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BRIDGING YIELD GAP THROUGH FRONT LINE DEMONSTRATION IN RAPSEED-MUSTARD UNDER TRIBAL BELT OF RAJASTHAN

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ABSTRACT

The study was carried out during rabi season 2006-07 to 2009-10 at farmer's field of five adopted villages (Devpura, Chundawara, Harmatia, Nayagoan and Likibadi) of Dungarpur district. Front Line Demonstration on rapseed-mustard crop was conducted in an area of 25.0 ha with active participation of 112 farmers. The results revealed that maximum seed yield (17.50) was recorded during rabi 2007-08 with an increase in 40.0 per cent over local check. Improved variety (Bio 902) of rapseed-mustard resulted in higher seed yield during four years of study, ranging between 38.14 to 51.04 per cent more over local check. Recommended packages and practices of rapseed-mustard gave higher value of yield attributes, net return and B C ratio as compared to local check over the years of study. The study was also revealed that extension and technology gap ranging between 4.50 to 5.0 and 2.50 to 5.50 q/ha, respectively during the period of study.

INTRODUCTION

India has made an impressive progress in achieving self sufficiency in cereal production and reached a growth level that is sufficient to feed the population. After the constitution of technological mission on oil seeds in 1986, the oil seed scenario in the country has completely changed. Oil seeds form the second largest agricultural commodity after cereal in India, producing 28.1 mt from 27.7 m ha with the average productivity of 1016 kg ha-1 and 7.3 mt production from 6.3 m ha area for rapeseed and mustard with the average productivity of 1155 kg ha-1 accounting 22.7 per cent in area and 25.9 per cent in production in oilseed scenario (Economic Survey, 2009). At present Rajasthan produces oil seeds 4.22 mt from 4.01 m ha area with the productivity of 1053 kg ha-1, whereas 2.35 mt rapeseed and mustard produced from 2.46 m ha area with the average productivity of 957 kg ha-1 (Govt. of Rajasthan. 2009). Thus there is an urgent need to bring out substantial increase in mustard production in state of Rajasthan as a general and in the zone IV-B particularly through evolving location specific economical viable production technology.

Crop production in the rainfed area is often very difficult and risky, because of the environmental stresses. Among the stresses, moisture stress is one of the most limiting factors for obtaining optimum yield. Moisture stress during crop growth affects adversely most of the vital processes of the plant life and plant tissues, when they are in a state of rapid growth and development are most sensitive to water stress. Our past experience has shown that under agro climatic conditions in Udaipur region of South Rajasthan, while crop growth and development of oil seed like rapeseed and more particularly mustard (Brassica Juncea L.) in vegetative phase goes normal with the available soil moisture reserves, occurrence of moisture shortage at flowering and grain filling stages results in serious reduction in Crop yield.

The concept of front line demonstration was introduced with the purpose of improving adoption behaviour of the farmers related to improved rapseed-mustard production technologies and to harvest the maximum yield potential of rapseed-mustard in real farm conditions. Free supply of critical input, guidance by the experts to avoid partial and non adoption of recommended technologies, monitoring crop performance at critical stages to

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obtain quality and disease free seed are important parameters. Farmers were inspired to exchange seed within and neighbouring villages and share their experience with fellow farmers. Extending cultivation of improved varieties, get feedback from farmers, constraints in adoption of recommended improved technologies for further research and to maximize the technology dissemination process among the farmers are some of the other important features of this programme (Nagarajan et al, 2001).

RESEARCH METHODOLOGY

The study was carried out by Krishi Vigyan Kendra, Dungarpur (Rajasthan) during rabi season from 2006-07 to 2009-10 (four consecutive years) in the farmers field of five adopted villages (Devpura, Chundawara, Harmatia, Nayagoan and Likibadi) of Dungarpur district. During these four years of study, an area of 25.0 ha was covered under front line demonstration with active participation of 112 farmers. Before conducting FLDs a list of farmer was prepared from group meeting in each village and specific trainings were imparted to the selected farmers regarding different aspect of cultivation. The differences between the demonstration package and existing farmers' practices are mentioned in Table 1. The region falls under Humid Southern Plain of Rajasthan (Agro climatic Zone IV b). The mean annual rainfall of the region is 760.2 mm, most of which is contributed by south-west monsoon from July to September. The soils under the study were sandy clay loam in texture with a pH ranging between 7.20 to 8.38, low in organic carbon (0.41 to 0.48 g /kg of soil), available nitrogen (236.45 to 246.75 kg/ha), medium in available phosphorus (16.59 to 18.67 kg P2O5/ha), high in available potassium (282.43 to 310.45 kg K2O /ha) and low in available sulphur (SO4-2 7.95 to 9.23 ppm). All the demonstrations were conducted under the supervision of a team of experts. In demonstration plots, use of quality seeds of improved variety (Bio 902 or Pusa Jai Kishan), line sowing, seed treatment and timely weed control as well as recommended dose of fertilizers were emphasized as per Zonal package (Zone IVb). The traditional practices were followed in case of local checks. Throughout the season, crop was monitored weekly for proper growth and the irrigation, plant protection, fertilizer application and intercultural operation were performed as and when needed. Field days were also organized at the demonstration site and the farmers from within as well as neighbouring villages were invited to interact with the FLDs farmers. The officials from line departments were also invited so that there is collaboration amongst researchers, extensionists and the farmers. The data on output were collected from FLDs plots as well as control plots and finally the yield attributes, yield, technology gap, extension gap, cost of cultivation, net returns with the benefit cost ratio were worked out.

Table 1. Comparision between demonstration package and existing farmers' practices under rap seeds-mustard

S. No.	Particulars	Rapseeds-Mustard	
		Demonstration Package	Farmers practices
1	Farming situation	Rain fed	Rain fed
2	Time of sowing	20-25 October	15-20 November
3	Method of sowing	Line sowing with proper crop geometry	Broadcasting
4	Seed rate	5 kg/ha	7-8 kg/ha
5	Fertilizers dose	40:20:20 (NPK kg/ha)	20:20:0 (NPK kg/ha)
6	Bio fertilizer inoculation	Seed treatment with *Azotobacter* and PSB	Nil
7	Seed treatment with Fungicide	Bavistin 3g/kg of seed	Nil
8	Plant protection measures	Need based application of Metasystox to protect the crop against mustard aphids	Nil
9	Weed Management	Fluchloralin at 1.0 kg a.i./ ha as pre plant incorporation followed by one hand weeding at 30 days after sowing (DAS)	One hand weeding at 30-35 DAS

Table 2. Productivity, technology gap, extension gap and economics of mustard (Variety Bio 902) under front line demonstration

Year	Area (ha)	No. of farmers	Seed yield (q/ha)			% increase over control	Technology gap (q/ha)	Extension gap (q/ha)	Cost of cultivation (Rs/ha)		Net returns (Rs/ha)		B C ratio	
			Potential	Demo.	Control				Demo.	Control	Demo.	Control	Demo.	Control
2006-07	5.0	23	20.0	15.40	10.50	46.67	4.60	4.90	12365	11925	17665	8550	2.42	1.71
2007-08	5.0	25	20.0	17.50	12.50	40.00	2.50	5.00	13027	12911	21098	9589	2.61	1.75
2008-09	5.0	24	20.0	16.30	11.80	38.14	3.70	4.50	13120	12885	18665	10125	2.42	1.78
2009-10	10.0	47	20.0	14.50	9.60	51.04	5.50	4.90	13687	13088	17488	6862	2.28	1.52
	Mean		**20.0**	**15.93**	**11.10**	**43.96**	**4.08**	**4.83**	**13049**	**12702**	**18729**	**8782**	**2.43**	**1.69**

RESULTS AND DISCUSSION

Perusal of data (Table 2) indicated that the yield of rapseed-mustard highest during 2007-08 over the year in demonstration plots followed by 2008-09, 2006-07 and 2009-10. The increase in per cent of yield was ranging between 38.14 to 51.04 during the four years of study. The results clearly speak of the positive effects of FLD over the existing practices towards enhancing the yield of rapseed-mustard in tribal dominated area of the Dundarpur district with its positive effect on yield attributes viz., No. of siliqua per plant, No. of seeds per siliqua and 1000 seed weight (Table 3). Cost of cultivation increased successively over the years of study in demonstration plots ranging from 12365 to 13687 Rs/ha whereas highest net return received in the year of 2007-08 and lowest during 2009-10. Benefit cost ratio was recorded to be higher under demonstration against control during all the years of study ranging from 2.28 to 2.61 (Table 2).

The extension gap was ranging between 4.50 to 5.0 q/ha during the period of study emphasizes the need to educate the farmers through various means for the adoption of improved agricultural production to reverse the trend of wide extension gap.

The trend of technology gap (ranging between 2.50 to 5.50 q/ha) reflected the farmers cooperation in carrying out such demonstration with encouraging results in subsequent years. The technology gap observed may be attributed to the dissimilarity in soil fertility status and weather condition.

Table 3. Yield attributes under demonstration package and existing farmer's practices

S. No.	Yield parameters	Demonstration Package	Existing farmers practices
1	No. of siliqua/plant	75-80	55-65
2	No. of seeds/siliqua	25-28	23-26
3	1000 seed weight (g)	3.30-3.50	2.60-3.10

CONCLUSION

From the above findings it can be concluded that use of scientific method of rapseed-mustard cultivation can reduce the technology gap to a considerable extent thus leading to increased productivity of rapseed mustard in the tribal dominated area of the Rajasthan. Moreover, extension agencies in the district need to provide proper technical support to the farmers through different educational and extension methods to reduce the extension gap for better rapseed-mustard production in the district.

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