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Evaluation of front line Demonstration on Mustard Crop in Bundelkhand Zone

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ABSTRACT

Krishi Vigyan Kendra, Datia, Madhya Pradesh conducted 517 demonstrations on mustard varieties RVM-2 and NRCHB-101 during five consecutive years from 2014-15 to 2019-20 at farmers' field in Datia district to find out the worth of the improved technology. The parameters like technological impact, economical impact and extension gap were analyzed and feasibility of demonstrated technologies at grass root levels was assessed. The results of five years study revealed that the yield under demonstration plots was 19.79 q/ha as compared to 15.77q/ha in traditional farmer practices plots. This additional yield of 4.02q/ ha and the increase in average mustard productivity by 25.24 per cent may contribute to present oilseed requirement on national basis. The average of technology gap, extension gap and technology index were found to be 287.00 kg/ha, 401.75 kg/ha and 12.70 per cent respectively. An additional investments of Rs.1633 per ha coupled with scientific monitoring of demonstrations and non-monetary factors resulted in additional net return of Rs.12884 per ha. Fluctuating sale price of mustard during different years influenced the economic returns per unit area. On five years overall average basis incremental benefit cost ratio was found as 3.28. The results clearly indicate the positive effects of FLDs over the existing practices.

Keywords: Benefit cost ratio, Extension gap, Technology gap, Technology index

INTRODUCTION

Oilseed crops are the second largest agricultural commodity in India after cereals sharing 13 per cent of the gross cropped area and accounting for 11 per cent of value of all agricultural products. The continuous increase in import of oilseeds is a matter of concern today. Among the oil seeds crops, rapeseed-mustard occupies a prominent position in Indian oilseeds scenario. They are cultivated in 6.23 m ha in a wide range of agro-ecological conditions, resulted in the production of 9.34 m tones of grain mustard in 2018-19 with a productivity of 1499 kg/ha (Anonymous, 2019). In Madhya Pradesh, the total cultivated area under Rapeseed and Mustard crop, total production and yield/ha are 0.78 Mha, 0.75 Mt and 1305 kg/ha, respectively, (Directorate of Economics and Statistics, 2019). Rapeseed-mustard group of crops have been given the importance by the government because vast yield gap exists between potential yield and yield under real farming situation. Less or uncertain productivity mainly due faulty sowing practices, improper crop geometry, other intercultural operations and climatic variabilities are predominant reasons for limiting the potential yield. The factors affecting the productivity also include proper weed control and knowledge about different production recommendations (Kumar *et al*., 2016; Kumar *et al*., 2018).

KVKs are grass root level organizations meant for application of technology through assessment, refinement and demonstration of proven technologies under different micro farming situations in a district (Das, 2007). KVK Datia had made intensive efforts through front line demonstrations at farmers' field to identify the constraints

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and potential of the Mustard in specific area as well as it in improving the economic and social status of the farmers. The main objective of this front line demonstration was to show the value of the technology. Under such condition it is quite imperative that reasons for the technological gap in Mustard should be identified and studied critically in order to address the existing challenge of low productivity. In this context the present study was undertaken to evaluate the difference between demonstrated technologies vis-a-vis practices followed by the local farmers in mustard crop.

METHODOLOGY

The present study was carried out by the Krishi Vigyan Kendra, Datia (M.P.) in *rabi* seasons at the farmers' fields of six villages of Datia district in Bundelkhand zone during 2015-16 to 2019-20. 517 front line demonstrations in 208 ha area were conducted in different villages. Technology for the present study with respect to FLD was on following:

The improved technology included improved varieties; treatment of seed and plant protection measures. In general, soils of the area under study were medium black clay with medium to low fertility status. Seed treatment was done with Carbendazim 50 WP @ 2 g/kg of seed. The seed rate of mustard was kept 3.5 kg/ha in demonstration fields. The sowing of mustard crop seed was done during middle of October to first week of November. Fifty per cent nitrogenous and other fertilizers doses were given as basal dose and the remaining half dose of nitrogen applied in the form of foliar spray. Weed management through weedicide was done at 18 to 20 hour after sowing. The data were collected through personal contact with farmers at farmer's field and after that tabulated and analyzed to find out the findings and conclusion. The statistical tool like percentage used in this study to analyze data. The technology gap, extension gap and technology index were calculated as suggested by Samui *et al*. (2000).

Extension gap = Demonstration yield – farmers' yield (control)

Technology gap = Potential yield – Demonstration yield

Technology index (%) = Technology gap x 100/Potential yield

RESULT AND DISCUSSION

Grain yield

The increase in grain yield under demonstration was 22.13 to 27.87 per cent over farmers' local practices. On the basis of five years, 25.24 per cent yield advantage was recorded under demonstrations carried out with improved cultivation technology as compared to farmers' way of mustard cultivation. The results indicated that the front line demonstrations have given a good impact over the farming community of Datia district as they were motivated by the new agricultural technologies applied in the FLD plots (Table 2). However, the obtained seed yield in FLD's was low as compared to potential yield of the varieties due to soil fertility level and uncertain weather

Table 1: Details of demonstrated technology and farmers' practices

Practice	Demonstrated practice	Farmers' practice
Variety	RVM-2 and NRCHB 101	Local variety
Seed treatment	Carbendazim @ 2g/kg	No seed treatment
Sowing Method	Through Seed drill	Broadcast
Seed rate & spacing	3.5 kg/ha and 30X10 cm	5 kg and not definite
Time of sowing	First fortnight of October	October to first fort night of November
Fertilizers	80:40:20:30:: NPKS kg/ha	Use of N & P as DAP mixing with seed at sowing
Weed control	Pre-emergence application of Pendimethalin 30 EC 3.3 l/ha followed by manual weeding at 30 days after sowing	No or Non judicious use of weedicides
Plant protection management	Aphid management: Imidachloprid 17.8 SL 5ml/15 l water	Non judicious and non specific use of insecticide

Table 2: Grain Yield and gap analysis of front line demonstration on Mustard at farmers' field from 2014-15 to 2019-20

Year	No. of Demo	Variety	Potential Yield (kg)	Demo yield (kg)	Farmers Practice Yield (kg)	Yield increase (%)	Extension gap (kg)	Technology gap (kg)	Technology index (%)
2014-15	12	RVM-2	2220	1570	1264	24.21	306	650	29.28
2015-16	60	RVM-2	2220	1810	1482	22.13	328	410	18.47
2016-17	75	NRCHB-101	2380	**2276**	**1780**	27.87	496	104	4.37
2018-19	75	NRCHB-101	2380	2260	1783	26.75	477	120	5.04
2019-20	295	NRCHB-101	2380	**2229**	**1760**	26.65	469	151	6.34
	517		**2348.00**	**1979.00**	**1577.25**	**25.24**	**401.75**	**287.00**	**12.70**

situation at the time of flowering and siliqua formation stage of the crop. As the crop grown under irrigated condition, the beneficial effect of improved variety with scientific agronomic practices like nutrient management, weed management etc. resulted in greater and longer availability of nutrients as per demand of the crop. The similar findings were also reported by Shekhawat *et al. (*2012). Ahmad *et al.* (2013) and Katare *et al.* (2011) and observed that technology adoption is the key to increase crop productivity.

Gap analysis

An extension gap of 306 to 496 kg/ha was found between demonstrated technology and farmers' practices during different five years and on average basis the extension gap was 401.75 kg per hectare (Table 2). The extension gap was lowest (306 kg/ha) during *rabi* 2014-15 and it was highest (496 kg/ha) during *rabi* 2016-17. Such gap might be attributed to adoption of improved technology in demonstrations which resulted in higher grain yield than the traditional farmers' practices. Singh *et al.* (2017) showed in their study on extension gap also agrees with the present observation.

Technology Gap

Wide technology gap were observed during different years and this was lowest (104 kg/ha) during *rabi* 2016-17 and was highest (650 kg/ha) during *rabi* 2014-15. On five years average basis the technology gap of total 517 demonstrations was found as 287.00 kg per hectare (Table 2). The observed technology gap may be attributed to dissimilarity in soil fertility status, rainfall distribution, disease and pest attacks as well as the change in the locations of demonstration plots every year. The difference in technology gap during different years could be due to more feasibility of recommended technologies during different years. The technology gap observed may be attributing to the dissimilarity in soil fertility status, timely sowing and weather conditions. Similar finding were recorded by Mitra and Samajdar (2010) and also reported by Raj, *et al.* (2013).

Technology index

The technology index for all the demonstrations during different years were in accordance with technology gap. The highest technology index per cent of 29.28 was recorded in the year *rabi* 2014-15 and the lowest was observed in the year *rabi* 2016-17 which is 4.37 per cent. The technology index shows the feasibility of the evolved technology at the farmer's fields and the lower the value of technology index more is the feasibility of the technology (Table 2).

Economic return

The input and output prices of commodities prevailed during the demonstrations were taken for calculating gross return, cost of cultivation, net return and benefit cost ratio (Table 3). Use of pricey seeds for crop sowing, seed treatment, recommended dose of chemical fertilizers, proper pest management etc., all of these are the main reasons for high cost of cultivation in demonstration fields than local check. Therefore, the average cost of cultivation of five years increased in demonstration practice (Rs. 21358/ha) as compared to

Table 3: Economic analysis of front line demonstrations from 2014-15 to 2019-20

Year	Cost of cultivation (Rs/ha)		Selling price of	Gross return (Rs/ha)		Increase in gross	Net Return (Rs/ha)		Increase in net	B : C ratio	
	Improved technologies	Local farmers practices	black gram in Rs./kg	Improved technologies	Local farmers practices	return (%)	Improved technologies	Local farmers practices	return (%)	Improved technologies	Local farmers practices
2014-15	19000	17900	31	48670	39184	24	29670	21284	39.40	2.56	2.19
2015-16	21130	19500	34	60635	49647	22	39505	30147	31.04	2.87	2.55
2016-17	22300	20500	37	84212	65860	28	61912	45360	36.49	3.78	3.21
2018-19	23000	21000	40	90400	71320	27	67400	50320	33.94	3.93	3.40
2019-20	24500	21800	42	93618	73920	27	69118	52120	32.61	3.82	3.39
	21358	**19725**		**70979**	**56503**	**25**	**49622**	**36778**	**35.22**	**3.28**	**2.84**

Local check (Rs. 19725 /ha). The cultivation of mustard under improved technologies gave higher net return of Rs. 49622/ha (35.22% more) as compared to farmers' practices which was Rs. 36778/ha. The benefit cost ratio of Mustard under improved technologies was 3.28 as compared to 2.84 under farmers' practices. The lowest and highest incremental benefit cost ratio depends on grain yields obtained and sale rates under improved technologies compared to local check (farmers' practice). The similar results were also observed by earlier investigators Mitra and Samajdar (2010) and Balai *et al.* (2012).

CONCLUSION

The results showed that the integration of improved technology along with active participation of farmer have a positive effect on increase the grain yield and economic return of mustard crop production. The suitable technology for enhancing the productivity of mustard crop and need to conduct such demonstrations may lead to the improvement and empowerment of farmers. These demonstration trails also enhanced the relationship and confidence between farmers and KVK scientists. The recipient farmers of FLDs also played an important role as source of information and quality seeds for wider dissemination of the improved varieties of mustard for other nearby farmers. It may be concluded that the FLD programme is a successful tool in enhancing the production and productivity of mustard crop through changing the knowledge, attitude and skill of farmers.

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