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Impact of Frontline Demonstration on Indian Mustard through Improved Technology

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ABSTRACT

Indian mustard (*Brassica juncea* L.) is a major oilseed crop of Uttar Pradesh. It is also one of the important oilseed crops of Eastern Uttar Pradesh. However, its productivity is very low in the district of eastern Uttar Pradesh compared to other districts of Uttar Pradesh. The Directorate of Extension SHIATS, Allahabad has carried out 21 frontline demonstrations on Indian mustard covering an area of 7 ha. of farmers field in 7 districts (Allahabad, Kaushambi, Fatehpur, Pratapgarh, Mirzapur, Sonebhadra & Bhadohi*)* in 2015 & 2016 to exhibit latest production technologies and compared it with farmer's practice. An attempt has also been made to know the productivity of frontline demonstrations and the adoption of latest production technologies by the 21 FLD farmers and 21 non-FLD farmers. FLD farmers and non FLD farmers were randomly selected from FLD villages. The results were compared between FLD plots and control plots. The results revealed that improved technologies of mustard enhanced yield from 14.32q/ha to 18.62 q/ha in frontline demonstrations. The percentage of increase in yield ranges from 17.77 to 31.14. The extension gap and technology gap were recorded ranging between 2.68-3.77 q/ha and 1.38-5.68 q/ha, respectively. The technology index ranged from 6.90 % to 22.40 %. The results indicated that the FLD was effective in changing attitude, knowledge and adoption of improved technologies of mustard and ultimately in obtaining sustain income.

Keywords: Extension gap, FLD, indian mustard, technology gap, technology index

INTRODUCTION

Edible oilseed crops have significant contribution in Indian Agriculture. The average contribution of rapeseed-mustard to the total oilseed production in India was 24.2% during 2012-13, its average productivity was 1167 kg/ha as compared to 1135 kg/ha of total oilseeds. Though, rapeseed-mustard ranks second in terms of production after soybean, however due to more oil contain (ranging from 35-45%), rapeseed-mustard rank first in terms of oil yield among all oilseed crops. The rapeseed-mustard production trends represent fluctuating scenario with on all time production of 8.3 million tons from 6.90 million hectares during 2010-11. The yield levels also have been variable ranging from 1001 kg./ha (2007-08) to 1250/ha (2013-14) during the last five years. Highest productivity 1262 kg/ha was achieved during 2012-13 (anonymous, 2015). Indian mustard (*Brassica juncea* L.) is the major oilseed crop grown in Uttar Pradesh during *Rabi* season. In Uttar Pradesh, The productivity of rapeseed-mustard was 1136 kg/ha during 2011-12, 639 lakh hectare area under cultivation and total production was 726 lakh tons (2011-12). The yield levels also have been variable ranging from 895 kg/ha (2002-03) to 1136 kg/ha (2011-12) during the past ten years. Though rapeseed-mustard group of crops occupy prominent position in the state oilseeds scenario but vast yield gap exists

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between potential yield and yield under real farming situation.

The available Agricultural Technology does not serve the very purpose until its reach and adopted by its ultimate users the farmers. Technology transfer refers to the spread of new ideas from originating sources to ultimate users (Prasad *et al, 1987).* Conducting of frontline demonstrations on farmer's field help to identify the constraints and potential of the rapeseed-mustard in specific area as well as it helps in improving the economic and social status of the farmers. The aim of the frontline demonstration is to convey the technical message to farmers that if they use recommended package and practices then the yield of this crop can be easily doubled than their present level. 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 need to be addressed. Eastern part of Uttar Pradesh has the sizeable area under mustard cultivation but the productivity level is very low. The reasons for low productivity are poor knowledge about newly released crop production and protection technologies and their management practices in the farmer's field. Keeping the above point in view, the FLDs on rapeseed-mustard using improved production technologies was conducted with the objective of sowing the productive potentials of the new production technologies under actual farm situation.

METHODOLOGY

The present study was carried out by the Directorate of Extension, SHIATS, Allahabad during *Rabi* season 2015-2016 at farmer's field of 7 adopted villages of 7 different districts *viz.* Allahabad, Kaushambi, Fatehpur, Pratapgarh, Mirzapur, Sonebhadra & Bhadohi. An area of 7 ha was Covered with plot size 0.33 ha under front line demonstration with active participation of 21 farmers in 7 different districts were conducted. Before conducting FLDs a list of farmers was prepared from group meeting and specific skill training was imparted to the selected farmers regarding different aspects of cultivation etc. were followed as suggested by Choudhary (1999) and Venkattakumar *et al*, (2010). Material for the present study with respect to FLDs and farmer's practices has been given in table-1. In case of local check plots, existing practices being used by farmers were followed. In general, soils of the area under study are sandy loam and medium in fertility status.

In demonstration plot, use of quality seeds of improved variety, line sowing, recommended dose of fertilizers, bio-fertilizer inoculation, and use of soil amendments like gypsum, timely irrigation and plant protection management were demonstrated on the farmer's field through frontline demonstration of different locations. Visit of farmers and extension functionaries was organized at demonstration plots to disseminate the message at large scale. The demonstration farmers were facilitated by Directorate of Extension scientists in performing field operations like sowing, spraying, weeding, irrigation, fertilizers application, harvesting etc. during the course of training and visit. The necessary step for selection of site and farmers, layout of demonstration etc. were followed as suggested by Choudhary (1999). The traditional practices were maintained in case of local checks. The data were collected from both FLD plots as well as control plots (farmers' practices) and finally the extension gap, Technology gap and technology index were worked out *(*Samui *et al.* 2000) as given below:

Technology gap = Potential yield –Demonstration yield

Extension gap = Demonstration yield – Farmers yield

$$\text{Technology index} = \frac{\text{Potential yield} - \text{Demonstration yield}}{\text{Potential yield}} \times 100$$

RESULTS AND DISCUSSION

Results of 21 frontline demonstrations conducted during 2015-16 in 7 ha area of farmers field in 7

Table 1: Comparison between Adoptions of Demonstration Package & Farmers Practice under Rapeseed –Mustard FLD_s

Particular	Demonstration Package	Farmers Practice
Improved Variety	Varuna	Local seed
Optimum seed rate	5kg/ha	6-8kg/ha
Sowing Method	Line sowing (40cm.x10cm.)	Broadcasting
Seed Treatment	Carbendazim 50WP @2.5gm/Kg seed	Not used
Time of Sowing	1st fortnight of October	Last week of October to mid -November
Use of Bio-fertilizers	Seed inoculation with Azotobactor and PSB	Not used
Use of Gypsum	Used of Gypsum@200kg/ha	Not Used
Basal Application of Fertilizers	50kgN+60kgP2O5+40kgK2O per ha	Used 200kg/ha DAP
Top Dressing of Urea	50kg/ha N at after first irrigation(35-40DAS)	100-150kg/ha N used
Weed Management	Pendimethalin 30 EC @ 3.3 lit./ha as pre-emergence followed by one hand weeding after 1st irrigation (35DAS)	Not used
Control of Alternaria Blight	Spray Dithane M-45@ 2kg/ha	No fungicide used
Control of Mustard Aphid	Spray Dimethoate 30 EC @ 1.0 lit./ha	No Insecticide used

villages of 7 different district *viz.* Allahabad, Kaushambi, Fatehpur, Pratapgarh, Mirzapur, Sonebhadra & Bhadohi districts (Table-2) included the cultivation practice under FLD *viz.* use of improved variety (*Varuna*), timely sowing, bio-fertilizer inoculation with *Azotobactor and phosphate solubilizing bacteria (PSB)*, balanced application of fertilizer (100 kg. N: 60 kg. P_2O_5 : 40 kg. K_2O per ha) through urea, single super phosphate and Murate of potash, use 200 kg/ha gypsum for soil reclamation, control of alternaria blight of mustard by Dithane M-45 @ 2.0 kg./ha, control of mustard aphid through Dimethoate 30 EC@ 1.0 lit/ha at economic threshold levels. The yield of Indian mustard ranged between 14.32q/ha to 18.62q/ha over the observation period, which was 17.77% to 31.14% higher over farmer's practice (local check). On an average 24.20% increase in yield has been observed as compared to local practices 13.38%. The variation in yield from site to site accounted for varying climatic conditions and variation in Agricultural practices followed. The similar results of yield enhancement in rapeseed-mustard crop in frontline demonstration have been documented by Mitra and Samajdar (2010) in Tarai zone of West Bengal. The similar reasons were provided by Tomer *et al.* (2003*) and* Singh *et al.* (2007). The results indicate that the front line demonstrations have given a good impact on the farming community of these districts as they were motivated by the improved Agricultural technologies used in the frontline demonstrations. The results clearly indicated the positive effects of FLDs over the existing practices toward in enhancing the yield of rapeseed-mustard in adopted districts, with its positive effect on yield attribute (Table-3). These results were also supported by Singh *et al.* (2008) who found that the improved technologies of mustard crop have significant effect in higher productivity of mustard. The finding revealed that a gap exists between the actual farmer's yield and realizable yield potential of the variety. Use of improved variety carries 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 FLDs ought to be increased awareness among the farmers.

The extension gap showed an increasing trend. The extension gap ranging between 2.68q/ha to 3.77q/ha during the period of study emphasizes the need to educate the farmers through various means for adoption of improved agricultural production technologies to reverse the trend. The average extension gap was observed 3.18q/ha. The technology gap observed might by attributing to the dissimilarity in soil fertility status and weather conditions. The

Table 2: Extension Gap, Technology Gap and Technology Index of FLD on Indian Mustard

Districts	FLD Variety	Local Check Variety	Area (ha.)	No. of FLDs		Yield (q/ha)		% Increase in Yield	Extension Gap (q/ha)	Technology Gap (q/ha)	Technology Index (%)
Allahabad	Varuna	Vardan	1	3	20	18.50	14.73	25.59	3.77	1.50	7.50
Kaushambi	Varuna	Vardan	1	3	20	16.25	13.45	20.82	2.80	3.75	18.75
Fatehpur	Varuna	Kanti	1	3	20	18.62	15.81	17.77	2.81	1.38	6.90
Pratapgarh	Varuna	Vardan	1	3	20	15.52	12.37	25.46	3.15	4.48	22.40
Mirzapur	Varuna	Pusa Bold	1	3	20	15.85	12.22	29.71	3.62	4.15	20.75
Sonebhadra	Varuna	Vardan	1	3	20	14.32	10.92	31.14	3.40	5.68	17.00
Bhadohi	Varuna	Pusa Bold	1	3	20	16.83	14.15	18.94	2.68	3.17	15.85
		Average				**16.56**	**13.38**	**24.20**	**3.18**	**3.44**	**15.59**

technology gap ranged between 1.38 q/ha to 5.68q/ha during the study period. The average technology gap was observed 3.44 q/ha. Similar findings were also recorded by Mitra *et al.* (2010) and Katare *et al.* (2011). The technology index showed the feasibility of the evolved technology at the farmer's field. The lower is the value of technology index, the more is the feasibility of technology demonstrated *(*Sagar and Chandra, 2004*)*. The wider gap in technology index ranging between 7.50% to 22.40% during the study period in certain region, may be attributed to the difference in soil fertility status, weather condition, non- availability of irrigation water and insect-pests attack in the crop.

Table 3: Yield Parameters under Demonstrations Package and Existing Farmers Practice

Yield Parameters	Demonstration Package	Existing Farmers Practice
No. of Siliqua/plant	110-125	75-90
No. of Seed/siliqua	12-18	8-12
Test weight (gm.)	4.63-5.15	3.26-3.42

CONCLUSION

The productivity enhancement under FLDs over traditional method of Indian mustard cultivation created greater awareness and motivated the other farmers to adopt appropriate production technology of Indian mustard in these adopted 7 districts. The selection of specific technology like improved and recommended variety, seed inoculation with bio-fertilizers, use of soil amendments, plant protection measures were undertaken in a proper way. These technologies were found to be the main reason for increase in yield and thus, it would be said the FLDs were the most successful tools for transfer of technology for productivity enhancement of Indian mustard.

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