Analysis of Adoption Gaps in Summer Moong Cultivation Technology in Sonipat District of Haryana

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Paper Received on July 15, 2019, Accepted on September 18, 2019 and Published Online on October 01, 2019

ABSTRACT

Green Gram is one of the main pulse crops of Haryana, sown both in Summer and Kharif seasons and it works as catch crop in between Rabi and Kharif. It takes about 60 days for maturity in summer; however its cultivation was not promoted before 2005. The Summer Moong not only provides additional income to the farmers, but it also improves soil health by adding organic matter in soil. It adds nutrition in daily food of poor farming community. The present study was conducted by KrishiVigyan Kendra, Sonipat in operational villages of FLDs. KVK Sonipat has conducted 245 front line demonstrations on summer moong covering 98.0 hectares area and 245 farmers as beneficiaries during 2012-13 to 2016-17. The production, productivity and economic returns of summer moong in demonstrated plots were compared with the corresponding farmers' practices. The data so obtained were pooled and analyzed. The data depicted that the average yield of summer moong under FLD plots ranged between 9.1q/ha to 9.8q/ha, whereas, under the farmers' practice, it ranged between 7.7 q/ ha to 8.1 q/ha. The FLD plots recorded 12.34 to 24.05 per cent increase in yield over local check. The increase in yield of summer moong crop under front line demonstrations was due to improved practices demonstrated at farmers' fields namely timely sown of the crop, use of healthy seed, high yielding varieties, recommended seed rate, IPM & INM etc.

***Key words**: Green Gram; Catch crop; Summer Moong; Organic matter; Farming community;*

Pulses are important source of dietary protein, play a major role in fulfilling dietary requirements along with achieving nutritional security for burgeoning Indian population, majority being vegetarian. Green Gram is one of the major pulse crop sown both in summer and Kharif seasons in Haryana. It is a catch crop in between Rabi and Kharif season crops of paddy and wheat. It takes about 60 days for maturity; however its cultivation was not promoted over large acreage due to the non availability of short duration varieties, which can successfully fits into the exiting crop rotation. The summer moong not only gives additional income to the farmers but it also improves soil health by adding organic matter in the soil along with tackling malnutrition problem among the poor farm and labour families. Conducting Frontline Demonstrations (FLDs) to showcase the production potentials of different agricultural technologies is one of the mandates of Krishi Vigyan Kendras. Therefore, since inception KVK, Sonipat is also conducting FLDs on different crops and enterprises with special emphasis on pulse crops.

METHODOLOGY

The present study was conducted by KrishiVigyan Kendra, Sonipat in operational villages where FLDs were conducted over years in Sonipat District of Haryana. KVK Sonipat has carried out 245 front line demonstrations on summer moong in 98.0 hectares area during 2012-13 to 2016-17 to demonstrate the improved production technologies. Third week of March (20th March) to mid-April is considered as optimum time of sowing of summer moong. The sowing after mid-April, may result in damage due to high humidity during maturity period. The selected farmers were provided training on improved cultivation of summer moong. The farmers were also guided and monitored during the period

of summer moong cultivation. The data were collected from farmers by interview method with the help of a well structured questionnaire after harvesting/marketing of moong with active association of KVK Scientist. The productivity and economic returns of summer moong in demonstrated plots were calculated and compared with the corresponding farmers' practices (local check). The data were tabulated to make inferences in terms of yield obtained, increase in yield and monetary benefits. Different parameters were calculated to find out technology gaps (*Yadav et al., 2004*) as follows:

Extension gap= demo. yield- farmers' practice yield

Technology gap= potential yield-demo. yield

Additional return= demo. return- farmers' practice return

$$\text{Techno. index} = \frac{\text{Potential yield} - \text{Demo. yield}}{\text{Potential yield}} \times 100$$

RESULTS AND DISCUSSION

Year wise front ine demonstrations: The data presented in Table 1 shows that maximum number of demonstrations (81) were conducted during 2014-15 followed by 63,48,31 and 22 in 2012-13,2013-14,2015-16 and 2016-17, respectively. This was due to the funds availability with KVK to conduct FLDs.

Table 1. Year wise distribution of FLDs

Year	No.	Area (ha)	No. of Beneficiaries
2012-13	63	25.2	63
2013-14	48	19.2	48
2014-15	81	32.4	81
2015-16	31	12.4	31
2016-17	22	8.8	22
Total	245	98.0	245

Technology demonstrated: The moong variety sown under FLDs were SML668 and MH-421, which were developed by PAU, Ludhiana and CCSHAU, Hisar, respectively, while SML668 and local varieties were grown under farmers' field. Both the varieties grown under FLDs are short duration and fits in crop rotation. The data presented in Table 2 show that farmers were using less seed (20 kg/ha) as compared to demonstration plots (25 kg/ha), no farmer was treating the seed before sowing with fungicides and/or bio fertilizers. Farmers apply irrational fertilizer doses and no weed management practice was adopted by them. It is also depicted from Table 2 that the farmers were not following any plant protection measures to protect their crop from insect pest infestation, while in demonstration plots proper plant protection measures were adopted. Similar results were reported by *Yadav et al. (2007)* and *Dhillon 2016*.

Yield gap: The crop was harvested under the supervision of KVK scientists. The yield of demonstration plots and farmers' practice were compared and the data is presented in Table 3. It shows that 24.05 per cent increase in demonstrated plots was recorded over the farmers' practice in 2014-15 followed by 19.75 per cent, 14.28 per cent, 13.75 per cent and 12.34 per cent during 2013-14, 2015-16, 2012-13 and 2016-17, respectively. This can safely be attributed to the effect of improved practices demonstrated to the farmers in demonstration plots.

Extension gap : The calculation of extension gap between demonstrated technologies and farmers' practice is major objective of conducting FLDs. The extension gap was calculated and it ranged between 1.0 to 1.9 q/ha (Table 3). The factors attributing the extension gap were adoption of improved practices namely proper seed rate, seed treatment with fungicide and bio fertilizers, weed management, nutrient management and adoption of plant protection measures.

Technology gap: The technology gap was highest (3.2 q/ha) during 2015-16 followed by 2.9 q/ha, 2.9 q/ha,

Table 2. Details of summer moong grown under front line demonstration and farmers practices

Technology components	Demonstration package	Farmers' practice
Farming situation	Irrigated	Irrigated
Variety	SML 668 and MH-421	SML 668
Seed rate	25 kg/ha	20 kg/ha
Time of sowing	March 20 to April 10	20 April to 5 May
Method of sowing	Line sowing	Broadcasting
Seed treatment	Carbendazim 50 WP @2.5gm/kg seed	No seed treatment
Use of biofertilizers	Rhizobium +PSB	No inoculation
Fertilizer application	35 kg/ha urea +250kg SSP as basal dose	Irrational use
Weed management	Pendimetheline 30 EC @ 3.3 l/ha	Not used
Plant protection	Rogor @625 ml/ha &indofil M-45 @1.75 kg/ha	Not used

Table 3. Yield gap analysis of front line demonstration (FLDs) and farmers' practice (FP) of Summer Moong

Year	Yield (q/ha)			Increase	Extension	Technological	Technology
	Potential	FLD	FP	over FP (%)	gap (q/ha)	gap	index (%)
2012-13	12	9.1	8.0	13.75	1.1	2.9	24.16
2013-14	12	9.7	8.1	19.75	1.6	2.3	19.16
2014-15	12	9.8	7.9	24.05	1.9	2.2	18.33
2015-16	12	8.8	7.7	14.28	1.1	3.2	26.66
2016-17	12	9.1	8.1	12.34	1.0	2.9	24.16

Table 4. Economic analysis of front line demonstration (FLDs) and farmers' practice (FP) of Summer Moong

Year	Average Cost of cultivation (Rs./ha)		Average Gross Return (Rs./ha)		Average Net Return (Rs./ha)		Additional return	B:C ratio
	FLD	FP	FLD	FP	FLD	FP		
2012-13	18643	17780	40500	36000	21857	18220	3637	2.17
2013-14	19643	18780	39560	34430	19917	15650	4267	2.01
2014-15	20567	19870	40210	35340	19643	15470	4173	1.95
2015-16	20867	20145	39678	34749	19111	14604	4507	1.90
2016-17	21428	22678	45650	40340	24222	17662	6560	2.13

2.3 q/ha and 2.2 q/ha during the year 2012-13, 2016-17, 2013-14 and 2014-15, respectively (Table 3). It is due to the adoption of improved recommended technologies like sowing time, seed rate and treatment, weed and nutrient management and proper plant protection measures. The similar findings were observed by *Biyan et al. (2012)* and *Dhillon 2016.*

Economic analysis: The average gross return, average net return and additional return is a combination of grain yield obtained and minimum support price (MSP) fixed by Government. Probing the data given in table 4 shows that maximum average gross return of Rs. 45650/ha was obtained during 2016-17 and minimum Rs.3 4430/ha was in 2013-14. The average net return ranges from Rs. 19111/ha to Rs. 24222/ha over years. Further, it was also found that additional return of demonstration farmers ranges from Rs. 14604/ha to Rs. 6560/ha with B:C ratio ranges from 1.90 to 2.17.

CONCLUSION

It is concluded on basis of the study that FLD programme of KVKs is a unique programme and it can effectively change knowledge, skills and attitude of participating farmers and hence resulting in increase of production and productivity of summer moong crop. FLD is greater tools of mass awareness and can also motivate other farmers to adopt improved practices of summer moong cultivation. It also indicates that with adoption of improved practices, farmers can get more yield and better economic returns.

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