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Evaluation of Front Line Demonstration Programme on Green gram Variety Meha (IPM-99-125) in Bharuch district of Gujarat

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Abstract: *The present study was conducted by KVK, Bharuch during 2012 to 2014 in the summer seasons with seventy five frontline demonstrations across twenty two villages of Bharuch district of Gujarat. The results of demonstrations showed that farmers could increase the Green gram productivity notably by switching over to improved variety and adoption of improved production technology. From the front line demonstrations, it was observed that the improved Green gram variety Meha recorded the higher yield (1325 kg/ha) compared to the farmers' practices variety (975 kg/ha). The increase in the demonstration yield over farmer's practices was 35.90 %. Technology gap and the technology index values were 175 kg/ha and 11.66, respectively. The decline in overall yield and area under cultivation of green gram in district Bharuch from the year 2008-2010 was due to the high incidence of yellow vein mosaic (YVM) disease. The increment in yield of green gram crop under front line demonstrations was due to spreading of improved and latest technology viz. YVM resistance variety, seed treatment with bio-fertilizers, recommended seed rate, proper dose of fertilizers and plant protection measure.*

I. Introduction

India is the largest producer, consumer and importer of pulses. Pulses are a good and chief source of protein for a majority of the Indian population. Pulses contribute 11% of the total intake of proteins in India (Reddy, 2010). In India, frequency of pulses consumption is much higher than any other source of protein, which indicates the importance of pulses in their daily food habits. The domestic production of pulses was around 18.1 million tonnes over the last three years. Pulses production in India has not kept up with growth in demand calling for import to the tune of 2.0 to 4.0 million tones (Raj *et. al.*, 2013). Even though pulses production increased significantly during the last decade but continuing the rapid growth is a challenge for researchers, extension agencies and policy makers to fulfill the domestic demand. The productivity of pulses in India (694 kg/ha) is lower than most of the major pulse producing countries. In Gujarat, *kharif* and summer green gram was cultivated in an area of 2.65 Lakh ha with production 1.20 Lakh MT and productivity 455 kg/ha during the year 2011-12 (DOA, 2011-12).

The concept of front line demonstrations in India was put forth under a "Technology Mission on Pulses" in 1991-92. The main objective of front line demonstrations is to demonstrate newly released crop production technologies and its management practices in the farmers' field under different farming situations and at different agroclimatic regions. These demonstrations are carried out under the supervision of agricultural scientists. The newly and innovative technology having higher production potential under the specific cropping system can be popularized through FLD programme. The present study has been undertaken to evaluate the difference between demonstrated technologies vis-a-vis practices followed by the local farmers in green gram crop.

II. Research Methodology

The study was carried out in operational area of Krishi Vigyan Kendra (KVK), Bharuch located in south Gujarat. Seventy five front line demonstrations were conducted on green gram crop in 22 villages over the period three years. The data on output of high yield variety of green gram crop and inputs used per hectare have been collected from the front line demonstration trials conducted by KVK, Bharuch. All the participating farmers were trained on various aspects of green gram production technologies. Recommended agronomic practices and genuine seeds of green gram were used for FLDs in 0.4 ha area/demonstration. A one fifth area was also devoted to grow local standard check (farmer's practices). In addition to this, data on traditional practices followed by farmers have also been collected. The primary data were collected from the selected farmers with the help of interview schedule and interpreted and presented in terms of percentage increased yield. Thus, a total sample size comprised of 75 respondents from 22 villages across Bharuch district. To estimate the technology gap, extension gap and technology index following formulae used by Samui *et al.* (2000) have been used:

Technology gap = Pi (Potential yield) - Di (Demonstration yield)
Extension gap = Di (Demonstration Yield) - Fi (Farmers yield)
$$\text{Technology index} = \frac{\text{Technology gap X 100}}{\text{Potential yield}}$$

III. Results And Discussion

Differentiation in farmers' practices and demonstration package in green gram crop:

The major differences were observed between demonstration package and farmer's practices are regarding recommended varieties, seed treatment, time of sowing, fertilizer dose, method of fertilizer application and plant protection measures. Table 1 shows that under the demonstrated plot only recommended varieties and bio-fertilizers were given to farmer by the KVK and all the other package and practices were timely performed by the farmer itself under the supervision of KVK scientist. Under farmers' practice, they generally sow seed of green gram var. K 851 and GM 4 at higher seed rate

without treatment. Both these varieties grow by farmers found susceptible to yellow vein mosaic disease (Pawar and Mahatma, 2013). As a result, the farmers selected under FLD program on green gram were provided with the seed of YVM resistance green gram var. Meha (IPM-99-125) from the year 2012 onwards.

It is also observed that under farmer situation, normally sowing of green gram is earlier to escape from water shortage for irrigation, thus leading to reduction in yield. Regarding the method of fertilization, under demonstration, all fertilizers were drilled at the time of sowing, whereas, under farmers' practice, broadcast method of fertilization was adopted. Similar findings have also been observed by Chandra G. (2010) and Raj *et. al.* (2013).

Table 1. Differences between farmers' practices and technological intervention for green gram crop

SN.	Particular	Farmers' Practice	Demonstration Package
1	Variety	K 851 and GM 4	Meha (IPM 99-125)
2	Seed Treatment	No seed treatment	Thiram @ 3g/kg seed + Rhizobium and PSB culture 10ml/kg seed
3	Time of sowing	First Week of February	25 February 15 March
4	Fertilizer dose	Irrational use of nitrogenous fertilizers and less use of phosphate fertilizers.	Urea @ 43 kg/ha and SSP@ 266 kg/ha

The performance of FLD programme on production and economics of green gram:

Performance of FLD:- A comparison of yield performance between demonstrated practices and local checks is shown in Table-2. It was observed that in front line demonstrations, the improved yellow vein mosaic resistance green gram variety Meha recorded the higher seed yield (1325 kg/ha) when compared to farmers practices (975 kg/ha). The increase in the yield over local check was 35.90 %. Similar yield enhancement in different crops in front line demonstration has been documented by Poonia and Pithia (2011), Patel *et al*. (2013), and Raj *et al*. (2013). It is evident from the results that the yield of improved YVM resistance variety was found better than the local check under same environment conditions. Farmers were motivated by results of demonstrated agro technologies applied in the FLDs and it is anticipated that they would adopt these technologies in future. Yield of the front line demonstration and potential yield of the crop was compared to estimate the yield gaps which were further categorized into technology index.

Technology gap: - The technology gap is the difference or gap between the demonstration yield and potential yield and it was 175 kg/ha. This gap exists due to variation in the soil fertility and climatic conditions. Hence location specific recommendations are necessary to bridge the gap. These findings are similar to the findings of Patel *et al* (2013).

Technology index: - Technology index shows the feasibility of the technology at the farmer's field. The lower the value of technology index more is the feasibility. Result of present study depicted in Table- 2, revealed that the technology index values were 11.66. The results of the present study are in recurrence with the findings of Bar and Das (2015)

Table 2. Yield Performance of Green gram under Farmers' Practice and Front Line Demonstration.

Variables	Yield (kg/ha)	% increase over local check	Technology gap (kg/ha)	Technology index (%)
Farmers Practices	975	-	-	-
Demonstration (Cv. Meha)	1325	35.90	175	11.66

Economics of frontline demonstrations:- The economics of green gram production under front line demonstrations have been presented in Table- 3.The Results of economic analysis of green gram production revealed that the gross expenditure in recommended practices was higher than the farmer's practices by about 12.79%. But, front line demonstrations recorded higher gross returns (Rs. 78,175/ha) and net return (Rs. 53,925/ha). The benefit cost ratio of demonstration plot (3.22) was also more than the farmer's practice. Further, additional cost of Rs.2, 750 per hectare in demonstration has increased additional net returns Rs.20, 650 per hectare with incremental benefit cost ratio 7.51 suggesting its higher profitability and economic viability of the demonstration. More and less similar results were also reported by Raj *et al* (2013).

Table 3. Economics of frontline demonstrations

Variables	Cost of cultivation (Rs/ha)	Gross return (Rs/ha)	Net return (Rs/ha)	Benefit: Cost ratio
Farmer's Practices (Local check)	21500	57525	36025	2.68
Demonstration	24250	78175	53925	3.22
Additional in demonstration	2750	20650	17900	7.51*

***** Incremental benefit cost ratio

Exploitable yield reservoir in Green gram:-

The results obtained from FLDs during the three years (2012 to 2014) have conclusively proved the beneficial impact of the production technology over the farmers' practices. The existing average productivity of green gram in Gujarat is 455 kg/ha however the total annual production is 1.20 Lakh MT (DAO, 2011-12). The estimates derived from the FLD's showed that there exists a commercially exploitable yield reservoir, which can be achieved through adoption of advocated improved crop production technology for green gram. Thus, it is clear that with full adoption of the presently available production technologies, 3.64 Lakh MT of green gram production could be achieved, which is almost adequate to meet the requirement of green gram in the state.

Table 4. Exploitable yield reservoir in Green gram in Gujarat.

Average Demonstration yield under FLD (kg/ha)	Gujarat State Average Productivity (kg/ha) 2011-12	Gujarat State Average Production (Lakh MT) 2011-12	Expected production (Lakh MT) *if yield gap is bridged through complete adoption of improved practices*
1325	455	1.20	3.64

Role of FLD programme in augmenting green gram cultivation in the district:

There were sizeable areas under green gram cultivation in Bharuch district before the widespread occurrence of yellow vein mosaic disease. The decline in overall yield and area under cultivation of green gram in district was reported due to high incidence of yellow vein mosaic (YVM) disease. Farmers started summer groundnut cultivation in replacement of green gram to avoid losses. Groundnut on contradictory as a four months crop incurs more irrigation and expenditure on inputs than green gram. The FLD programme on Meha variety with subsequent extension programme leads to revival of green gram cultivation in the district. The area under green gram showed an increasing trend over the period of last few years (2011-12 to 2013-14). The area under green gram in the district was 48.19 percent more in 2013-14 as compared to the area during 2011-12. (District Agriculture Officer, 2013-14)

IV. Conclusion

The findings of the study revealed that wide gap exist in demonstration yield and farmer's practices in green gram varieties due to technology and extension gap in Bharuch District of Gujarat. The per cent increment in yield of green gram to the extent of 36 % in FLDs over the farmers practice created greater awareness and motivated the other farmers to adopt the improved package of practices of green gram. These demonstration trails also enhance the relationship and confidence between farmers and KVK scientists. The recipient farmers of FLDs also play an important role as source of information and quality seeds for wider dissemination of the improved varieties of green gram for other nearby farmers. It is concluded that the FLD programme is a successful tool in enhancing the production and productivity of green gram crop through changing the knowledge, attitude and skill of farmers.

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