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Estimation of Yield Gap in Rapeseed-Mustard through Cluster Front Line Demonstrations

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ABSTRACT

The present study was carried out at KVK in Mau district of Uttar Pradesh to know the yield gaps between improved package of practices (IP) under Cluster Font Line Demonstrations (CFLD) and farmers practices (FP) of rapeseed mustard. It was revealed from the study that the yield of rapeseed mustard in IP under irrigated condition ranged from 20.89 to 21.55 q/ha, where as in FP it ranges between 16.94 to 17.25 q/ha. The percent increase in yield IP over FP was recorded in the range of 24.05 to 26.37. The extension gap and technological index were range between 4.70 - 5.36 q/ha and 20.42 percent respectively. The trend of technological gap reflected to farmer cooperation in carrying out the demonstrations in subsequent years. The cost benefit ratio was 3.57 and 3.42 under demonstration, while it was 3.24 to 3.47 under control plots. By conducting Cluster Front Line Demonstrations (CFLD) of proven technologies, yield potential of rapeseed mustard crop enhanced to a great extent with increase in the income level of farming community.

Key Words: Extension gap, Gap, Mustard, Rapeseed, Technological index.

INTRODUCTION

In India, the mustard - rapeseed is the most important oil seed crop after groundnut accounting around 25 per cent of total oilseed production. It is one of the important oilseed crop grown in Indo-Gangetic plains. Indian mustard (Rai) cultivation has occupied about 85-90 per cent of total area under cultivation of mustard - rapeseed. India's Agricultural Production: Nine Oilseeds: Rapeseed & Mustard: Uttar Pradesh data reported at 0.100 Mt in March 2017 with an increase from the previous number of 0.090 Mt for March 2016. India's Agricultural Production: Nine Oilseeds: Rapeseed & Mustard: Bihar data is updated yearly, averaging 0.090 Mt from Mar 2002 to 2017, with 16 observations. The data reached an all-time high of 0.110 Mt in 2014 and a recorded low of 0.060 Mt in 2003. Besides, the utilities of oil obtained from mustard rapeseed, the seeds, sprouts, leaves, tender plants are also useful to human health, when they are consumed as spices and vegetables. They contain selenium, calcium, magnesium, iron, phosphorus, zinc, magnesium, manganese, *etc.* Several biotic-abiotic and socio- economic constraints inhibits exploitation of the yield potential and these need to be addressed. Mau district has the sizeable area under mustard cultivation but the productivity level is very low. The reasons for low productivity is lack of newly released crop production technologies and their management practices in the farmers fields.

Keeping the above points in view, the CFLD on rapeseed-mustard using production improved technologies was conducted with the objective of showing the productive potential of the new production technologies under actual farm situation.

MATERIALS AND METHODS

The present study was carried out the Krishi Vigyan Kendra, Pilkhi, Mau, Uttar Pradesh during *Rabi* season from 2017- 2018 to 2021-22 (Five

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Table.1 Comparison between demonstration package and existing farmers practices under Rapeseed - Mustard practices

Particular	Rapeseed-Mustard Demonstration package	Farmers practices
Farming situation	Irrigated medium land Irrigated	Irrigated medium land Irrigated
Variety	RH-0749	Local
Time of sowing	25th October to Last of November	05th November to 10th December
Method of sowing	Line sowing	Broad casting
Seed rate	5 Kg/ha	6-7 Kg/ha
Fertilizers doses	(60 kg N, 40 kg P_2O_5,: 40 kg K_2O, 30 kg Sulphur and 20 kg Boron	80 kg N, 60kg P_2O_5
Plant Protection	Need based used of mancozeb 20% WP for fungal disease and Dimethoate to protect the crop against aphid	Nil
Weed management	Pendamathilian @0.3 kg a.i/ha pre emergence followed by one hand weeding at 25 DAS	Two hand weeding at 22 and 35 DAS

consecutive years) in the farmers field in twelve adopted villages *viz.* Chauri, Ardauna, Basti baharwar, Gonaipur, Ekbalpur, Parasupur dighera, Ladanpur, Shadipur, Thalaipur, Mustafabad, Amari and Nasirabad of Mau district of Uttar Pradesh.

Before conducting CFLD a list of farmers was prepared from group meeting and specific skill training was imparted to the selected farmers regarding different aspect of cultivation *etc.,* were followed as suggested by Chaudhary (1999) and Venkatta Kumar *et al (*2010). In case of local check plots, existing practices used by farmers were followed. In general, soil in study area was medium saline soils having pH 7.5 to 8.0 with medium fertility status. In demonstration plots quality seed of improved variety, timely weeding, need based application of pesticides, use of balance fertilizers (using micro nutrient sulphur) and use of suitable fungicides is Bavistin 35%WP for seed treatment were used as suggested by Chattopadhyay *et al* (2003) was used as technical interventions. For the control of aphid (*Lipaphids crrysimi*) Diamethoate 30 EC was used in demonstrated plots as per package of practices for the Zone III, Uttar Pradesh.

Visits of farmers, the district agriculture line department and extension functionaries were organized at demonstration plots to disseminate the message at large scale. The demonstrated farmers were facilitated by KVK scientists in performing field operation like sowing, spraying, weeding, organize field day, harvesting *etc*. during the course of training and visits. The data outputs were collected from both FLD plots as well as control plots (farmers' practices) and finally the extension gap, technology gap, technology index along with the benefit cast ratio(B:C:R) worked out (Sanui *et al,* 2000).

RESULTS AND DISCUSSION

The result of CFLD conducted during 2017-18 to 2021-22 in 50 ha area at the farmers' field in twelve village of Mau district indicated that the cultivation practices under-CFLD *viz*- use of improved variety (RH-0749), line sowing, balance used of fertilizers, sulphur, weedicide, and control of mustard aphid through insecticides at economic threshold level, produced on an average 25.10% more yield of mustard as compared to local practices

Table.2 Productivity, technology gaps, extension gaps, technology index and benefit cost ratio of Rapeseed –Mustard (RH-0749) grown under CFLDs and existing package of practices.

Year	Area (ha)	No. of Beneficiaries	Grain Yield q/ha			% increase over control	Technological gap (q/ha)	Extension gap (q/ha)	Technology Index %	B:C Ration	
			Potential Yield	CFLD RH-(0749)	Control (Varuna)					CFLD	Control
2017-18	10	25	26.25	21.09	16.94	24.50	5.16	4.15	19.66	3.50	3.42
2018-19	10	25	26.25	20.89	16.84	24.05	5.36	4.05	20.42	3.42	3.38
2019-20	10	25	26.25	21.42	16.95	26.37	4.83	4.47	18.40	3.56	3.47
2020-21	10	25	26.25	21.55	17.25	24.93	4.70	4.30	17.90	3.54	3.39
2021-22	10	25	26.25	20.95	16.67	25.67	5.30	4.28	20.19	3.57	3.24
Average				**21.18**	**16.93**	**25.10**	**5.07**	**4.25**	**19.31**	**3.52**	**3.38**

(16.93 q/ha). The data (Table 2) revealed that the yield of rapeseed- mustard fluctuated successively over the field of demonstrated plots. The maximum yield recorded was 21.55 q/ha over local practices (16.67q/ha). The increase in percentage of yield was ranged from 26.37% to 24.05% during five year study. The similar result of yield enhancement in rapeseed crop in front line demonstrations has been documented by Mitra and Samajdar (2010), in Tarai zone of West Bengal. The results were also in conformity with the findings of Tiwari *et al* (2003) Tomer *et al* (2003), Singh *et al* (2007) and Katare *et al* (2011).

The result clearly indicated the positive effect of CFLDs over the existing practices toward in enhancing the yield of rapeseed- mustard in Mau area, with its positive effect on yield attribute (Table 3). Benefit Cost ratio was recorded higher under demonstration against control of all the year of study. These results were also supported by Singh *et al* (2008), who found that the improvement technologies of mustard crop have significant effect in higher productivity of mustard.

The findings revealed that a gap exists between the actual farmer's yield and realizable yield potential of the variety. Use of improved variety carry potential to enhance the present level of mustard productivity which is not percolating down at desired pace due to lack of confidence among the farmers. Hence, to exploit the potential of improved production and protection technologies efforts through CFLDs ought to be increased to create awareness among the farmers.

Extension gap

The extension gap showed an increasing trend. The extension gap ranging between 4.05-4.47 q/ha during the study period emphasized the need to educate the farmers through various means for adoption of improved agricultural technologies to reverse the trend. The trend of technology gap (ranging from 4.70 to 5.36 q/ha) reflects the farmer's cooperation in carrying out such demonstrations with encouraging results in subsequent years.

Technology gap

The technology gap observed might be attributing to the dissimilarity in soil fertility status and weather conditions. Mukharjee (2003) also opined that depending on identification and use of farming situation, specific interventions may have greater implications in enhancing system productivity. Similar findings were also recorded by Mitra *et al* (2010). The technology index, showed the feasibility of the evolved technology at the farmer's field.

The lower the value of technology index, the more is the feasibility of technology. The wider gap in technology index (ranging between 17.90 - 20.42%) during the study period in certain region, may be attributed to the difference in soil fertility status, weather condition, non-availability of irrigations water and insect- pests attack in the crop. The benefit cost ratio of front line demonstrations have been presented in Table 2 clearly showed higher BC ratio of recommended practices was than control plots *i.e.* farmer's practices in all the years of study. The benefit cost ratio of demonstrated and control plots were 3.50 and 3.42, 3.42 and 3.38, 3.56 and 3.47, 3.54 and 3.39, 3.57 and 3.24 during the periods of study 2017-18, 2018- 19, 2019-20, 2020-21 and 2021-22 respectively.

Hence, favorable benefit cost ratios proved the economic viability of the interventions and convinced the farmers on the utility of interventions. Similar findings were reported by Sharma (2003) in moth bean and Gurumukhi and Mishra (2003) in sorghum.

The result of CFLD convincingly brought out that the yield of rapeseed –mustard could be increased by 24.05 to 26.37 per cent with the intervention of balanced nutrient coupled with the improved seed and disease management in the Mau district of Uttar Pradesh. From the above finding, it can also be concluded that use of scientific methods of mustard cultivation can reduced the technology gap to a considerable extent thus leading to increased productivity of the district. Moreover, extension agencies in the district need to provide proper technology support to the farmers through different educational and extension methods to reduce the extension gap for higher oilseed production in the district.

CONCLUSION

It is concluded from the above study that use of scientific methods of mustard cultivation can reduce the technology gap to a considerable extent thus leading to increased productivity of rapeseed-mustard in the district. Moreover, Krishi Vigyan Kendra 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 oilseed production in the district.

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Table 3 Yield attributing parameters under FLD v/s FP

Yield Parameters	Demonstration package	Existing farmers' practices
No. of siliqua/plant	130.85-230.50	71.2 – 90.00
No. seeds/siliqua	10.3-11.89	6.95-9.00
Test weight (g)	4.5-4.9	3.70-4.10

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