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Impact of Cluster Front Line Demonstrations on Green Gram (MH-421) in Sirsa District of Haryana State

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ABSTRACT

Pulses are one of the important food crops globally due to higher protein content. In India, they are also responsible for yielding large financial gains by amounting for a large part of the exports. Cluster frontline demonstrations on moong bean crop covering 110 ha area under variety MH-421 were conducted by Krishi Vigyan Kendra at 110 locations in Sirsa district of Haryana state during four consecutive years *viz.* 2016 to 2019. The technological gaps were identified in existing crop production technology through farmers meetings and group discussions. The findings showed significant increase in the average yield of demonstrated plot (23.1%) over the farmer's plot of moong bean crop. Average yield of demonstration plots was recorded higher by 26.90 per cent, 20.50 per cent, 20.00 per cent and 25.00 per cent in years 2016, 2017, 2018 and 2019, respectively. The extension gap was 2.02 q/ha, 1.50 q/ha, 1.50 q/ha and 2.00 q/ha while technology gap was 2.48 q/ha, 3.20 q/ha, 3.00 q/ha and 2.00 q/ha in 2016, 2017, 2018 and 2019 respectively. During these four years yield increase in demonstrations plots expressed as additional income over check plots accounted for Rs. 11300/ha, Rs. 900/ha, Rs. 6200/ha and Rs.14400/ha during various years.

INTRODUCTION

Pulses are one of the important food crops globally due to higher protein content. In India, they are also responsible for yielding large financial gains by amounting for a large part of the exports. India is the largest producer as well as consumer of pulses (also referred to as grain legumes, peas & beans) in the world. India has lion share in area (42.6%) and production (28.34%) of pulses globally (Chury, 2019). The quantum increase from 14.76 m t (2007-08) to 25.43 m t (2017-18) in pulses production and productivity from 625 kg/ha (2007-08) to 864 kg/ha (2017-18) can certainly be termed as "Pulses Revolution' in India (Chaturvedi et al., 2018).

Over a period of time, a number of improved pulses varieties and production technologies have been developed, but full potential of these varieties as well as technologies could not be exploited due to low rate of adoption and low yields (Reddy, 2009). Green gram (*Vigna radiata)* also known as moong bean is short duration legume crop grown mostly as fallow crop and in spring season with vegetables. In India, area under green gram during 2020-21 was 33.91 lakh ha as against 29.03 lakh ha during the same period in 2019-20 (Greengram Outlook, 2021). India contributes more than 70 per cent of world's green gram production (Greengram Outlook, 2020).

Cluster Frontline Demonstrations scheme was initiated by Ministry of Agriculture and Farmers Welfares, GOI, New Delhi to implement on pulses during 2015-16 through National Food Security Mission. The aim of these practices in general is to raise production through transfer of farm technology. The efforts were taken with planning, execution and follow up action of the pulses production technology through front line demonstrations, to access the impact of demonstrations on green gram production, yield and ultimately fulfilling objective of providing nutritive diet and increase availability of green gram per capita.

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METHODOLOGY

Cluster Front Line Demonstrations on pulses had been organized every year since 2014-15 in different villages of the district. The villages were selected in different blocks on the basis of less sown area of moong bean. The main aim of these demonstrations was to showcase advanced technologies so that adoption gaps should be minimized. Before demonstrations, surveys in adopted villages were conducted and technology gaps, extension gap & technology index were identified by standard methods.

After identifying the gaps, in all 110 numbers of demonstrations were organized during various years *viz*. 2016, 2017, 2018 and 2019 at different locations of Sirsa district. During all the years, demonstrations were conducted after harvest of potato so that crop could be harvested before occurrence of rainfall. The recommended amount of fertilizer was applied and crops were sown in lines. Before sowing, 1 litre of pendimethalin per hectare was applied (pre-emergence) to control weeds. Clusters were monitored from time to time during entire cropping season. At the end of cropping season yield and economics was calculated. A control *viz.* farmer practice was run simultaneously to have an idea of impact of these techniques in increasing yield and improving income of farmers which was calculated in terms of economics.

RESULTS AND DISCUSSION

The economic analysis of demonstrations has been presented in Table 1. The expenditure incurred on cultivation practices *viz*. land preparation, seed cost, herbicide, fertilizers and miscellaneous costs was slightly higher in demonstration. The average gross return of Rs. 47600/ha, Rs. 43200/ha, Rs. 41400/ha and Rs. 48000/ha was calculated in the year 2016, 2017, 2018 and 2019 respectively. The average net return for respective years to the tune of Rs. 30800/ha, Rs. 28600/ha, Rs. 22200/ha and Rs. 28400/ha during the study period was recorded. Further, it was also found that additional return ranged from Rs. 6200/ha to Rs. 14400/ha. This may be attributed to the use of improved technologies in demonstration plots. Benefit-cost ratio (BCR) was at par in all the years. FLD participating farmers got approximately Rs. 9000/ha additional income as compared to farmers practice. Similar findings were stated by Singh et al., (2017) in moong bean, Kumar and Boparai (2020) whereas the B: C ratio ranged 1.92 to 2.44 during their study period. The variety (SML818) showed very high B:C ratios as 3.20 to 6.56 during investigation period of Kumar et al., (2019).

The results indicated in Table 2 shows that there was 100 per cent gap in seed treatment, bio-fertilizer and bio-fertilizer application performed by farmers. In adoption of improved variety and proper seed rate, the gap was 60 and 90 per cent respectively. While in case of weed management a key concern to be addressed only 60 per cent farmers' used recommended practice. So there was an urgent need to minimize the gap by creating awareness among the farmers which could ultimately lead to increase in yield and returns. The results were corroborated with the earlier findings of Biyan et al., (2012); Sangwan et al., (2021); Dhillion (2016); Lathwal (2010).

Analysis of gap

An extension gap of 2.02 q/ha, 1.50 q/ha, 1.50 q/ha, and 2.00 q/ha during 2016, 2017, 2018 and 2019 was found respectively (Table 3). The reason for existence of gap may be attributed to consideration of moong bean as subsidiary crop as compared to other main crop. Kumar et al., (2019) concluded that field extension functionaries of Poonch district, Jammu and Kashmir focused on dissemination of improved moong bean production technologies to enhance its productivity over existing level. Kumar and Boparai (2020) observed average extension gap of 1.80 q/ha and emphasized need to educate farmers for adoption of improved moong bean cultivation practices. The findings are also line with Singh et al., (2019); Kumar & Kispotta (2017).

The existed technology gap was 2.48 q/ha, 3.20 q/ha, 3.00 q/ha and 2.00 q/ha in years 2016, 2017, 2018 and 2019, respectively. This gap may be attributed to prevailing micro farming situation

Table 1. Economic analysis of CFLDs and farmers' practice of moong bean

Year	Average cost of cultivation (Rs./ha)		Average gross return (Rs./ha)		Average net return (Rs./ha)		Additional return	B:C Ratio	
	FLD	FP (Check)	FLD	FP (Check)	FLD	FP (Check)	(Rs/ha)	FLD	FP (Check)
2016	16800	16000	47600	37500	30800	19500	11300	2.83	2.34
2017	17600	16500	43200	35000	28600	20700	7900	2.45	2.12
2018	19200	18750	41400	33750	22200	16000	6200	2.10	1.80
2019	19600	19600	48000	33600	28400	14000	14400	2.45	1.71

Table 2. Technological gap in CFLDs and farmers' practice of moong bean

Technology	Recommended Practice	Farmers' practice	% Gap
Variety	MH-421	SML-668	60
Seed Rate	25-30 kg/ha	15-20 kg/ha	90
Seed Treatment	Thiram (4 g/ kg seed)	No seed treatment	100
Bio-fertilizer	Rhizoctonia (125 ml/ha seed); PSB (125 ml/ha seed)	No seed treatment	100
Fertilizers (kg/ha)			
N	20	No application	100
P	40	40kg/ha	90-95
K	20	No application	100
Weed Management	Pre-emergence application of pendimethalin @ 2.5 ltr/ha	60 per cent farmers use recommended practice	40

Table 3. Yield, extension and technology gap analysis of CFLDs and farmers practice of moong bean

Year	Yield (q/ha)			Increase over farmers practice (%)	Extension gap (q/ha)	Technological gap (q/ha)	Technology index (%)
	Potential	FLD	Farmers' practice				
2016	12	9.52	7.5	26.90	2.02	2.48	20.66
2017	12	8.80	7.3	20.50	1.50	3.20	26.66
2018	12	9.00	7.5	20.00	1.50	3.00	25.00
2019	12	10.00	8.0	25.00	2.00	2.00	16.66

i.e. variation in soil fertility, weather conditions at maturity of moong bean crop, crop management practices etc. Therefore, there is an urgent need to recommend location specific crop management practices to pass over the potential demonstration yield. The similar findings were observed by Biyan et al., (2012); Kalita et al., (2019); Dhillon (2016).

Technology index varied from 20.66, 26.66, 25.00 and 16.66 per cent during 2016, 2017, 2018 and 2019, respectively. It indicates that there exists a gap between the generated technology in moong bean cultivation at the research institution and its dissemination to the farmers. Kumar et al., (2019) reported as high as 55.00-70.85 per cent technology index in his study.

CONCLUSION

There was a gap in potential yield, demonstration yield and farmers' practice due to existing technological extension gap and CFLDs had positive effect towards increase in yield of moong bean. The dual advantage of this technology *i.e.* enhancing farmers' income and improving soil health may help in its rapid spread. A gap also existed between improved recommended cultivation practice of moong bean and their adoption by the farmers in the District. Therefore, Cluster Front Line Demonstration (CFLD) being an educational activity was effective in updating knowledge, skills and attitude of farmers and enhancing production and productivity of moong bean in the district. As the gaps still exists, the CFLDs should be continued in coming years so that gaps may be minimized as more and more area is covered under moong bean.

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