Indian Journal of Extension Education
Vol. 56, No. 1 (January-March), 2020, (82-85)

Evaluation of Front Line Demonstrations on Summer Moong (*Vigna radiata*) in Sangrur district of Punjab

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ABSTRACT

The study was conducted with an objective of enhancing farmers' income through crop intensification. A total of 175 front line demonstrations were conducted on summer moong (*Vigna radiata*) var. SML 668, during year 2017 and 2018 and SML 832 during year 2019 in two adopted villages of Sangrur district under Farmer FIRST Project. During the year 2017, a yield of 10.84 q/ha and 9.38 q/ha was obtained in FLD plots and local checks respectively. During 2018 and 2019, average yield of 10.25 q/ha and 10.30 q/ha was obtained in FLD plots as compared to 9.30 q/ha and 9.02 q/ha respectively in local check plots. Cost of cultivation of the summer moong at demonstrated field was Rs. 17918.57/ha whereas it was 16687.85/ha in case of farmers' fields during 2017 and net returns of the demonstrated field and local check were Rs. 38720.43/ha and Rs. 32322.64/ha respectively. The B:C ratio of the demonstrated and local check were 3.16 and 2.94 respectively. In 2018 BC ratio of 2.96 and 2.71 was obtained in FLDs and check plots and during 2019 BC ratio of 2.94 and 2.44 was obtained in FLDs and check plots respectively. Farmers were unaware about the appropriate time of application and adequate dose of the pesticides.

Keywords: BC ratio, Crop intensification, Extension gap, Summer moong, Technology gap

INTRODUCTION

Better irrigation facilities and assured marketing has led to monoculture of paddy and wheat in Punjab. It has led to ill effects of green revolution in terms of problems of ecological and nutritional nature. Although productivity of cereals has achieved its maximum limits but it has not achieved food security. The nutritional dimension is integral to the concept of food security (Anonymous, 2009). Although availability of wheat and paddy is in abundance at cheaper rates, but there is shortage of other food items like pulses, vegetables, oilseeds (Chand and Paul, 2003). Main reason behind this was the low returns from pulses and other crops as compared to paddy and wheat crop rotation. *Moong* is very important pulse crop which is an integral part of diet of the people. But this crop was also neglected due to poor returns. Reason behind the low returns may be attributed to marketing problems of the crop and low yield. But summer moong can be successfully added to paddy wheat rotation without competing the main paddy crop. It gives additional monetary benefits apart from improving soil fertility. So there was urgent need to promote this crop and its recommended package of practices for the diversification of agriculture and food security, particularly in Sangrur District. Farmer FIRST Project aiming at improving sustainability of agriculture and natural resource management has adopted inclusion of summer moong in paddy wheat cropping system as an important crop intensification practice. In order to have adoption and impact, the demonstrations on the summer moong were conducted in the Chatha Nanhera and Taranji Khera district of Sangrur.

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METHODOLOGY

The Front Line demonstrations on summer moong (*Vigna radiata*) were conducted in April 2017, 2018 and 2019. A total of 100 and 40 demonstrations on moong var SML 668 were conducted during 2017 and 2018 respectively and 35 demonstrations on summer moong var SML 832 were conducted during 2019 at 0.4 hectares each in two adopted villages Chatha Nanhera nad Taranji Khera. The necessary steps for selection of site, selection of farmers, layout of demonstrations etc. were followed as suggested by Choudhary (1999) and Venkatasubramanian *et al* (2009). Training on package of practices of summer moong was provided. Data were collected from the FLDs plots and from the local check for comparison purpose. The data regarding cost of cultivation, yield, net income and cost of benefit ratio were calculated. The extension gap, technology gap and technology index were calculated as per formulae given below (Katare *et al*., 2011, Samui *et al*., 2000):

Technology gap = Potential yield – Demonstration yield

Extension gap = Demonstration yield – Farmers yield

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

RESULTS AND DISCUSSION

A comparative analysis of the recommended package of practices and farmers practices has been furnished in Table 1. It was observed that SML 668 was demonstrated at farmers' field and local as farmers practice. Demonstrations were conducted by following the recommended seed rate i.e. 37.5 kg/ha whereas the farmers were cultivating with less amount of the seed. The demonstrations were laid between 20 March to 10 April to ensure the proper growth and development and avoid the pre-soon monsoon during the harvesting season. In local check, late sowing of the moong was done with broadcasting and drilling. It was noticed that at farmers' practices farmers realized no importance to the seed treatment and it was completely absent among the farmers' practice. It was also reported that farmers were applying excess dose of the fertilizers and agro chemicals whereas, this aspect was kept in mind to supply the need based fertilizers and agrochemicals at the recommended dose at the appropriate time of application.

Data furnished in Table 2 indicate that during the year 2017, variety of Summer Monng i.e. SML 668 was demonstrated at farmers' field that yielded 10.84 q/ha. However, the yield of local plots was reported to be 9.38 q/ha. Comparatively, an additional increase of 15.68 per cent was observed from the demonstrated field than local check plots. Similarly, during the year 2018 an average yield of 10.25 q/ha was obtained in FLD plots as compared to 9.30 q/ha in local check plots. It indicates that there was increase of 10.22 per cent in FLD plots. In year 2019, one recently released variety of summer moong SML 832 was selected for FLDs. As evident from table this variety also given almost similar yield and it was 10.30 q/ha as compared to 9.02 q/ha in local check.

It is quite clear from the table that technology gap was 0.41 q/ha, 1.00 q/ha and 1.20 q/ha respectively over

Table 1: Comparison between demonstration package of summer moong and existing farmers' practices

Particulars	Demonstration Plot	Farmers' Practices
Variety	Recommended variety of PAU (SML 668) and SML 832	Local
Seed Rate (kg/ha)	37.5 kg/ha for SML 668 and 30.0 kg/ha for SML 832	20 to 30 kg
Sowing Time	20 March to 10 April	End of April
Seed Treatment	Rhizobium (LLR-12) and Rhizobacterium (RB-12)	Absent
Line Spacing	Drilling at 22.50 cm row to row	Drill
Fertilizers application	27.5 kg urea and 125 kg SSP	Varied dose
Weed Management	Stomp 30 EC 1500 ml/ha	Manually hoeing
Plant protection	Need based and at appropriate dose and time	Blanket spray

Source: Anonymous (2015)

Table 2: Yield performance of FLDs on summer moong and local checks

Particulars	FLDs	Local check
Year 2017		
Variety	**SML 668**	**Unknown**
No. of farmers	100	100
Area/FLD (ha)	0.4	0.4
Total area (ha)	40	40
Yield (q/ha)	10.84	9.38
Increase in yield (%)	15.68	
Potential yield (q/ha)	11.25	
Technology gap (q/ha)	0.41	
Extension gap (q/ha)	1.46	
Technology index (%)	3.64	
Year 2018		
Variety	**SML 668**	**Unknown**
No. of farmers	40	40
Area/FLD (ha)	0.4	0.4
Total area (ha)	16	16
Yield (q/ha)	10.25	9.30
Increase in yield (%)	10.22	
Potential yield (q/ha)	11.25	
Technology gap (q/ha)	1.00	
Extension gap (q/ha)	0.95	
Technology index (%)	8.89	
Year 2019		
Variety	**SML 832**	**Unknown**
No. of farmers	35	35
Area/FLD (ha)	0.4	0.4
Total area (ha)	14	14
Yield (q/ha)	10.30	9.02
Increase in yield (%)	14.19	
Potential yield (q/ha)	11.50	
Technology gap (q/ha)	1.20	
Extension gap (q/ha)	1.28	
Technology index (%)	10.44	

the reported years. Reason behind increasing technology index may be attributed to the occurrence of early rains during fruiting period in the years 2018 and 2019. However, benefits of improved practices are clearly visible from the extension gap which varies from 0.95 q/ha to 1.46 q/ha over the years.

Economics analysis revealed that cost of cultivation of the summer moong at demonstrated field was found to be Rs. 17918/ha whereas it was 16887/ha in case of farmers' practice during 2017. Same year, gross returns from the demonstrated field and farmers' practice were reported to be Rs. 56639/ha and Rs. 45010/ha respectively. The net returns of the demonstrated field and local check were Rs. 38720/ha and Rs. 32322/ha respectively. The B:C ratio of the demonstrated and local check were 3.16 and 2.94 respectively. It can be noted that additional benefit of the Rs. 6398/ha was reported from the demonstrated field than local check. In this way similar results were noticed in year 2018, except there was decline in additional net returns which comes out to be Rs 4530/- as compared to Rs. 6398/ha during year 2017. This may be attributed to the fact that farmers had started spending on plant protection measures after learning from previous years' FLDs experiences. In the year 2018, BC ratio of 2.96 and 2.71 was obtained in FLDs and check plots respectively. During the year 2019 where a new variety SML 832 was selected for sowing, BC ratio was 2.94 in FLD plots as compared to 2.44 in farmers' practice. Similar results were reported by Kumar *et al.* (2015); Kaur *et al.* (2018); Singh and

Table 3: Economic impact analysis of the demonstration of Summer Moong and local check

Particulars	Demonstrated Field	Farmers' Field	Additional increase/ decrease
Year 2017			
Cost of cultivation (Rs/ha)	17918	16687	+1231
Gross returns (Rs/ha)	56639	49010	+7629
Net returns (Rs/ha)	38720	32322	+6398
B:C ratio	3.16	2.94	+0.22
Year 2018			
Cost of cultivation (Rs/ha)	17980	17960	+20
Gross returns (Rs/ha)	53300	48750	+4550
Net returns (Rs/ha)	35320	30790	+4530
B:C ratio	2.96	2.71	+0.25
Year 2019			
Cost of cultivation (Rs/ha)	18190	19960	-1770
Gross returns (Rs/ha)	53402	48750	+4652
Net returns (Rs/ha)	35212	28790	+6422
B:C ratio	2.94	2.44	+0.50

Aggarwal (2013) and Chauhan *et al.* (2013) in crops summer moong, paddy, gram and okra, respectively.

Here it is important to note that although it seems that there is additional return ranging from Rs 4530/- to Rs 6422/- per ha but the actual benefit is much more. There was no cultivation of summer moong in the adopted villages. Paddy and wheat was the main cropping pattern followed by the farmers. So after harvesting of wheat there were 60 to 70 days of fallow fields till paddy was to be transplanted. This slot can be excellently utilized to get additional crop of summer moong. So in reality farmers had harvested additional net income ranging from Rs 35212/- to Rs 38720/-.

It was observed that farmers were unaware about the appropriate time of application and adequate dose of the pesticides and they had more reliance on the insecticides/pesticides retailers for the selection and availing information regarding agro-chemicals. Also, farmers were of opinion that higher application of the nitrogenous fertilizers lead to better yields. Crop intensification increased with introduction of this leguminous crop which resulted in additional income and delayed sowing due to delay in harvesting of wheat was resulting in crop failure. So farmers were of opinion that if early maturing variety of wheat would be there than it would be an excellent third crop option in paddy-wheat cropping pattern.

CONCLUSION

The yield level has achieved to maximum level in case of paddy and wheat so there is very little scope of enhancing farmers' income by increasing yields. Summer moong is one good option to fit in this rotation and enhancing income of farmers through intensification. It is evident from the FLDs data that farmers can get additional net income. However delayed sowing due to delay in harvesting of wheat can lead to crop failure. So availability of early maturing varieties of wheat would lead to be an excellent third crop option in paddy-wheat cropping pattern.

ACKNOWLEDGEMENT

Financial help received form ICAR in the form of Farmer FIRST Project to conduct these FLDs is fully acknowledged.

Paper received on : February 19, 2020
Accepted on : February 25, 2020

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