Increasing farm level economy by cultivating summer green gram

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ABSTRACT

The concerned ICAR institutes in consultation with SAUs and other stakeholders develop a comprehensive plan for organizing the demonstrations in cluster mode. The various aspects such as crop diversification, crop intensification and cropping pattern can enhance the income of the farmers. Under crop intensification, the cluster frontline demonstrations on summer green gram were conducted at farmers fields in Kaithal district of Haryana to increase the income of the farmers and the productivity during the 2017-18, 2018-19 and 2019-20. The data were recorded under both the frontline demonstrations as well as under farmers' practice and compared. The average grain yield to the tune of 8.67 q/ha was observed under demonstrations as compared to farmers' practice (7.0 q/ha). The extension gap, technology gap and technology index were 1.66 q/ha, 0.92 q/ha and 9.56 per cent respectively. The average higher net return of Rs 41,523.67/ha and benefit-cost ratio of 3.75 were observed.

Keywords: Cluster frontline demonstrations; farmers practice; summer green gram; gap

INTRODUCTION

Green gram is one of the important pulse crops in India. It is grown in approximately 3.50 million ha area in the country. Green gram fulfills the protein requirement of vegetarian population. It contains about 25 per cent protein which is almost three times that of cereals. It is a protein-rich staple food. It also contains 0.5 per cent fat, 0.9 per cent fibre, 57.6 per cent carbohydrates and 3.7 per cent ash (Choudhary et al 2010). Green gram covers the annual world production of about an area of 5.5 million hectares. In India, it ranks third after Bengal gram and red gram in area, production and productivity.

Summer green gram can ideally be grown in irrigated tracts of Haryana as catch-cum-cash crop for diversifying rice-wheat system. Success in summer cultivation has not only increased the green gram production but also helped in defeating malnutrition, crop diversification, sustaining agricultural production and increasing household income of poor farmers of Haryana.

Rice-wheat rotation is the traditional cropping system of Kaithal district of Haryana. The summer moong crop can be successfully grown after harvest of potato or fodder crops as the recommended sowing time of the crop is 20 March to 10 April. The productivity of summer moong is not sufficient on account of several causes like unavailability of quality seeds of improved varieties well in time and poor crop management practices due to unawareness and non-adoption of recommended production and plant protection technologies by the farmers. It is necessary to demonstrate the high yielding varieties, following recommended sowing time, resistant to biotic and abiotic stresses and other production technologies which the farmers generally do not adopt. Keeping above points in view cluster frontline demonstrations were conducted on summer moong (var MH-421) by Krishi Vigyan Kendra, Kaithal, Haryana. The main objective of the study was to boost up the productivity of summer green gram by the use of recommended high yielding summer green gram variety with full recommended package of practices.

MATERIAL and METHODS

The cluster frontline demonstrations on summer green gram were conducted at farmers' fields in Kaithal district of Haryana to increase the income of the farmers and the productivity of the crop during the years 2017 to 2020. Kaithal is in the northwestern region of Haryana and is a part of the Indo-Gangetic alluvial plains. The soils of the district vary from sandy to clay loam in texture which are low to medium in organic carbon (0.3 to 0.6%), available phosphorus (12-18 kg/ha) and medium to high in potash (125-185 kg/ha).

Each demonstration was conducted in an area of 0.4 ha and the critical inputs were applied as per the package of practices for rabi crops recommended by the CCS Haryana Agricultural University, Hisar, Haryana. The quality seed of summer moong variety MH-421 was used for conducting FLDs and the seeds were treated with biofertilizer during all the years of the study (Kaur et al 2014). The sowing operation was carried out from mid-March to first week of April under assured irrigated conditions and harvesting of the crop was done during the first fortnight of June (Table 1). The demonstrations at farmers' fields were regularly monitored by scientists of Krishi Vigyan Kendra, Kaithal, Haryana from sowing to harvesting. The grain yield of demonstration crop was recorded and analyzed. The obtained data were pooled by using different statistical tools for 2017-18, 2018-19 and 2019-20. The extension gap, technology gap and the technology index were worked out as per formulae given by the Yadav et al (2004):

Extension gap (EG)= Demonstration yield – Farmers' yield

Technology gap (TG)= Potential yield – Demonstration yield

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

RESULTS and DISCUSSION

The main focus of the study was to popularize summer moong and implementation of full package of practices. The major difference was observed between the practices followed under cluster frontline demonstrations and farmers' practice such as use of variety, seed rate, seed treatment, sowing time, weed management, nutrient management and integrated pest management.

The farmers used the non-recommended Desi/local variety of summer green gram with high seed rate. They did not go for seed treatment, recommended sowing time, use of herbicides and pesticides and proper doses of fertilizers and time of fertilizer application as followed in cluster frontline demonstrations.

Yield and gap analysis

The data pertaining to yield and gap analysis in demonstrations and farmers' practice are given in Table 1.

Yield: Grain yield is the net result of various agronomic factors/inputs influencing growth and yield attributing characters during the life cycle of a crop. The efficiency of different factors is judged mainly by their contribution to the economic yield. It is evident from yield and gap analysis between demonstrations and farmers' practice that the average grain yield (8.67 q/ha) was recorded under demonstrations as compared to farmers' practice (7.0 q/ha) during 2017-18 to 2019-20. Similarly yield enhancement in different crops under frontline demonstrations was recorded by Patil et al (2015) and Dhaka et al (2010). Increase in yield under cluster frontline demonstrations might be due to following of recommended agronomic practices and regular field visits conducted by KVK scientists. The farmers who were ignorant about recommended agronomic practices got decreased grain yield. These differences caused the high yield of summer green gram under frontline demonstrations. Similar findings have also been observed by Yadav et al (2007).

Extension gap: Extension gap of 1.50, 1.75 and 1.75 q/ha during 2017-18, 2018-19 and 2019-20 respectively with average extension gap 1.66 q/ha was observed between cluster frontline demonstrations and farmers' practice. This gap might be due to the better management of cluster frontline demonstrations from sowing to harvesting as compared with farmers' practice plots.

Table 1. Yield and gap analysis of cluster frontline demonstrations

Component	Year			Mean
	2017-18	2018-19	2019-20	
Variety	MH-421	MH-421	MH-421	-
Potential yield (q/ha)	9.50	9.50	9.75	9.58
Number of demonstrations	66	65	70	67
Area (ha)	30	30	30	30
Yield (q/ha) (demonstrations)	8.50	8.75	8.75	8.67
Yield (q/ha) (farmers practice)	7.0	7.0	7.0	7.0
Extension gap (q/ha)	1.50	1.75	1.75	1.66
Technology gap (q/ha)	1.00	0.75	1.00	0.92
Technology index (%)	10.53	7.89	10.25	9.56

Technology gap: The average potential yield of the summer green gram was 9.58 q/ha and average technology gap of 0.92 q/ha was recorded during the period from 2017-18 to 2019-20. The highest technology gap of 1.00 q/ha was recorded during 2017-18 and 2019-20 as compared to 2018-19 (0.75 q/ha). This could be due to the regular monitoring of the demonstrations by the KVK scientists. Similar results were found by Singh (2017) and Meena and Singh (2014).

Technology index: Technology index represents the variability of recommended technology used for conducting demonstrations at farmers' fields. Lower technology index (7.89%) during the year 2018-19 indicates the more feasibility of followed technology. Lower the value of technology index, more is the feasibility of technology demonstrated (Sagar and Chandra 2004). The average value of technology index (9.56%) observed reflects the recommended technology for transferring to farmers and sufficient extension services for transfer of technology.

Economics of cluster frontline demonstrations

The data given in Table 2 show that economic returns and minimum support price (MSP) varied during the study period. The highest gross return (Rs 62,965.00) was observed during 2019-20 due to higher grain produce per hectare under cluster frontline demonstrations. The average gross retuen (Rs 56,523.67) of cluster frontline demonstrations was recorded higher as compared to farmers' practice (Rs 46,500.00).

This might be due to the use of recommended seed treatment, herbicides for weed management and integrated pest management applied under cluster frontline demonstrations. The average higher net return (Rs 41,523.67) was recorded under demonstrations. The highest average (3.75) benefit-cost ratio was observed during 2017-18 to 2019-20 under demonstrations as compared to farmers' practice. Similar findings were made by Pagaria (2015) and Singh et al (2012).

Table 2. Economic analysis of cluster frontline demonstrations

Component	Year			Average
	2017-18	2018-19	2019-20	
MSP (Rs)	5,650.00	6,695.00	7,196.00	6,513.67
Demonstration				
Gross cost (Rs/ha)	14,000.00	15,000.00	16,000.00	15,000.00
Gross return (Rs/ha)	48,025.00	58,581.00	62,965.00	56,523.67
Net return (Rs/ha)	34,025.00	43,581.00	46,965.00	41,523.67
B-C ratio	3.43	3.90	3.93	3.75
Farmers' practice				
Gross cost (Rs/ha)	10,000.00	11,000.00	12,000.00	11,000.00
Gross return (Rs/ha)	41,500.00	48,000.00	49,500.00	46,500.00
Net return (Rs/ha)	31,500.00	37,000.00	37,500.00	35,500.00
B-C ratio	4.15	4.36	4.12	4.21

From the study it was concluded that the cluster frontline demonstrations increased overall productivity of summer green gram. The improved and recommended agronomic practices applied under cluster frontline demonstrations reduced the technology gap. The highest gross return, net return and benefit-cost ratio were obtained under demonstrations which could be due to follow up of recommended package of practices for summer green gram, timely operations and regular monitoring of demonstration fields by the KVK scientists. The cluster frontline demonstrations created awareness among the farmers and helped in dissemination of the technology. It also reduced the gap between farmers and scientists of the area.

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