline demonstration has given a good impact over the farming community of Champawat district as they were motivated by the new agricultural technologies applied in the demonstrations. Results of 45frontline demonstrations indicated that the cultivation practices comprised under FLD *viz.*, use of improved variety (PT-303), balanced application of fertilizers (N:P:K @120:60:40 kg/ha with 25 kg ZnSO4& 30 kg S /ha), line sowing, timely weed management and control of mustard white rust &aphid through fungicide & insecticide, produced on an average 1775 kg/ha mustard yield, which was 16.14%higher compared to prevailing farmers practice (1528 kg/ha). Kumar and Yadav (2007) also reported that recommended dose of phosphorus and sulphur increase the yield and quality of Indian mustard.

The technology gap, extension gap and technology index were calculated using the following

Table 2: Yield performance of mustard under FLDs at farmer's field

Year	Yield kg/ha		% yield increase over FP	Technology gap (kg/ha)	Extension gap (kg/ha)	Technology index %
	Demonstration	Farmer Practice				
2013-14	1750	1510	15.89	191	240	9.84
2014-15	1790	1525	17.37	151	265	7.78
2015-16	1786	1550	15.16	156	235	8.04
Average	1775	1528	16.14	166	246	8.55

Table 3: Economic performance of mustard under FLDs farmer's field

Year	Cost of cultivation (Rs./ha)		Gross return (Rs./ha)		Net return (Rs./ha)		B:C ratio	
	Demons.	F.P.	Demons.	F.P.	Demons.	F.P.	Demons.	F.P.
2013-14	11500	8500	34125	29445	22625	20945	1.96	2.46
2014-15	10900	8900	34905	29737	24005	20837	2.20	2.34
2015-16	11100	9200	34807	30225	23707	21025	2.12	2.28
Average	11167	8867	34612	29802	23445	20935	2.09	2.36

Sell price of mustard averaged three years 1950 Rs. per quintal

formulae given by (Samui *et al*., 2000).

Technology gap = Potential yield - Demonstration yield

Extension gap

= Demonstration yield - yield under existing practice

Technology index = {(Potential yield - Demonstration yield)/Potential yield} x 100

Potential yield of mustard variety PT-303is 1941 kg/ha

Technology and Extension gap

The technology gap observed may be attributed to the dissimilarity in the soil fertility status and weather conditions. Hence, variety wise location specific recommendation appears to be necessary to minimize the technology gap for yield level in different situations. The extension gaps ranged from 240 to 265 kg/ha during the period of demonstration emphasized the need to educate the farmers through various means for the adoption of improved agricultural production technologies to reverse this trend of wide extension gap. More and more use of latest production technologies with high yielding varieties will subsequently change this alarming trend of galloping extension gap. The new technologies will eventually lead to the farmers to discontinuance of old varieties with the new technology.

Technology index

The technology index shows the feasibility of the evolved technology at the farmers' fields. The lower value of technology index more is the feasibility of the technology. The data (Table 2) showed that maximum technology index value 9.84% was noticed in the year 2013-14 followed by 8.04% in 2015-16 whereas, minimum value of technology index of 7.78% in the year 2014-15, it may be due to uneven weather conditions in the area. The findings of the present study are in line with the findings of Hiremath *et al.* (2007) and Dhaka *et al.* (2010).

Economic performance

The economics (Cost of cultivation, gross & net return) of mustard under front line demonstrations were estimated and the results have been presented in Table 3. The front line demonstrations recorded higher average gross returns (Rs. 34612/ha) and net return (Rs. 23445/ ha) with cost: benefit ratio (2.09) compared to farmers practice as gross return Rs. 29802/ ha with higher cost: benefit ratio.

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