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Impact of cluster frontline demonstrations on green gram for productivity enhancement and dissemination of technology in Hisar district of Haryana

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Abstract

The present study was conducted at farmer field in two clusters of district Hisar to demonstrate production potential and economic benefit of improved production technologies comprising sowing method, nutrient management, chemical weed control and insect pest and disease management in a respect of integrated crop management mode. A total of 40 demonstrations were conducted in 1 acre size plot and also maintained same size check plot. Sown the crop after seed treatment with fungicide and culture and applications of pendimethalin @1.0 kg/ ha in 500 litres of water used for effective controls of the weeds during summer season 2018. The finding of the study revealed that improved technology recorded an average yield of 6.2q/ha which was 29.17 % higher than obtain under farmer practice (4.8/ha). Higher net income of Rs. 13481 /ha with a benefit cost ratio of 1.77 was obtained with improved technology in comparison to farmer practices 8000/ha benefit cost ratio was 1.5. Further it was found that adoption of improved technology significantly increased the yield of green gram crop and also the net return to the farmers. The study revealed that an extension gap of 140 kg/ha. was found between demonstrated technology and farmer practices. The technology gap was observed 580 kg/ha between potential yield of variety and demonstrated plot yield. Technology index for demonstration in the study was 48.33 kg per ha in accordance with technology gap. From the above findings it can be concluded that the production and productivity of green gram crop can be increased through cluster frontline demonstrations by motivating the farmers for the adoption of scientific production technologies which were demonstrated in CFLD plots.

Key words: Cluster frontline demonstrations, Extension gap, Green gram, Innovation, Technology gap, Technology index

Introduction

Green gram (*Vigna radiata*) commonly known as moong, is an important pulse crop in India and more than 70 % of world's green gram production comes from India. India is the largest producer consumer and importer of pulses in the world. It accounts for 33% of world area and 22% of the total production of pulses (Sandhu and Dhaliwal, 2016). Pulses are important food crops for human consumption and animal feed. Pulses are good and cheaper sources of proteins, which indicate the great importance of pulses in their daily food habits. Being leguminous nature, they are considered to be important components of cropping system because they have ability to fix the atmospheric nitrogen and adoption of organic matter to soil, which are important factors to maintain soil fertility (Kumar and Singh, 2014). Moong is a very important pulse crop in summer season. The green gram crop variety MH 421 can be grown both as kharif and summer season with the advent of short duration (50-60 days). This variety MH 421 is tolerant against moong bean yellow mosaic virus (MYMV) and synchronous maturity in nature. Green gram contributes about 7.75 percent share in total production in the country with a production of 19000 thousand metric tons during the year 2017-2018.

Materials and Methods

Indian government imparts large quantity of pulses to fulfill domestic requirement of pulses. In this regard to sustain this production and consumption system, the department of agriculture, corporation and farmer welfare had sanctioned the project cluster frontline demonstration on pulses to ICAR Atari Jodhpur through national food security mission from October 2015. This project was implemented by Krishi Vigyan Kendra of Zone-2 with main objective to boost the production and productivity of moong through CFLD's with latest and specific technology. The main objective of the CFLD's is to demonstrate newly released crop production, crop protection technologies and management practices at farmer's field under different agroclimatic regions and farming situations. Keeping in view, the present study has under taken to increase the green gram productivity by conducting the CFLD's and simultaneously feedback from the farmers may be generated on the demonstrated technology (Singh, *et al*. 2012)

To increase the area and productivity of green gram in the district, Cluster front line demonstrations on kharif moong were conducted by Krishi Vigyan Kendra, Hisar in two clusters of districts during summer season 2018 and 40 demonstrations in 16 hectares area were conducted to demonstrate the Integrated Crop Management (ICM) technology of green gram in summer season.The demonstrations were conducted in sandy loam soil during summer 2018. Sowing was done in the month of March with seed rate of 25 kg/ha. The study was conducted at farmers' field to demonstrate production potential and economic benefit of improved production technologies comprising of newly improved variety (MH-421), seed treatment with fungicide (carbendazim) and culture (Rhizobium and PSB), pre-emergence weed management with pendimethalin @1.0 kg/ha in 500 liters of water used for effective control of weeds during summer season and soil test base fertilizer application and IPM practices. The methods used for the present study with respect to CFLD's and farmer's practices are given in Table 1. In case of local check plots, existing practices being used by

Table 1: Particular showing the details of green gram under CFLDs and Farmer Practices

Technology	Farmer Practices	Improved Practices demonstrated under CFLD's	% Gap
Line sowing	Broad casting of seed/ Line sowing	Spacing 30 cm between rows and 10 cm between plants	50
Variety	SML-668 & Local seed	MH-421	65
Seed rate	15-20 kg/ha	25 kg/ha	72
Time of sowing	April	March	50
Seed Treatment	No seed treatment	Carbendazim 50 WP (2 g/ kg seed)/ Thiram (4g/ kg seed)	100
Biofertilizer	No seed treatment	Rhizotica (125 ml/ha seed)PSB (125 ml/ha seed)	100
Fertilizers (kg/ha)			
N	No application	20 kg/ ha	100
P	40 kg/ ha (40%)	40 kg/ ha	60
K	No application	20 kg/ha	100
Weed Management	One hoeing – 50%	Two hoeing and pendimethalin 30 EC @ 1 lt/ha	50
Insect management	Based on Availability in local market	Dimethoate 625 ml/ ha or Malathion 1ltr/ha	50
Disease Management	No Application	COC 50 WP @ 2 kg/ha	100

farmers were followed. Other management practices were applied as per CCS HAU, package of practices for summer crops. The demonstrations at farmer's field were regularly monitored at different stages of crops by multi-disciplinary team of KVK, scientists. Technical observation was also noted i.e. plants per square meter, pods per plant and seeds per pod. The data with respect to green yield from CFLD plots and from fields cultivated following local practices adopted by the farmers of the area were collected and evaluated. Potential yield was taken into consideration on the basis of standard plant population and average yield under recommended package of practices. Different parameters as suggested by Yadav et.al. (2004) was used for gap analysis, calculating the economic. The details of different parameters and formula adopted for analysis are as under.

Extension gap = Demonstration's yield – Farmer practices yield

Technology gap = Potential yield – Demonstration yield

Technology index
= (Potential yield – Demonstration yield)/ Potential yield *100

Results and Discussion

The findings of the study revealed that higher average yield (6.2 q/ ha.) in demonstrated field was observed as compared to farmer's practice (4.8 q/ ha.) which was 29.17 percent higher than farmer's practice (Table 2). The economic analysis of CFLD's observed that higher gross income can be obtained by adoption of improved production technology of summer moong which reflects from the gross income of demonstrated field (Rs. 13500/ha) over farmer's practice (Rs. 8000/ha). Further analysis of data revealed that benefit cost ratio of 1.77 was obtained in CFLD fields in comparison to farmer's practices (1.50). The findings confirm with the finding of Yadav *et al* (2007).

The study revealed that an extension gap of 140 kg/ha was found between demonstrated technology and farmer practices. The technology gap was observed 580 kg/ha between potential yield of variety and demonstrated plot yield. Technology index for demonstration in the study was 48.33 kg / ha (Table 3) in accordance with technology gap. Such gap might be attributed to adoption of improved technology especially high yielding varieties sown with the help of seed cum fertilizer drill with balanced nutrition, seed treatment, weed management and appropriate plant protection measures in demonstration which resulted in higher green yield than the traditional farmers practices. The technology gap was recorded 580 kg/ha between potential yield of variety and demonstrated plot yield. This gap is due to better performance of recommended varieties with different interventions and more feasibility of recommended technologies during the course of study. Similarly, the technology index for all demonstrations in the study was observed 48.33 in accordance with technology gap. Higher technology index reflected the inadequate transfer of proven technology to growers and insufficient extension services for transfer of technology. These finding were in confirmative with the results of study carried out by Chandra (2010), Meena and Dudi (2012). Meena and Singh (2016) Meena and Singh (2017) and Dayanand *et al* (2012) So, on the basis of above findings it can be concluded that the adoption of improved technologies significantly increases the yield as well as yield attribute traits of green gram crop and also net returns of farmers. Hence there is need to disseminate the improved technologies of summer moon among farmers by using effective extension methodologies like FLD and trainings. Farmers should be encouraged to adopt the ICM technologies for getting higher returns.

Table 2: yield and economics of CFLDs on green gram in the year 2018

Treatments	Average yield (q/ha)	% Increase	Cost of cultivation (Rs./ha)	Gross Returns (Rs./ ha)	Net Returns (Rs./ ha)	B:C Ratio
Farmer Practices	4.80	-	16000	24000	8000	1.50
Demonstration	6.20	29.17	17500	31000	13500	1.77

Table 3: Technological gap analysis of cluster frontline demonstration on green gram at farmer field

Year	No. of Demo.	Potential yield kg/ha	Demonstrations yield q/ha	Farmer practices yield q/ha	EG kg/ha	TG kg/ha	TI kg/ha
Kharif 2020	40	1200	6.2	4.8	140	580	48.33

EG – Extension gap; TG- Technology gap; TI- Technology index

Conclusion

It may be concluded that the cluster front line demonstrations conducted on green gram at the farmer's field revealed that the adoption of improved technologies significantly increased the yield as well as yield attributing traits of the crop and also the net returns to the farmers. Hence there is a need to disseminate the improved technologies among the farmers with effective extension methods like training and demonstrations. The farmers should be encouraged to adopt the recommended package of practices for realizing high net returns. Green gram has strong root system and capacity to fix the atmospheric nitrogen into the soil and improves soil health and contributes significantly to enhancing the yield of subsequent crops.

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