The Pharma Innovation Journal 2023; 12(3): 1802-1805

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; 12(3): 1802-1805

www.thepharmajournal.com
Received: 02-01-2023
Accepted: 04-02-2023

GS Gathiye
Scientist (Agronomy), Krishi Vigyan Kendra, Dhar, Madhya Pradesh, India

RC Aswani
Scientist (Horticulture), Directorate of Extension Services, RVSKVV, Gwalior, Madhya Pradesh, India

Jagdeesh Morya
Scientist (Soil Science), Krishi Vigyan Kendra, Jhabua, Madhya Pradesh, India

Vishal Verma
SRF (Plant Breeding & Genetics), JNKVV, Jabalpur, Madhya Pradesh, India

Corresponding Author:
GS Gathiye
Scientist (Agronomy), Krishi Vigyan Kendra, Dhar, Madhya Pradesh, India

Productivity and profitability enhancement in green gram (*Vigna radiata* L.) through frontline demonstrations at tribal farmer's fields in Dhar district of Madhya Pradesh

GS Gathiye, RC Aswani, Jagdeesh Morya and Vishal Verma

Abstract
The present study was carried out by Krishi Vigyan Kendra, Dhar, Madhya Pradesh to study the impact of productivity and profitability enhancement through frontline demonstrations in green gram (*Vigna radiata* L.) at tribal farmer's fields in Dhar district of Madhya Pradesh. The results revealed that, an average highest yield (848 kg/ha) was recorded in frontline demonstrations plots of green gram by adopting integrated crop management technology as compared to farmers practice (606 kg/ha). By the adoption of improved production technology of green gram, the yield was found in increasing trend *i.e.* 39.93% over farmer practices. The average technological gap (152 kg/ha), extension gap (246 kg/ha) and technological index (15.20%) were noticed. The maximum average gross monetary returns (Rs. 46640/ha), net monetary returns (Rs. 27440/ha and profitability (2.43) was recorded under demonstration while the minimum gross monetary returns (Rs. 28896/ha), net monetary returns (Rs. 10396/ha and profitability (1.56) was recorded in farmer's practice. The maximum yield was recorded in demonstration plots over local check due to adoption of innovative knowledge and full package of practices.

Keywords: Extension gap, technology transfer, yield, technology index and economics

Introduction
Pulse, the food legume has been grown since millennium and has been a vital ingredient of the human diet in India. Pulse and milk provide the full complement of proteins to people who avoid eating meat. Pulse is the second most important groups after cereals. In year 2021-22, the total pulse area 28.83 million hectares with production in India was 25.75 million tonnes with productivity 892 kg/ha (Anonymous 2021) [1]. Pulses like green gram (mung) and black gram are grown in rainfed areas. Green gram is one of the important pulse crops in India, which plays a major role in augmenting the income of small and marginal farmers of the country. India is the largest producer and consumer of pulse in the world, accounting for 25 percent of global production and 15 percent consumption (Saraswati *et al*., 2004) [12]. Pulse is the most important food crop in India and from all integral part of the cropping system farmers all over the country. Pulse crops are primarily grown under rainfed condition and a low fertility neglected soil in India.

Green gram or mung bean (*Vigna radiata* L.) is the major pulse crop of the state Madhya Pradesh covering total area of 66512 hectares with average productivity 342 kg per ha. The district of Dhar lies in the 10th agro climatic zone of Madhya Pradesh. The average normal rainfall of the district is 830 mm and more than 75% of the precipitation is received over three months *i.e.* June- September.

Green gram is an important *kharif* pulse crop for livelihood of tribal farmers in Dhar district of Madhya Pradesh but due to unavailability of improved variety and non-adoption of improved cultivation practices in the district, productivity (375 kg/ha) of green gram is far below the average national productivity (655 kg/ha) and state average of 342 kg/ha. *Kharif* green gram is mostly sown in July-August and harvested in October-November. Indian government imports large quantity of pulses to fulfill domestic requirement of pulses. In this regard, to sustain this production and consumption system, the Indian Institute of Pulse Research, Kanpur had sanctioned the project "Frontline Demonstrations on *kharif* pulses under Tribal sub Plan to ICAR-ATARI, Zone-IX, Jabalpur. The basic strategy of the Mission is to promote and extend improved technologies, *i.e.*, seed, balance use of fertilizers, soil amendments, integrated pest management, farm machinery and implements, irrigation devices along with capacity building

of farmers. This project was implemented by Krishi Vigyan Kendra, Dhar in district with main objective to boost the production and productivity of pulses through FLDs with latest and specific technologies at tribal farmers' fields.

Materials and Methods

Front line Demonstration on green gram were conducted in kharif 2021-22 in operational villages of Krishi Vigyan Kendra, Dhar with the objective of boosting the production and productivity and profitability of greengram with the latest and climate resilient specific technologies. The low production of traditional varieties of green gram was a cause of concern for the farmers at large. To overcome this problem of low yield, Krishi Vigyan Kendra Dhar has conducted 25 frontline demonstrations in field of five villages of Dhar district. The study was carried out during *kharif* season 2021-22.

Farmers were trained to follow the package and practices for green gram cultivation as recommended by the Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior (M.P.) and need based inputs were provided to the beneficiaries (Table 2). The farmers followed the full package of practices like soil testing, seed treatment with bio-fertilizer, fertilizer application; weed management, integrated pest management (IPM) practices etc. In case of local check, the traditional practices were followed by using existing varieties. An area of 10 hectares was covered with plot size 0.4 ha under front line demonstration with active participation of tribal farmers. Green gram variety IPM 410-3 (Shikha), maturity 65-70 days having bold seeded, Yellow Mosaic Virus (YMV) tolerant and depending on the environmental conditions were selected. Before conducting FLDs, a list of farmers was prepared from group meeting and specific skill training was imparted to the selected farmers.

In demonstration plots, use of quality seeds of improved varieties IPM 410-3 (Shikha), line sowing and timely herbicide application, need based pesticide as well as balanced fertilizer were emphasized and comparison has been made with the existing practices. Visit of farmers and the extension functionaries was organized at demonstration plots to disseminate the message at large scale. The beneficiaries under the programme were facilitated by KVK scientists in performing field operations like sowing, spraying, weeding, harvesting etc. during the course of training and visits. The traditional practices were maintained in case of local checks. The data were collected from both FLD plots as well as control plots and finally the extension gap, technology gap, technology index along with the benefit cost ratio were worked out (Samui *et al.*, 2000) [11] as given below.

Technology gap= Potential yield - Demonstration yield

Extension gap= Demonstration yield - Farmer's yield

$$\text{Technology index (\%)} = \frac{\text{Potential yield} - \text{Demo. yield}}{\text{Potential yield}} \text{ X } 100$$

Results and Discussion

Results of front line demonstrations conducted during *kharif* 2021-22 in different tribal villages of Nalcha block of Dhar district indicated that the cultivation practices comprised under FLD *viz.* use of improved variety IPM 410-3 (Shikha), line sowing, balanced application of fertilizers and control of pest through insecticide at economic threshold level (Table 1). The maximum number of pods (22/plant), pod length (9.15 cm), number of seeds (12.20/pod), number of branches (5.8) per plant and seed index (5.16 g) were recorded in demonstrations as compared to farmer's practice number of pods (17/plant), pod length (7.23 cm), number of seeds (9.58/pod), number of branches (4.4) per plant and seed index (3.8 g) during 2021-22 (Table 5). Yield parameters enhanced by the improved package of practices over existing farmers practice are shown in Table 3.

It is evident from results that under the demonstrated plots, performance of green gram (yield) was comparatively much higher than the farmer's practice. The average maximum yield (848 kg/ha) was recorded in recommended practice while minimum yield (606) observed in farmer's practice during the course of study. The demonstration plot produced on an average of 39.93% more yield of green gram as compared to local practices. The data revealed that the yield of green gram fluctuated significantly over the years in demonstration plot due to climatic factors and management practices. Similarly, yield enhancement in different crops in front line demonstrations were documented by Dhaka *et al.*, (2015) [2]. The results clearly indicated the positive effects of FLDs over the existing practices toward enhancing the productivity of green gram in tribal villages of Dhar district with its positive effect on yield attributes (Table 3). The yield of the front line demonstrations and potential yield of the crop was compared to estimate the yield gaps which were further categorized into technology index and technology gap. The trend of extension gap (246 kg/ha) and technology gap (152 kg/ha) during the period of study emphasizes the need to educate the farmer through various means for adoption of improved agricultural production to reverse the trend of wide extension gap. Data revealed that the performance of the technology demonstrated was found to be better than the farmers practice under same environment conditions. The farmers were motivated by seeing the results in terms of productivity and they are now adopting the green gram variety *i.e.* IPM 410-3 (Shikha) with improved package and practices. The technology index (15.20%) showed the feasibility of evolved technology at the farmer's fields. The lower value of technology index showed that there is more feasibility of technology. As such fluctuation in technology index during the study period in certain region may be attributed to the dissimilarity in soil fertility status, weather conditions, non-availability of water and insect pest attack in the crop.

The maximum gross monetary return (Rs. 46640/ha) was recorded in recommended practice while minimum gross monetary return (Rs. 28896/ha) was observed in farmer's practice during kharif season. Moreover, the net return is the best index of profitability of green gram crop and higher net return per ha of Rs 27440/ha was recorded in recommended practice while minimum net monetary return registered in farmer's practice (Rs. 10396/ha). Similar trend was found in case of Benefit-Cost ratio as highest B:C ratio was found in recommended practice (2.43) as compared to farmers existing practice (1.56) during the year of study. Similar results were found by Saikia *et al.*, (2018) [10]. Data clearly showed higher benefit cost ratio of recommended practices than control plot in the year of study. Hence, favorable benefit cost ratios proved the economic viability of the interventions and convinced the farmers on the utility of interventions.

Table 1: Comparison between demonstration package and existing practices under FLD (green gram)

Particulars	Blackgram	
	Demonstration	**Farmers Practice**
Farming situation	Rainfed	Rainfed
Variety	IPU 410-3 (Shikha)	JM-721
Time of sowing	Mid July to mid-August	Mid July to mid-August
Method of sowing	Line sowing	Line sowing
Seed rate	20 kg/ha	30 kg/ha
Fertilizer as per STV	NPK 20:60:20 kg/ha	NPK 18:46:00 kg/ha
Seed treatment and inoculation	With Carboxin 17.5 + Thiram 17.5 @ 2.5 ml/kg of seed and inoculation with Rhizobium and PSB @ 5 g/kg of seed	Nil
Weed management	Pre-emergence herbicide (Pendimethalin)	No weeding
Plant protection	Need based application of insecticide	Nil
Time of harvesting	September till first week of October	September till first week of October

Table 2: Details of need based critical inputs/technological packages distributed in front line demonstrations of green gram

Year	No. of demonstrations	Variety	Technology demonstrated	Need based input distributed
2021-22	25	IPU 410-3 (Shikha)	Improved variety, seed treatment, inoculation, NM, WM and IPM	Improved seed (20 kg/ha), soil testing, seed treatment with Carboxin 17.5 + Thiram 17.5 @ 2.5 ml/kg of seed and inoculation with Rhizobium and PSB @ 5 g/kg of seed, pendimethalin, profenofos+cypermethrin, copper oxychloride, on and off campus trainings, field day and exposure visits

Table 3: Productivity, technology gap, extension gap and technology index under FLDs and farmer practices in green gram

Year	Sample Area (ha)	Sample No. of farmers	Seed yield (kg/ha)			% increase over control	Technical gap (kg/ha)	Extension gap (kg/ha)	Technical index (%)
			Potential	FLD	FP				FLD
2021-22	10	25	1000	848	606	39.93	152	246	15.20

Table 4: Economics of Demonstrations

S. No	Village covered	No. of Farmers	Area (ha)	Cost of Cultivation (Rs./ha)		Gross Monetary Return (Rs./ha)		Net Return (Rs.)		B:C ratio	
				Demo.	FP	Demo.	FP	Demo.	FP	Demo.	FP
1	Mehdikhedi, Patdi, Meghpura and Subhanpura	25	10	19200	18500	46640	28896	27440	10396	2.43	1.56

* Rate of green gram during October 2021-22 in the Mandi of Dhar was Rs 5500/q

Table 5: Yield attributing data of crop

S. No.	Crop	Yield attributing characters									
		Av. No of pods/plant		Pod length (cm)		Av. no of Seeds/pod		No of Branches /Plant		Seed index (100 grain wt.)	
		Demo.	FP	Demo.	FP	Demo.	FP	Demo	FP	Demo	FP
1	Greengram (IPM 410-3)	22	17	9.15	7.23	12.20	9.58	5.8	4.4	5.16	3.8

Conclusion

It is concluded from the above findings of FLDs on green gram *var*. IPM 410-3, that the technology gap can be reduced to a considerable extent by adopting scientific methods of green gram cultivation thus leading to increase productivity of green gram in the district. It was observed that potential yield can be achieved by imparting scientific knowledge to the farmers, providing the quality need based inputs and their proper utilization. The changes will accelerate the adoption of newer varieties to increase the productivity of green gram in this area. There is a need to adopt multi-pronged strategy which involves enhancing green gram production through horizontal and vertical expansion and productivity improvements through better implementation and adoption of various extension activities like training programme, field days, exposure visit *etc*. organized in FLD programmes at the farmer's fields. Moreover, Krishi Vigyan Kendra in the district need to play the lead role in providing proper technical support to the farmers through different educational and extension activities to reduce the extension gap for better pulse production and productivity in the district.

Acknowledgment

The authors are grateful to the Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior for their technical as well as financial support for successful completion of this research work.

Conflict of Interest

None.

References

1. Anonymous. Agricultural Statistics at a Glance, Directorate of Economics & Statistics, GOI; c2021. p. 114
2. Dhaka BL, Poonia MK, Meena BS, Bairwa RK. Yield and economic viability of coriander under front line demonstrations in Bundi district of Rajasthan. J Hortl. Sci. 2015;10(2):226-228.
3. Chandra G. Evaluation of frontline demonstrations of

greengram in Sunderban, West Bengal. J Indian Soc Costal Agril Res. 2010;28:12-15.
4. Chaitanya T, Kumar MS, Rammulamma A, Kumari AS. Productivity Enhancement of Greengram by Cluster Frontline Demonstrations in Mahabubabad District of Telangana, India. International Journal of Current Microbiology and Applied Sciences. 2020;9(2):1492-1498
5. Chaudhary S. Impact of Front Line Demonstration on Adoption of Improved Greengram Production Technology in Nagaur District of Rajasthan. M.Sc. Thesis, SKRAU, Bikaner; c2012.
6. Meena ML, Dudi A. Increasing Greengram Production through Frontline Demonstrations under Rainfed Conditions of Rajasthan. J Krishi Vigyan. 2018;7(1):144-148.
7. Meena ML, Singh D. Technological and extension yield gaps in greengram in Pali district of Rajasthan, India. Legume Research. 2017;40(1):187-190.
8. Meena OP, Sharma KC, Meena RH, Mitharval BS. Technology transfer through FLDs on mungbean in semiarid region of Rajasthan. Rajasthan Journal of extension Education. 2012;20:182-186
9. Patel D, Sharma P. Increasing green gram production through cluster frontline demonstrations in Hoshangabad district of Madhya Pradesh, India. The Pharma Innovation Journal. 2021;SP-10(5):25-28.
10. Saikia N, Nath KD, Chowdhury P. Impact of cluster frontline demonstrations on popularization of blackgram var. PU 31 in Cachar district of Barak Valley region of Assam. Journal of Pharmacognosy and Phytochemistry. 2018;7(4):940-942
11. Samui SK, Maitra S, Roy DK, Mandal AK, Saha D. Evaluation of front line demonstration on groundnut. J Indian Soc. Coastal Agri. Res. 2000;18(2):180-183.
12. Saraswati S, Fox LE, Soll DR, Wu CF. Tyramine and octopamine have opposite effects on the locomotion of Drosophila larvae. Journal of neurobiology. 2004 Mar;58(4):425-441.