

STUDY ON PRODUCTIVITY ENHANCEMENT THROUGH FRONT LINE DEMONSTRATION IN GREEN GRAM AT DEWAS (M.P.)

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Abstract: A total of 50 demonstrations on summer green gram variety MH-421 were conducted by Krishi Vigyan Kendra, Dewas during two the consecutive year of 2019-20 and 2020-21 with 25 demonstrations in each year across 06 blocks of Dewas district to explore the production potential and economic benefits of improved practices. The result of the demonstrations showed that farmers significantly increase the green gram productivity by adopting high-yielding variety (MH 421) and recommended packages of practices. The average yield of 8.99q/ha of green gram was recorded under front line demonstration as compared to farmers' practice of 6.82 q/ha. The increase in the demonstration yield over farmers' practice was 31.90%. Simultaneously higher net returns (Rs. 36272/ha) and B: C ratio (2.20) were recorded in front line demonstrations as compared to farmer's practices (net return of Rs. 21395 and B: C ratio of 1.75). The average extension gap, technology gap and technology index were 217 kg/ha, 101 kg/ha and 10.1%, respectively.

Keywords: CFLDs, Extension gap, Technology gap, Summer green gram, Yield

INTRODUCTION

India is the world's largest producer, consumer and importer of pulses. However, during the last decade, growth in pulses production has increased significantly. India achieved total pulse production of 28.34 mt pulses production during 2019-20. Pulses are grown across the country and Madhya Pradesh stands on IInd position in terms of acreage (4.73 mha) followed by Rajasthan with 6.34 mha. The overall productivity of pulses in India is 817 kg/ha while in Madhya Pradesh it is 803 kg/ha. (Agricultural Statistics at a glance, 2020).

These data show the importance of pulse growing in India as well as in Madhya Pradesh. Among pulse crops, Green gram or moong bean (*Vigna radiata*) is an important pulse crop in our country after chickpea and pigeon pea, cultivated in three different seasons, viz., Kharif, Rabi and Summer in different parts of the country. Green gram is an excellent source of high quality protein (25%) having high digestibility. Pulses contribute 11% of the total intake of proteins in India (Reddy, 2010). It is consumed as whole grains as well as "Dal" in a variety of ways in our food. Sprouted green gram is used in the preparation of curry. It is supposed to be easily digestible and hence the patients prefer it. It is also a good source of riboflavin, thiamine and vitamin C (ascorbic acid). It is a leguminous crop that can fix atmospheric nitrogen (30-40 kg N/ha). It also helps in preventing soil erosion. Being a short-duration crop, it fits well in many intensive crop rotations (Kumawat *et al.*, 2010). Green gram can be used as feed for cattle. India is the largest producer of green gram that accounts for 54% of the world's production and covers 65% of the world acreage (Padiyar *et al.*, 2017). Green gram is grown in the Dewas district (M.P.). The district occupies 4000 hectares area

under green gram and the total production was 2200 tonnes with average productivity of 5.5 q per hectare. (Padiyar *et al.*, 2017).

Looking to the importance of green gram, it is very necessary to demonstrate the high-yielding varieties with recommended new production technologies. Keeping the above points in view front line demonstrations were conducted on summer green gram by Krishi Vigyan Kendra, under the close supervision of the scientist. The main objectives of the study were to exhibit the performance of recommended package of practices and explore potential yields and higher returns.

MATERIALS AND METHODS

The present study was conducted in the Dewas district of Madhya Pradesh during the summer season of 2019-20 and 2020-21. In this study 25 farmers during each year were selected from 06 blocks viz., Dewas, Sonkatch, Tonkikhurd, Bagli, Kannod and Khategaon of Dewas district. These front line demonstrations were conducted at farmer's field and each demonstration was in an area of 0.4 ha and the adjacent field was used as a local check in which the same crop was grown with farmers practice. Soil of the area was vertisol and neutral to alkaline in nature. Fertility status of the soil was medium in nitrogen, low to medium in phosphorus and medium to high in potash.. Improved green gram variety MH 421 was provided to all the beneficiary farmers. The crop was sown during the IInd fortnight of March with 20-25 kg/ha seed rate. Before sowing seed was treated with Carboxin + Thiram @ 3 g/kg seed followed by Rhizobium and PSB culture @ 5 g/kg . Nitrogen, Phosphorus and Potash were applied @ 20:50:20 kg/ha as basal application. The scientific

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interventions under demonstrations were taken as mentioned in Table-1.

All the participating farmers were trained on scientific aspects of green gram production management before implementing the FLDs at their field. During the period there was 50 demonstrations in 20 ha area. Thus, a total sample size comprised of 50 respondents from 06 blocks across the Dewas district. To study the impact of frontline demonstrations, data from FLD and farmers' practices were analyzed. The primary data were collected from the selected farmers with the help of an interview schedule. The yield data were collected from the selected FLD farmers by the random crop cutting method. The extension gap, technology gap and the technology index worked out with the help of formulas given by Samui *et al.* (2000) as mentioned below:

Extension gap (kg/ha) = DY (Demonstration Yield) - FY (Farmers yield)

Technology gap (kg/ha) = PY (Potential yield) - DY (Demonstration yield)

Technology index (%) = (Technology gap/ Potential yield) X 100

RESULTS AND DISCUSSION

Adoption of recommended package of practices:

Data presented in Table 2 show that there is improvement in adoption practices after the conduction of summer green gram demonstrations in the areas. The highest adoption was observed in the selection of varieties and it scored ranked first with 88.0% adoption. It might be due to yield enhancement is directly correlated with variety. Earlier farmer grow old variety PDM 139 which is susceptible to yellow vein mosaic virus and other fungal diseases while MH 421 is a new variety and tolerant of YMV and other fungal diseases which results in higher yield in the demonstrated yield. Further, the non-adoption of HYV might be due to the non-availability of seed in the region. When improved variety seed was provided to the farmers they adopted it most. These findings are in accordance with Singh *et al* 2016 a. Followed by a selection of variety, the highest adoption were observed in Seed rate (78%), Time of sowing (76%), Seed treatment (74%), Integrated pest management (70%), Fertilizer application (70%). The findings of the demonstrations revealed that the adoption for improved packages of practices was different from practice to practice and the highest adoption was reported in the technology which is economically viable and directly correlated to yield enhancement. Similar findings were also reported by Yadav *et al.* (2012).

Yield:

Data in Table-3 revealed that yield in the demonstration plots increased as compared to farmer's practices. During the year 2019-20, yield in

the demonstration plot was recorded at 8.87 q/ha and it increased to the tune of 33.18 percent in farmers practices (6.66 q/ ha). Likewise in 2020-21 yield was observed 9.11 q/ha in demonstration plot and it was 30.63 percent higher as compared to farmers practices (6.98 q/ha). On an average 8.99 q/ha yield was recorded in demonstration plots and yield enhancement due to recommended practices were reported by 31.90 percent in comparison to farmers practices which was merely 6.82 q/ha. This might be due to the adoption of improved variety MH-421, optimum seed rate with timely sowing, seed treatment with fungicide and culture, timely integrated pest management, judicious use of fertilizer application, proper weed management and timely harvesting of the crop. Table 2 also clearly indicated the adoption of recommended practices in the demonstration plots may cause enhancement of yield. Maximum of the farmers in the area growing old variety PDM 139 of green gram without seed treatment with higher seed rate which leads to high plant population. High populated fields suffer for nutrition. Light, moisture, etc which lead to heavy infestation of insect pest resultant in low yield. These findings conformed to the results brought out by Morya *et al.* (2016), Singh *et al* (2016b) and Meena and Dudi (2018). The above these findings were also in agreement with the findings of Chauhan *et al.* (2021).

Extension gap:

An extension gap refers to the gap or differences between the yield of the demonstrations plot and the farmer's plot. An extension gap of 2.21 q/ha and 2.13 q/ha were observed during the year 2019-20 and 2020-21, respectively (Table 3). On an average extension gap of two years demonstrations were observed by 2.17 q/ha. This gap might be attributed to the adoption of improved technology in demonstrations which resulted in higher grain yield than the traditional farmers' practices. On the other side, farmers were unaware of recommended packages of practices for summer green gram cultivation which widens the extension gap. Farmers were unaware of improved variety seed, seed treatment, judicious use of fertilizer use and integrated pest, disease and weed management. There is more need of aware the farmers about recommended and latest production technologies with high-yielding varieties. This finding is in corroboration with the findings of Lepcha *et al.* (2015).

Technology gap:

The technology gap is the difference or gap between the demonstration yield and potential yield and it was observed 1.13 q/ha and 0.89 q/ha during the year 219-20 and 2020-21, respectively. The average technology gap found is 1.01 q/ha.. The difference in technology gap could be attributed to dissimilarity in the soil fertility status, crop production practices and local climatic conditions. Hence location-specific

recommendations are necessary to bridge the gap. Prajapati and Kumar (2012) were also reported that frontline demonstration plays a vital role in minimizing the technological gap through the supply of critical input with updating of technological aspects.

Technology index:

The technology index shows the feasibility of the technology at the farmer's field. The lower the value of the technology index high is the feasibility. Higher technology index reflected the inadequate proven technology for transferring to farmers and insufficient extension services for transfer of technology Observation of the present study depicted in Table 3, revealed that the technology index varies from 11.3 per cent to 8.9 per cent and the average technology index value was 10.1 per cent. As compared to the previous year, the technology index is being lowered which refers to technology given in the demonstrations is being popular and farmers adopted the recommended packages of practices for summer green gram. The results of the present study are in recurrence with the findings of Kaur *et al.* (2014).

Economic returns:

The economics of green gram production under front line demonstrations have been presented in Table 4 revealed that net return was higher in demonstrations as compared to farmer practices.

The results of economic analysis of green gram production revealed that the front line demonstrations recorded higher gross returns, net return and benefit-cost ration during both the year. On an average gross return of Rs. 66,709/ha, net return of Rs. 36,272/ha and benefit-cost ratio of 2.20 were recorded in demonstrated plot and it was higher than the farmer's practice. Further, an additional cost of Rs.1137/ha in demonstration has increased additional net returns to Rs.16014/ha with an effective gain of Rs 14877/ ha (Table 4) suggesting its higher profitability and economic viability of the demonstration. The higher additional returns and effective gain obtained under demonstrations could be due to improved technology, timely operations of crop cultivation and scientific monitoring. The results confirm the findings of frontline demonstrations by Bezbaruah and DekaS (2020), Lathwal (2010). This finding was in line with the findings of Raj *et al.* (2013) and Chauhan *et al.*, 2021.

Table 1. Differences between recommended practices and existing farmer practices under CFLD green gram.

S. No.	Particulars	Recommended practice	Farmer practice	Gap
1	Variety	MH 421	PDM 139 (Old variety)	Full gap
2	Seed rate (kg/ha)	20-25 kg/ha	30-40 kg/ha	Full gap
3	Seed treatment	Carboxin + Thiaram @ 3g/kg seed fb Rh + PSB @ 5 g/kg seed	Only fungicide treatment	Partial gap
4	Fertilizer dose (kg/ha)	NPK @ 150 kg/ha	DAP 100 kg/ha	Partial gap
	Sowing method	Line sowing (30 x 10 cm)	Line sowing with closer spacing	Partial gap
7	Plant protection	IPM with need-based insecticide spray	Indiscriminate use of Quinolfos /Renaxpyr	Full gap

Table 2. Extent of adoption of recommended technology (N=50)

Improved technology	Before FLD		After FLD		Rank
	No.	Per cent (%)	No.	Per cent (%)	
Selection of variety	18	36.0	44	88.0	I
Seed rate (Kg/ha)	23	46.0	39	78.0	II
Time of sowing	30	60.0	38	76.0	III
Seed treatment	21	42.0	37	74.0	IV
Integrated Pest Management	12	24.0	35	70.0	V
Fertilizer application	28	56.0	35	70.0	V

Time of harvesting	30	60.0	35	70.0	V
Use of culture	14	28.0	33	66.0	VI
Weed management	13	26.0	31	62.0	VII

Table 3. Yield Performance and gap analysis of front line demonstrations on summer green gram.

Year	Area (ha)	No of Demo	Potential Yield (q/ha)	Yield (q/ha)		% increase over F.P	Extension gap (q/ha)	Technology gap (q/ha)	Technology index (%)
				R.P.	F.P.				
2019-20	10	25	10.0	8.87	6.66	33.18	2.21	1.13	11.3
2020-21	10	25	10.0	9.11	6.98	30.63	2.13	0.89	8.9
Mean	10	25	10.0	8.99	6.82	31.90	2.17	1.01	10.1

Table 4. Economic analysis of demonstrations and farmer practices.

Year	Cost of cultivation (Rs/ha)		Gross return (Rs/ha)		Net return (Rs/ha)		Additional cost (Rs/ha)	Additional return (Rs/ha)	Effective gain (Rs/h)	B:C ratio	
	R.P.	F.P.	R.P.	F.P.	R.P.	F.P.				R.P.	F.P.
2019-20	32400	31900	65327	49003	32927	17103	500	16324	15824	2.02	1.54
2020-21	28474	26700	68092	52388	39618	25688	1774	15704	13930	2.39	1.96
Mean	30437	29300	66709	50695	36272	21395	1137	16014	14877	2.20	1.75

CONCLUSION

The front line demonstration program was very effective in changing the attitude of farmers towards the cultivation of summer green gram. Cultivation of demonstrated plots of summer green gram with improved technologies has increased the skill and knowledge as well as net returns of the farmers. The findings of the study revealed that the yield of summer green gram could be increased by 45.23 per cent by innovative technology interventions coupled with the proper management of the demonstrations field. Further improved practices captured net returns of Rs. 29396/ha with B: C ratio of 2.59 as against Rs. 16089/ha and B: C ratio of 1.95 only in farmer's practices. Under FLD improved practices create great awareness and motivated the other farmers to adopt improved production technologies for summer green gram. The selection of suitable variety, critical inputs and participatory approach in planning and conducting the demonstrations help in the transfer of technology to the farmers.

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