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RESEARCH PAPER

Impact of frontline demonstration on green gram yield through improved technologies in Gwalior district of Madhya Pradesh

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Abstract : The present study was conducted in Gwalior district of Madhya Pradesh during 2007-08 to 2011-12 in 25.20 ha of land with 63 frontline demonstrations have been conducted in Nikodi, Udaipur, Sirol, Bhadrauli, Hiri villages of Gwalior in sandy loam to clay loam soils with the active participation of farmers with the objective to demonstrate the improved technologies of green gram. The improved technologies of green gram consisted of use of improved varieties, seed treatment with Rhizobium culture and PSB (Phosphate soluble bacteria), balance dose of fertilizers,YVM resistance varieties, integrated pest and diseases management and integrated weed management. The average yield of green gram in frontline demonstration recorded higher (9.65q/ ha) as compared to farmers practice (6.75 q/ha). The average increased in the demonstration yield over farmer's practice was 42.96 per cent. The technology gap, extension gap and technology index were recorded 2.59 q/ha, 2.23 q/ha and 25.94 per cent, respectively. Improved technologies gave higher net return (Rs. 17685 per ha) with a benefit cost ratio 2.73 as compared to farmers practice (Rs.11463 / ha) benefit cost ratio 2.14.

Key Words : Frontline demonstration, Green gram, Technology gap, Extension gap, Technology index, BC ratio

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INTRODUCTION

According to the nutritionists, pulses are an excellent source of dietaryprotein and can play an vital role in fulfilling the requirement of rapid increasing population in India. Green gram is an important pulse crop that can be grown twice in a year *i.e. Kharif* (rainy) and Zaid/ summer season. Pulses are a good and chief source of protein for a majority of the population. Protein malnutrition is prevelent among men, women and children in India. The seeds of green gram is more palatable, nutritive, digestible and non-flatulent than other pulses grown in the country. Green gram contains 24.7 per cent protien, 0.6 per cent fate, 0.9 per cent fibre and 3.7 per cent ash. Besides being a rich source of protein maintains soil fertility through biological nitrogen fixation in soil and thus, play a vital role in sustaining agriculture (Kannaiyan, 1999).

In India, the area of green gram was 1.16 m ha in 2010-11 with production of 098 m tones and its average productivity was around 356 kg / ha (Anonymous, 2011).

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The per capita availability of pulses in India has been continuously decreasing which is 32.5 g/day angaist the minimum requirement per capita *i.e*. 8 g/ day as prescribed by Indian council of Medical Research (ICMR). So, it is dired need of today to popularize the improved technologies at farmer's field to increase production of pulses to meet the protein requirement of population in the country.

MATERIAL AND METHODS

The present study was conducted in the operational area of Krishi Vigyan Kendra, Gwalior. Sixty three frontline demonstrations have been conducted on green gram in different villages *i.e.* Udaipur, Nikaudi, Sirol, Rai, Bhadrauli and Hiri during the years 2007-08 to 2011-12 with an area of the each frontline demonstration 0.4 ha. Before conducting the frontline demonstration a list of farmers have been prepared from group discussion / meetings and specific training skill was imparted to the selected farmers regarding different aspects of cultivation were followed as suggested by Choudhary (1999). The seeds of improved varieties of green gram (TJM-3 and TM99-37) have been demonstrated with full package of practices at farmers field. The regular visits of demonstrated fields by KVK scientists have been ensured to proper guidance to the farmers. Training, field days and group meetings also organized to aware the farmers about scientific package of practices. Technical guidance has been provided to beneficiaries of FLDs about sowing date, planting distance, fertilizer dose, irrigation time, pest and disease management and harvesting. The data regarding yield have been collected from both FLDs plots as well as check plots also. Accordingly, the cost of cultivation, net return, benefit cost ratio technological gap, extension gap and technological index also work-out for this study. The demonstrations have been conducted under the supervision of scientist of Krishi Vigyan Kendra, Gwalior. Conduction of frontline demonstrations at farmers field help to identify the problems and potential of green gram in the specific locale, therefore, the socio-economic condition of the farmers could be increased.

The aim of frontline is to convey the technical message to the farmers that if they adopt recommended package of practices of crop than the yield of green gram could be increased easily. Yet, adoption levels for several components of the improved technology were very low, emphasizing the need for better dissemination (Kiresur *et al.,* 2001). The newly and innovative technologies having higher production potential under specific cropping system can be popularized through FLDs programme. The present study has been undertaken to evaluate the difference between demonstrated technologies *vis-a vis* practices followed by the farmers in the given crop. To estimate the technology gap, extension gap and technology index following formulae used by Samui *et al.* (2000) have been used.

Technology index=Potential yield- Demonstrated yield
Extension gap = Demonstration yield- Farmers yield
Technological index= Technology gap x 100/Potential yield

RESULTS AND DISCUSSION

Table 1 showed that the average yield of geen gram variety TM 99-37 in the years of 2007-08, 2008-09, and 2009-10 was 6.02, 6.25 and 6.16 while it was in case of farmers practices *i.e*. 4.25, 3.75 and 4.46 q/ha, respectively. The yield performance regarding the variety TJM-3 *i.e.* 6.50 and 8.75 q/ha while it was observed in farmers practice *i.e.* 6.63 and 6.75 q/ha during the year of 2010-11 and 2011-12, respectively. The highest grain yield of variety TJM-3 has been recorded *i.e*. 9.65 q/ha as angaist the farmers practices *i.e*. 6.75 q/ha in the year of 2011-12, during this year 42.96 per cent incremental has been seen over farmers practice. The average (7.40q/ha), minimum (5.60 q / ha) and maximum (9.86q/ha) yield have been recorded in the frontline demonstration during five years, while it was 5.17, 4.09 and 6.86 q/ha found in the farmers practice during the years. The per cent increased over farmer's practices are 41.64, 75.07, 38.12, 34.69 and 42.0 during 2007-08, 2008-09, 2010-11 and 2011-12, respectively. The average yield increased over farmers practice is 46.49 per cent during five years.The similar results of yield enhancement in geen-gram crop in frontline demonstration have been documented by Lalit *et al*. (2015); Roy *et al*. (2006); Jyothiswaroopa *et al*. (2016); Poornia and Pithia (2011); Patel *et al*. (2013) and Raj *et al*. (2013). It is evident from the results that the yield of the improved YVM resistance varieties was found better than the local check under similar environmental conditions. Farmers were motivated by the results of demonstrated technologies applied in the frontline demonstration and it is anticipated that they would adopt there technologies in future. The yield of the FLDs and potential yield of the variety was compared to estimate the yield gap which was further categorized into technological index.

Technology gap:

The technological gap is the gap between the demonstrated yield and potential yield and it were 0.35, 1.06, 3.84, 3.75 and 3.97 q/ha during the 2007-08, 2008-09, 2009-10, 2010-11 and 2011-12, respectively. The overall average technological gap was 2.59 q/ha during the years (Table 1). This gap exists due to variation in soil fertility of climatic conditions. Hence, location specific recommendations are necessary to bridge the gap. These findings are similar tothe findings of Patel *et al*. (2013); Lalit *et al*. (2015); Jyothiswaroopa *et al.* (2016) and Mukhargee (2003).

Extension gap:

The highest extension gap was (2.90 q / ha) observed in the year of 2011-12. The extension gap was varied from 1.70 q / ha to 2.90 q/ha during the study period. The overall average extension gap has been recorded *i.e*. 2.23 q/ha (Table 1). This emphasized the need to educate the farmers through various means for adoption of improved package of practices of crop. More and more use of latest production technologies with high yielding as well as yellow vein mosaic resistance varieties would be change this alarming trend. The latest technologies would be eventually lead to discontinue the old technologies and to adopt new technologies by the farmers. This finding is in corroboration with the findings of Hiremath and Nagarju (2010) and Jyothiswaroopa *et al*. (2016).

Technology index:

The technology index shows the feasibility of the evolved technology at the farmer's field, as lower the value of technology index more is the feasibility of the technology (Jeenger *et al*., 2006). The technology index varied from 3.5 per cent to 39 per cent during the study period, while, it was observed an overall average 25.94 per cent. The result of the present study contrast with the findings of Bar and Das (2015).

Economic return:

The input and output price of the commodities prevailed during the demonstrated period were taken for calculating cost of cultivation *i.e.* gross return, cost of cultivation, net return and cost benefit ratio (Table 2). The cultivation of green gram varieties (TJM-3 and TM 99-37) under improved package of practice have been given higher average net return *i.e.* Rs. 17 685/ ha as compared to farmers practice *i.e.* Rs. 11 463/ ha. The Rs. 6222/ ha additional gain has been received during the study period as compared to farmers practices after incurring additional Rs. 1507/ only. The overall average

Table 1 : Productivity, technology gap, extension gap and technology index of green gram crop under frontline demonstrations

Year	Variety	Area (ha)	No. of farmers	Av.yield (q/ha.) farmer practice	Yield (q/ha.) demonstration			Per cent increased	Potential yield	Technology gap (q/ha)	Extension gap (q/ha)	Technology index (%)
					Minimum	Average	High					
2007-08	TM 99-37	5.2	13	4.25	4.50	6.02	8.75	41.64	10	3.97	1.77	39.70
2008-09	TM 99-37	5.2	13	3.75	4.50	6.25	7.50	75.07	10	3.75	2.50	37.50
2009-10	TM 99-37	4.4	11	4.46	3.75	6.16	8.75	38.12	10	3.84	1.70	38.40
2010-11	TJM-3	5.2	13	6.63	6.50	8.93	11.80	34.69	10-12	1.06	2.30	10.60
2011-12	TJM-3	5.2	13	6.75	8.75	9.65	12.0	42.96	10-12	0.35	2.90	3.50
	Av.	25.20	63	5.17	5.60	7.40	9.86	46.49	10	2.59	2.23	25.94

Table 2 : Cost of cultivation (Rs./ ha.) gross return (Rs./ha), net return (Rs./ha) and B:C ratio of improved and farmers practices

Year	Cost of cultivation (Rs./ha)		Gross return (Rs./ha)		Net return (Rs./ha)		B.C. ratio	
	Demo.	Farmers practice	Demo.	Farmers practice	Demo.	Farmers practice		
2007- 08	7725	6539	12040	8500	4315	1961	1.56	1.29
2008-09	7725	6539	18750	10710	11025	4171	2.43	1.63
2009-10	9017	7707	27682	20038	18655	12331	3.07	2.60
2010-11	11380	9560	37560	31620	26180	20720	3.30	2.90
2011-12	12250	10218	40530	28350	28250	18132	3.30	2.27
Av.	9619.4	8112.6	27312.4	19843.6	17685	11463	2.73	2.14

gross return also higher *i.e.* Rs. 27312/ha as compared to farmers practices *i.e.* Rs. 19844/ ha. The gross return was varies *i.e.* 12040, 18750, 27682, 37560 and 40530 as compared to farmers practices *i.e.* Rs. 8500/, 10710, 20038, 31620 and 28350, during the study years - 2007-08, 2008-09, 2009-10, 2010-11 and 2011-12 , respectively. The benefit cost ratio of demonstrated technologies (2.73) was more than the farmer's practices (2.17). This shows the higher profitability and economic viability of the demonstrated technologies. More or less similar results were also reported by Raj *et al.* (2013); Lalit *et al.* (2015) and Mokidue *et al*. (2011).

Conclusion:

The productivity enhancement under frontline demonstration over existing farmers practices of Green-Gram cultivation created greater awareness and motivated the other farmers to adopt appropriateness production technology of Green Gram along with improved varieties in the district. The selection of the specific technology like YVM resistant varieties seed treatment with Rhizobium culture as well as PSB culture @5 g/kg of seed each, plant protection measures and integrated weed management measures were taken in a proper way. The demonstration trials also enhance the relationship and confidence between farmers and scientist of Krishi Vigyan Kendra. The recipient farmers of front line demonstrations also play an vital role as a source of information and quality seeds for wider dissemination of the improved varieties of green gram for other nearby farmers. It could be concluded that the FLDs programme is an important tool in enhancing the production and productivity of green gram through changing the attitude, knowledge and skill of the farmers of district.

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