Impact Analysis of Frontline Demonstration in Shivpuri District of M.P.

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ABSTRACT

Krishi Vigyan Kendra, Shivpuri conducted 60 demonstrations on mustard variety – RVM-2, Pusa- Agrani during five years from 2010–11 to 2014–15 at farmers field in Shivpuri district. Total no of 60 frontline demonstrations conducted during 2010-11 to 2014-15 in Rabi season in adopted villages (Lalgarh, Tanpur, Tharrah, Sirsod, Manikhera and Kulwara) of two Block viz Kolaras and Shivpuri. Integrated nutrient management with (80:40:20) NPK + 20 kg sulphur / ha adopted on soil test basis. Summer deep ploughing, integrated pest management, seed treatment with Imidacloprid 70WS @5.0 gram / kg + PSB culture @ 10 gm /kg seed and spray of insecticide for control of Aphid & white fly. There was an appraisable increase in yield level 18.00 to 21.87 q/ ha under demonstration plot against 13.75 to 17.88 in farmers' plot. Adoption of improved technology had significant effect on seed yield vis–a–vis yield gaps. Improved technologies enhanced mustard yield 370 kg to 429 kg. /ha over farmers practice with an overall increase yield of 26.43 per cent.

Key words: *Mustard crop; Front line demonstration; Farmers practice; Gap analysis; Productivity;*

Rapeseed - mustard (*Brassica juncea*) is third important oilseeds crops in the world after the soybean (*Glycine max*) and Palm (*Elaeis guineensia*) oil. Among the seven edible oilseeds cultivated in India, rapeseed mustard contribute 28.6 per cent in total oilseed production and rank second after groundnut 27.8 per cent in the Indian oilseed economy. Under marginal resource situation cultivation of rapeseed mustard becomes remunerative to farmers. This results in reducing a big gap between requirement and production of mustard in India. India produces 6.7 Mt. of rapeseed mustard next to china (11-12mt) and EU(10-13mt) with significant contribution in world rapeseed mustard industry (*Anonymous, 2016*). The Rapeseed mustard gaps broadly include Indian mustard, yellow sarson, brown sarson, raya and toria crops. Indian mustard (Brassica juncea (L) (zerry and cosson) is predominantly cultivated in Rajasthan, UP, MP and Hariyana. n India, rapeseed mustard is an important source of edible oil followed by ground nut (*Panday et al., 1999*) and *Ahmad et al. (2013)*. It is grown in some no traditional areas of south India including Karnataka, Tamilnadu and Andhra Pradesh. The crop can be raised under both rainfed and irrigation condition. In India, rapeseed mustard is grown on an area of 5.53 Mh. with production and productivity of 6.41 Mt and 1161 kg/ha respectively in 2014-15. MP is the third major mustard producing state with 11 per cent of the national production due to the warm climate condition. The mustard yield in MP is significantly less than national average. The important mustard producing districts are Bhind, Morena, Gwalior, Shivpuri, Sheopur, Neemuch, Datia and Guna. In district Shivpuri, mustard area is 65366 ha with production 50933 tons and productivity 779 kg/ha. The front line demonstration programme (FLDs) in oil seeds is a noble initiative by Ministry of Farmer welfare and agriculture development Govt. of India which is conducted under close supervision of the KVK scientists. The main objective of FLDs in Oilseeds is to demonstrate and popularize the improved agro technology on farmers' field. Under various existing farming situations, for effective transfer of new

Table 1. Comparison between demonstration package and existing farmers practice under mustard crops

Particulars	Demonstration package	Farmers practice
Farming situation	Irrigated, medium black to heavy soil (early sowing at mid September to timely sowing in October)	Rainfed, medium black to heavy soil (some farmers have one irrigation facilities with early sowing at mid September)
Variety	Pusa Agrarni and RVM-2	Farmers sowing unidentified variety/Toria
Time of sowing	1st to 15 October	Farmers sowing 15 Sept to 1st week of November under irrigation farming
Method of sowing	Line sowing with use of seed cum ferti drill	Line sowing with fertilizer and some farmers broadcasting
Seed rate	5.00 kg/ha	7.00-10.00 kg/ha
Fertilizer dose	As per recommended soil testing report	Use only DAP and SAP as sowing time
Plant protection	Mustard seed are treated with Bavasteen 2g and Emidaclopird 70 WS@5g/kg	No seed treated at the time of sowing

generated technology and fill the gap between improved technology and indigenous technology to enhance the oil seeds. Productivity enhancement gained through oilseeds intensification and diversification for sustaining the production systems. Keeping in view the importance of oilseeds in food security mustard is a vital component of our farming system. KVK's to bring in enhanced appreciation of modern technology on generating yield data and collection of farmers feedback. Keeping in view the importance of FLDs, KVK Shivpuri conducted demonstrations on oilseeds (mustard) at farmer's field under irrigated situation in Rabi 2010-11 to 2014-15.

Objectives were as following -

- To compare the yield level of local check (farmers field) and FLD fields.
- To exhibit the performance of recognized & recommended high yielding of mustard varieties, full recommended packages of practices for harvesting higher yields.
- To collect feedback Information for further use in research and extension programme.

METHODOLOGY

Front line demonstrations on mustard were conducted at farmers field in district Shivpuri (MP) to assess its performance during rabi seasons of the year 2010-11, 2011-12, 2012-13, 2013-14 and 2014-15 in 7 villages (Sirsod, Hatod, Tanpur, Lalgargh, Karmachkala, Ratore and Raja Ki Muderi) of two block viz Shivpuri and Karera. For conducting FLDs, farmers were identified/ selected following the survey suggested by *Choudhary (1999)*. A total of 25 ha area was covered under mustard FLDs and demonstrated improved management practices using improved varieties. Total 60 farmers were associated with oilseed (mustard) demonstrations. Each demonstration was of 0.42 ha area using recommended package of practices and farmers were provided quality seed of mustard variety Pusa agarni and RVM-2 during all the five years of study period. The sowing was done during first week of October to third week o November under irrigated condition and harvesting last week of February and first week of March. The front line demonstrations at farmers' field were regularly monitored time to time and observation were taken by KVK scientist from sowing to harvesting.

Observation on the grain yield of demonstration crop was recorded and analyzed. The data output were collected from both FLD plots as well as control plots and cost of cultivation, net income, and benefit cost ratio were also worked out (*Samui et al., 2000*).

The technology gap, extension gap and technological index were calculated by using following formula as given below:

Extension gap = Demonstration yield – farmers practice yield
Technology gap = Potential yield – Demonstration yield
Additional return = Demonstration – farmers practice return
Incremental B:C ratio = Additional return/additional cost

$$\text{Tech. index} = \frac{\text{Potential yield} - \text{Demo. yield}}{\text{Potential yield}} \times 100$$

RESULTS AND DISCUSSION

Grain yield : The increase in grain yield under demonstration was 22.31 to 31.20 percent greater than farmers' local practice. On the basis of five years, 26.45 percent yield advantage was recorded under

demonstration carried out with improved cultivation technology as compared farmers' traditional way of mustard cultivation. Similar results were also shown by *Tiwari et al., (2003)* and *Katare, et al.* (*2011*). The results clearly indicated the positive effect of FLDs over the existing practices toward enhancing the yield of mustard in the study area due to use of high yielding variety, timely sowing, balance does of fertilizers along with sulphur, proper irrigation, need based plant protection etc.(Table 2).

Gap analysis : An extension gap of 370-429 kg./ha was found between demonstration technology and farmers practices during different five years and on average basis the extension gap was 406kg/ha (Table 3). The extension gap was lowest (370kg./ha) in the year 2011-12 and was highest (429kg./ha) during 2010-11. Such gap might be attributed to adoption of improved technology in demonstration which resulted in higher grain yield taken over the traditional farmers practice. Wide technology gaps were observed during different years. On the five years average basis the technology gap of total 60 demonstrations was found -42.4. The difference in technology gap during years could be due to more feasibility of recommended technology during different years. Similarly, the technology index for all the demonstration during different years was in accordance with technology gap. Higher technology index related the inadequate proven technology for transferring to farmers and insufficient extension services for transfer of technology. Technology index was lowest (-11.69) during the year 2014-15 and was highest (7.49) during the year 2010-11 on the five years average basis the technology index of total 60 demonstration was found as -2.21 per cent . 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 et al, (2010).*

Economics analysis : Different variables like seed, fertilizer, pesticide, fungicide were considered as cash input for the demonstrations as well as farmers practice and on an average an additional return of Rs.9706.00 per hector was made under demonstrations. Economics of returns a function of grain yield and MSP sale price varied during different years. Maximum return (56175 per ha.) during the year 2012-13 was obtained due to higher grain yield. The higher additional return and effective gain obtained under demonstrations could be due to improved technology, non monetary factors, timely operations of crop cultivation and scientific monitoring. The lowest and highest incremental benefit: cost ratio (IBCR) was 3.57 & 5.63 in year 2010-11 and 2013-14,

Table 2. Year wise yield data with percent change

Year	Variety	Area	No.	FP (q/ha)	RP (q/ha)	Change (kg/ha)	Change (%)	Village
2014-15	Pusa Agrani	05	12	16.80	20.93	413	24.58	Hatod, Sirsor, Tanpur
2013-14	Pusa Agrani	05	12	13.81	18.0	419	30.34	Lalgarh, Tanpur, Rator
2012-13	Pusa Agrani	05	12	17.88	21.87	399	22.31	Lalgarh, Hatod, Rator
2011-12	RVM-2	05	12	15.57	19.27	370	23.76	Hatod, Lalgarh, Tanpur
2010-11	RVM-2	05	12	13.75	18.04	429	31.20	Hatod, Lalgarh, Tanpur
Average yield		25	60	15.56	19.62	406	26.43	

Table 3. Grain yield and Gap analysis of front line demonstration on mustard on farmer's field

Year	Demo	Variety	Potential yield (kg/ha)	Demo yield (kg/ha)	Farmer Yield (kg/ha)	% Increase	Extent of gap (kg/ha)	Tech. gap	Tech. Index
2010-11	12	Pusa Agarni	1950	1804	1375	31.2	429	146	7.49
2011-12	12	Pusa Agarni	1950	1927	1557	23.76	370	23	1.18
2012-13	12	Pusa Agarni	1950	2187	1788	22.31	399	-237	-12.15
2013-14	12	RVM-2	1874	1800	1380	30.43	420	74	3.95
2014-15	12	RVM-2	1874	2093	1680	24.58	413	-219	-11.69
Total	60	Average	1919.6	1962	1556	26.45	406	-42.4	-2.21

Table 4. Economics analysis of front line demonstration on mustard at farmer's field

Year	Cost of culti. Rs./ha		Addl. cost of demo	Gross return Rs./ha		Net return (Rs./ha)		Addl. return	Effective gain	B:C ratio		IBCR
	Demo	FP	(Rs/ha)	Demo	FP	Demo	FP	(Rs/ha)	(Rs/ha)	Demo	FP	
2010-11	16500	15000	1500	30938	24090	14438	9090	5348	3848	1.88	1.61	3.57
2011-12	15590	13250	2340	57810	46710	42220	33460	8760	6420	3.71	3.53	3.74
2012-13	18183	16884	1299	74358	60792	56175	43908	12267	10968	4.09	3.60	9.44
2013-14	19500	17600	1900	54000	41400	34500	23800	10700	8800	2.77	2.35	5.63
2014-15	18000	15000	3000	73255	58800	55255	43800	11455	8455	4.07	3.92	3.82
Avg.	17555	15547	2008	58072	46358	40518	30812	9706	7698	3.31	2.98	4.83

respectively (Table 4) depends on produced grain yield and MSP sale rates. Overall average IBCR was found as 4.83. The superiority of recommended package of practices under frontline demonstration over farmers' practice was also reported by *Mitra and Samajdar (2010)* and *Balai et al., (2012).*

CONCLUSION

These technologies were found to be the main factors for increase in the yield of Mustard and thus it can be said that FLD's were the most successful tools for transfer of technology. The concept of frontline demonstration may be applied to all farmers' categories including progressive farmers for speedy and wider dissemination of the recommended practices to other members of farming community so that the front line demonstrations (FLD's) play a very important role to disseminate proven technologies. Because it shows the potential of technologies resulting in an increase in yield at farmers' level, under demonstration some specific technologies like seed treatment, seed rate, improved varieties, balance fertilizers application, intercultural and plant protection measures were undertaken in approved way. The demonstration farmers acted also as primary source of information on the improved practices of Mustard cultivation and also acted as source of good quality pure seeds in their locality and surrounding area for the next.

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