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Assessment of front line demonstrations on rapeseed and mustard cv. Rajendra Sufalam in Saran district, Bihar

Surendra Prasad, RK Jha and Vijay Kumar

Abstract
The front line demonstration (FLD) programme on rapeseed and mustard was carried out during 2017-18 and 2018-19 in operational area of Krishi Vigyan Kendra, Manjhi, Saran, Bihar. The plots were selected from different villages (each of 0.3- 0.4 ha) from the district. The variety 'Rajendra Sufalam' was used in both the demonstrated plots and farmer's field. Fertilizer, herbicides, irrigation application and plant protection measures were taken as per improved package of practices. During the FLD programme, it was found that the seed average yield of rapeseed and mustard was 15.55 q/ha in demonstration field as compared to seed obtained from farmers field (9.88 q/ha). The technology gap was found to be 2.46 q/ha. Average of 5.67 q/ha extension gap and technology index were 13.64%. Two years average benefit-cost ratio of 3.83:1 was found in demonstrated field as compared to farmer's practices of 2.74:1. The significant yield is attributed due to introduction of new variety in FLD mode which facilitated better crop management.

Keywords: Rapeseed and mustard, FLD, yield, B:C ratio

Introduction
In India, the mustard - rapeseed is the most important oil seed crop after groundnut accounting around 25 percent of total oilseed production. It is one of the important oilseed crops of the Indo-gangetic plains. Indian mustard (Rai) cultivation has occupied about 85-90 percent of total area under cultivation of rapeseed and mustard. Besides, the utilities of oil obtained from rapeseed and mustard, 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 needs to be addressed. Saran (Chapra) District has the sizeable area under mustard cultivation but the productivity level is very low. The seasons for low productivity about newly released crop production technologies and their management practices in the farmer fields. Keeping the above point in view, the FLDs on rapeseed and 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, Manjhi, Saran, Bihar during *rabi* season from 2017-18 and 2018-19 in the farmer's field in ten village *viz*. Dumari, Atarsan, Nandpur, Majhawaliya, Sitab Diyara, Affour, Sitalpur, Bareja, Madansath and Samahauta Saran district of Bihar. The study period, an area of covered 0.3-0.4 ha under Front Line Demonstration with control plot (farmer's practices). Before conducting FLDs a list of farmers was prepared from group meeting and specific skill training was impaired to the selected farmers regarding different aspect of cultivation etc., were followed as suggested by Chaudhary 1999 [2] and Venkattakumar *et al.* 2010 [12]. Materials for present study with respect to FLDs and farmer's practices have been given in Table 1. In case of local check plots, existing practices being used by farmers were followed. In general soils of area under study are sandy loam and medium fertility status. In demonstration plots use quality seed of improved variety, timely weeding, need based application of pesticides used of balance fertilizers (using micro nutrient sulphur) and use of suitable fungicides is Carbendazin 35%WP for seed treatment as suggest by Chattopadhyay *et al.*, (2003) [1] was used as technical interventions.

For the controlling of aphid (*Lipaphis errysimi)* Imidacloprid 17.8% SL was used in demonstrated plots given in package and practices in Saran District, Bihar region were emphasized and comparison has been made with the existing practices. Visits of farmers, the district agriculture line department and extension functionaries was organized at demonstration plots to disseminate the massage at large scale. The demonstrated farmers were facilities by KVK scientists in performing field operation like sowing, spraying, weeding, harvesting etc. during the course of training and visits.

The necessary steps for selection of site and farmers layout of demonstrations etc., were followed as suggested by Chaudhary (1999) [2]. Traditional practices were mentioned in case of local checks. 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) [6] as given below:

Technology gap = Potential yield − Demonstration yield
Extension gap = Demonstration yield − Farmers yield
Technology index (%) = (Technology gap × 100)/Potential yield

Result and Discussion

The results of 60 front line demonstration (FLDs) conducted during 2017-18 and 2018-19 in 22 ha area at ten adopted village in Saran District of Bihar state. The results finding obtained from the present study have been distributed in Yield and Economics of rapeseed and mustard cultivation as per Table 2 and Table 3. In Table 1 is conducted that demonstration yield of Rajendra Sufalam variety performance better than traditional farmer practices. The Rajendra Sufalam recorded maximum and minimum yield in the *Rabi* year 2017-18 and 2018-19 with 14.94 q/ha and 16.15 q/ha, respectively. The average yield of two years was recorded 15.55 q/ha as compared to local variety 9.88 q/ha. The percent increase in yield was ranging from 54.25 to 60.99 during the study. The similar results of yield enhancement in rapeseed crop in front line demonstrations have been documented by Mitra and Samajdar (2010) [4], in tarai zone of west Bengal. The results are also in conformity with the findings of Tiwari and Saxena (2001) [9], Tiwari *et al.*, (2003) [10] Tomer *et al.*, (2003) [11], Singh *et al.*, (2007) [7] and Katare *et al.*, (2011) [3].

The results clearly indicate the positive effects of FLDs over existing farmer practices toward enhancing the yield of rapeseed and mustard. Results of Table 2 revealed that yield of the front line demonstration and potential yield of the crop was compared to estimate the yields which were further categorized into technology and extension gaps. The technology and Extension gaps were ranged between 1.85 – 3.06 q/ha and 5.66 – 5.68 q/ha with a mean of two years 2.46 q/ha and 5.67 q/ha during period of study. Technology and Extension gaps indicated the needs to educate farmers more and more through various extension means to increase awareness and adoption of improved variety especially rapeseed and mustard for narrow down the both gaps. The technology gap increased may be attributing to the dissimilarity soil fertility status and weather conditions (Mitra and Samajdar, 2010) [4]. The technology index shows the feasibility of the improved technology at the farmer's fields. The lower the value of technology index more is the feasibility of the technology. As such, fluctuation in technology index was from 10.28 to 17.00 percent during study period (Table 2). These findings corroborate with the finding of Mokidue *et al.*, (2011) [5].

The Year wise economics of rapeseed and mustard cultivation with adoption of improved technology and farmers practices has been presented in Table 3. The adoption of improved technology under FLDs recorded higher average gross returns (63795 Rs/ha), net returns (47168 Rs/ha) and B: C ratio (3.83:1) compared to farmers practice i.e. 40547 Rs/ha, 25737 Rs./ha, 2.74:1, respectively. This fluctuating income trend was obtained due to variable price of rapeseed and mustard improper marketing system. These results are in conformity with the findings of Katare *et al.* (2011) [3] and Singh *et al.*, (2008) [7].

Table 1: Comparison between frontline demonstrations and farm's practices under Rapeseed and Mustard

S. No.	Particulars	Existing farmer practices	Improved practices on demonstration
1	Variety	Use of local variety	Rajendra Sufalum
2	Time of Sowing	20 Oct. to 30 Nov.	15 Oct. to 15 Dec.
3	Method of sowing	Broadcasting method	Line sowing
4	Seed rate	7 kg/ha	5 kg/ha
5	Seed treatment	No seed treatment	Seed treatment by Fungicides
6	Fertilizer dose	120 kg N/ha, 80kg P_2O_5/ha	60 kg N, 40kg P_2O_5/ha, 40 kg K_2O, 25 kg sulphur/ha
7	Weed management	Hand weeding	Use of pre emergence weedicide pendimethalin @ 0.3 kg a.i./ha
8	Plant protection	No use any plant protection technique	Adoption of IPDM practices

Table 2: Yield of Rapeseed and Mustard by production technologies and high yielding varieties over local farmer's variety in 2017-18 and 2018-19

Years	No. of demonstration	Area (ha)	Yield (q/ha)			% increase over control	Technology gap (q/ha)	Extension gap q/ha)	Technology index (%)
			Potential	Demonstration	Local (farmer's plot)				
2017-18	28	10	18	14.94	9.28	60.99	3.06	5.66	17.00
2018-19	32	12	18	16.15	10.47	54.25	1.85	5.68	10.28
Mean	-	-	18.0	15.55	9.88	57.62	2.46	5.67	13.64

Table 3: Economic influence of Rapeseed and Mustard by production technologies over farmer's field in 2017-18 and 2018-19

Years	Gross Return		Cost of cultivation		Net return		B:C ratio	
	Demo	Local	Demo	Local	Demo	Local	Demo	Local
2017-18	59760	37120	16422	14753	43338	22367	3.64	2.52
2018-19	67830	43974	16833	14867	50997	29107	4.03	2.96
Mean	63795	40547	16628	14810	47168	25737	3.83	2.74

Sale rate of Rapeseed and Mustard grain during 2017-18: Rs. 4000/q and 2018-19: Rs 4200/q

The present study observed that cultivation of rapeseed and mustard with improved technologies has been found more productive and grain yield might be increase up to 57.62 percent with the intervention of balanced nutrient coupled with the improved seed and disease management in the Saran district of Bihar. 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 Saran district of Bihar.

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