JFL

Journal of Food Legumes 33(4): 257-261, 2020

Effect of frontline demonstrations on summer moong in Amritsar district of Punjab

ASTHA*, RAMINDER KAUR HUNDAL and BHUPINDER SINGH DHILLON

Krishi Vigyan Kendra, Amritsar, Punjab

*Email: astha-asr@pau.edu

Received: December 11, 2020
Accepted: February 20, 2021

Handling Editor:
Dr Uma Sah, ICAR-IIPR, Kanpur

ABSTRACT

The productivity of pulse crops continues to be quite low due to technological gaps in adoption of pulse technologies and other factors also. The yield of pulses could be increased by demonstrating the cultivation technologies at the farmer's fields under the supervision of scientists working in the operational area. The Front line demonstrations were conducted on summer moong variety SML 668 and SML 832 across 89 villages in Amritsar district of Punjab. Two hundred and forty three front line demonstrations were conducted by KVK Amritsar from the year 2011 to 2019 on area of 106 ha during the summer seasons. The results of the study showed that the average yield of summer moong in FLD plots over the years was 10.5 q/ha, which was 20.6 % higher than average yield at farmers plots (8.7 q/ha), this difference may be attributed to dissemination of improved and latest technology *viz.*, HYV, recommended seed rate, fertilization and integrated weed control and integrated plant protection measures. The demonstration technology gave higher net return as compared to check plots and benefit cost ratio was also higher as compared to farmer's practices. The yield attributing parameters like number of branches/ plant and number of pods/plant, grain weight of moong obtained was also better under demonstrations than the farmers practice. The total area under moong crop in district Amritsar is steadily increasing over time as demonstrations were effective in changing attitude of farmers of Amritsar towards pulse cultivation.

Key words: Adoption, Front line demonstrations, Summer Moong Technological gaps

INTRODUCTION

India is the largest producer of pulses (around 25% of global production), however, the productivity of pulses in India is 755 kg/ha, whereas in the USA and Canada it is as high as 1,900 kg/ha. India is the largest producer and consumer of pulses in the world, accounting for about 25 per cent of global production, 27 per cent of consumption, and 34 per cent of food use (FAO, 2004). The pulse production of India in year 2017-18 was 24.51 million tons and imports stand at 5.65 million tons, which is around 18 % of our total pulses requirement. The Government of India had also established a "Technology Mission on Pulses" in the year 1991-92 with the objective to enhance the pulse production and productivity. The concept of front line demonstrations (FLDs) was put forth under this mission. These demonstrations are conducted under the close supervision of scientists of KrishiVigyanKendra's, SAUs and their Regional Research Stations. The FLD is an important tool for transfer of latest package of practices in totality to farmers and the main objective of this programme is to demonstrate newly released crop production and protection technologies and management practices at the farmer's field under real farming situation. The country would require 39 million tonnes of total pulses by 2050, which will require pulses production to grow at an annual rate of 2.2% (Ahlawat *et al* 2016).Through this practice, the newly improved innovative technology having higher production potential under the specific cropping system can be popularized and simultaneously feedbacks from the farmers are generated on the demonstrated technology. Therefore, it is very essential to demonstrate the high yielding varieties, resistant to biotic and abiotic stresses and other pulse production technologies which the farmers generally do not adopt. Keeping the importance of FLDs, the KVK, Amritsar conducted demonstrations on pulse crop *viz.*, summer moong at farmers' fields under irrigated situations in summer season during the year 2011 to 2019.The present study has been undertaken, to study the performance of recommended

high yielding summer moong varieties with full recommended package of practices for harvesting higher crop yields, to compare the yield levels of local check (farmers' practices) and FLD plots and to collect feedback for further improvement in the performance of summer moong cultivation practices.

MATERIAL AND METHODS

Farmers of operational area of KVK, Amritsar were selected as per allotment of FLDs to KVK by Zonal Coordinator (Zone-I). Accordingly, the FLDs under moong crop were laid out in 89 villages covering 106 ha of farmers fields from 2011 to 2019. Regular visits by the KVK scientists to demonstration fields were ensured and made to guide the farmers. These visits were also utilized to collect feedback information for further improvement in research and extension programmes. Field days and group meetings were also organized at the demonstration sites to provide the opportunities for other farmers to witness the benefits of demonstrated technologies. The critical inputs were duly supplied to the farmers by the KVK. The primary data were collected from the selected farmers with the help of interview schedule and interpreted and presented in terms of percentage, the qualitative data were converted into quantitative form and expressed in terms of per cent increased yield. Thus, a total sample size comprised of 243 respondents from 89 villages across Amritsar district wherein, FLDs were conducted by KVK Amritsar. The data were collected from both front line demonstration plots as well as control plots (farmers practices) and finally the extension gap, and technology gap were worked out (Samui*et al*., 2000) as given below:

Technology Gap in (q/ha) = Potential yield – Demonstration yield.

Extension Gap in (q/ha) = Demonstration yield – Farmer's yield.

RESEARCH AND DISCUSSION

The technological gaps in adoption of moong production technologies under demonstrations and local farmers' practices were measured. The major technological gaps were observed regarding recommended varieties, seed rate, seed treatment, time of sowing, fertilizer dose, method of fertilizer application and plant protection measures. **Table 1** elaborate that in case of demonstration plots recommended moong varieties and pesticides were provided to farmers by KVK and all the other package of practices were timely performed by the farmers under the supervision of KVK scientists. Under farmer's practice, they generally sow seed of local moong variety using lower seed rate that too without seed treatment. Sowing is done by broadcasting method in fields under farmer practice whereas in demonstration plots it's done in equally spaced lines. It was also observed that under farmer field, sowing of moong is done late, leading to reduction in yield. Regarding the method of fertilization, under demonstrations, all fertilizers were drilled at the time of sowing, whereas, under farmer's practice broadcast method of fertilization was adopted. Out of nine blocks of district Amritsar summer moong or green gram crop is popular in vegetable belt,which is confined to three blocks i.e. Jandiala Guru, Majitha and Verka. Summer crop is

Table 1. Particulars showing the technology gap between summer moong grown under Front Line Demonstrations and farmers practices.

SR. no.	Particulars	Farmers Practice	FLD
1.	Method of sowing	Broadcasting	Line with spacing 22.5 x7 cm
2.	Variety	Muskan, local	SML-668 and SML-832
3.	Seed Source	Own + seed from Private sources	sold by PAU Ludhiana
4.	Seed treatment	No treatment / un-recommended chemicals	Captan @ 3gm/Kg
5.	Bio-fertilizer	Not used	Rhizobium culture
6.	Time of Sowing	10 March – End April	20 March- 10 April
7.	Spray Technology (amount of water used/acre)	Half of recommended	As per recommendation
8.	Weed management	No weedicide	Stomp (Pendimethalin 30 EC) 2.5 L / ha as pre- emergence
	Mechanical removal of weed with hand hoeing	Difficult as sowing by broadcasting	Easy as sowing is done in lines
9.	Pest & Disease management	Un-recommended & overdose of pesticides is used	Need based by following Integrated pest and disease management principles

best suited after potato and pea crop in these particular blocks (**Table** 2).

Effect of FLD programme on production performance of summer moong

The results obtained during last eight years revealed that the average yield of summer moong sown after harvesting of *rabi* crops under FLD plots for all the years was 10.7q/ha, whereas, under the farmer's practice, it was 8.9 q/ha. The FLD plots recorded on an average 20.9 per cent increase in moong yield as compared to farmer's field similar results are documented by Lalit *et al*. (2015). The data regarding increase in yield over the farmer practice along with cost benefit ratio and technology gap is given in **table 3**. Cost benefit ratio of front line demonstration was observed at 2.5 compared to 1.58 in case of farmer's practice, which is quite a significant difference. These results collaborate with the studies of Raj et al. (2013) and Kumar et al. (2015) who also reported that additional return was increased under front line demonstration plots. The average technology gap of 0.55 q/ha in yields of FLDs on summer moong and potential yield of summer moong was observed and average extension gap of 1.86 q/ha was calculated between the yields of demonstration plots of summer moong, when compared to farmers field. The results confirm the findings of frontline demonstrations on oilseed and pulse crops by Yadav *et al* (2004) and Lathwal (2010).

Performance of moong under demonstration and farmer's practice sown after wheat, pea and potato crop

Yield of summer moong crop sown after potato and pea crop was better than moong crop sown after wheat crop. Per cent increase in yield in summer moong FLDs sown after potato crop (14.6%) and after pea crop (13%) was higher than that sown after wheat crop (11.28%) because of the difference in sowing dates. Also the fertility status of soil was highest in potato fields followed by pea fields because farmers use excessive fertilizers in vegetable crops. Least fertility status was observed in moong crop sown after wheat

Table 2. Block wise cropping pattern of district Amritsar

Blocks	Crop Rotations
Jandiala Guru	Rice/Basmati (short duration varieties)-Peas/Potato/Wheat-Spring Maize/Celery/Summer Vegetables/Summer Moong
Majitha	Rice/Basmati (short duration varieties)--/Peas/Potato/Wheat-Spring Maize/Celery/Summer Vegetables//Summer Moong
Verka	Rice/Basmati (short duration varieties) - wheat/Potato/Peas/Berseem for fodder –Celery/Summer Moong/ Fodder crops/summer vegetables
Tarsika	Rice/Basmati (short duration varieties) -Peas/Potato/Wheat- Spring Maize/ Celery/Summer Vegetables
Baba Bakala	Basmati/Rice-Wheat/Peas/Potato/Sugarcane
Ajnala	Basmati/Rice-Wheat/Sugarcane
Chogawan	Basmati/Rice-Wheat
HarshaChhina	Basmati/Rice-Wheat
Attari	Basmati/Rice-Wheat

Table 3. Performance of summer moong varieties through CFLDs during 2011-12 to 2018-19

Crop	Variety	Demo area (ha)	Farmers (No.)	Yield (q/ha)			Technology Gap (q/ha)	Extension gap (q/ha)	Net returns (Rs./ha)		BCR	
				Demo	Check	Increase (%)			Demo	Check	Demo	Check
2011-12	SML 668	15	35	10.4	8.5	22.4	0.85	1.9	29445	18554	2.7	1.15
2012-13	SML 668	4	33	10.3	8.6	19.8	0.95	1.7	29445	19654	2.6	1.33
2013-14	SML 668	8	12	10.8	8.8	22.7	0.45	2.0	22870	13900	2.12	1.45
2014-15	SML 668	9	15	10.5	8.7	20.7	0.75	1.8	22970	13950	2.4	1.55
2015-16	SML 668	10	23	10.9	8.9	22.5	0.35	2.0	25941	16544	2.42	1.67
2016-17	SML 832	20	51	11.2	9.4	19.1	0.30	1.8	29738	17011	2.62	1.77
2017-18	SML 668	20	40	11.1	9.2	20.7	0.15	1.9	27600	17544	2.52	1.78
2018-19	SML 832	20	34	10.9	9.1	19.8	0.6	1.8	29715	17032	2.72	1.95
Cumulative sum		106	243	86.1	71.2	167.7	4.4	14.9	217724	134189	20.1	12.65
Average of eight years		13.25	30.35	10.76	8.9	**20.96**	0.55	1.86	27215	16774	2.5	1.58

Table 4. Performance of moong under demonstration and farmer's practice sown after wheat, pea and potato

Crop	Variety	Yield After wheat crop (q/ha)			Yield After Pea crop(q/ha)			Yield After potato crop (q/ha)		
		Demonstration	Farmers practice	% increase	Demonstration	Farmers practice	% increase	Demonstration	Farmers practice	% increase
2011-12	SML 668	9.70	9.20	11.5	11.7	10	17.0	10.55	9.50	11.1
2012-13	SML 668	10.3	9.0	12.6	11.6	11.4	1.8	11.75	9.75	20.5
2013-14	SML 668	8.80	8.00	11.35	11.35	10.15	11.8	13.25	11.50	15.2
2014-15	SML 668	10.9	8.5	10.8	11.8	10.6	11.3	12.50	10.90	14.7
2015-16	SML 668	10.3	8.9	11.5	11.5	10	15.0	12.00	10.70	12.1
2016-17	SML 832	10.05	9.70	10.5	10.8	9.87	9.4	11.75	10.50	11.9
2017-18	SML 668	9.5	9.2	11.25	11.55	10.5	10.0	11.22	9.86	13.8
2018-19	SML 832	10	8.9	10.75	11.75	9.2	27.7	12.26	10.75	14.0
Cumulative sum		79.55	71.4	90.25	92.05	81.72	104	95.28	83.46	113.3
Average of eight years		9.94	8.92	**11.28**	11.50	10.21	**13.0**	11.91	10.43	**14.16**

crop. The sowing time of summer moong is recommended between March 20 to April 10 and the harvesting of wheat commence from 15th April in Punjab, which delays sowing of following summer moong crop. Therefore, summer moong sown after wheat matures in first fortnight of July and it came under the effect of pre monsoon showers whereas summer moong sown after pea and potato matures in first fortnight of June and so it escapes damage by monsoon (**Table 4**). The similar results of yield enhancement is documented by Roy *et al*. (2006). The yield attributing parameters like number of branches/ plant and number of pods/plant, grain weight of moong obtained over the years under recommended practice as well as farmers practice were also observed (**Table 5)**. The number of branches/plants of moong ranged from 3 to 5 under recommended practice as against farmer's field it ranged from 2 to 4. Similarly, higher number of pods/plants were recorded under recommended practice in demonstration from 12 to 28 as compared to farmer's practice where it ranged from 8 to 24.Grain weight per 100 seeds was also higher in demonstration plots i.e. 7.6 g whereas it was 6.8 g in case of farmers practice. Average number of grains per pod in demonstration ranged from 9-11 compared to 8-10 in farmers practice, similar findings in enhancement of yields under FLD have also been observed by Kirar *et al.* (2006), Asiwal and Hussain (2008). The productivity of pulse crops continues to be quite low due to technological gaps in adoption of pulse technologies and other factors also (Jagmohan et al, 2012). The yield of pulses could be increased by demonstrating their cultivation technologies at the farmer's fields under the supervision of scientists working in the operational area. Balai *et al* (2013) recorded more than 50 % increase in yield in groundnut FLDs in Rajasthan state through technology intervention.

Table 5. Average of Yield parameters under demonstrations and existing farmers practice.

Yield parameters	Demonstration Package	Farmers practices
Number of branches/plant	3-5	2-4
Number of pods/plants	12-28	10-24
100 grain weight (g)	7.6	6.8
Grains per pod	9-11	8-9

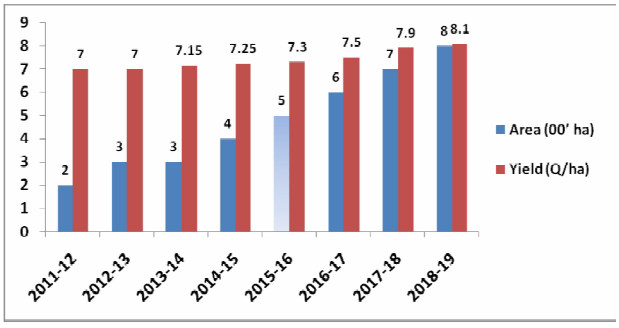

Fig 1: Status of summer moong in district Amritsar 2011-12 to 2018-19

CONCLUSION

From the study, it is concluded that the FLD programme is an effective tool for increasing the production and productivity of moong crop and changing the knowledge, attitude and skill of farmers. The per cent increase in yield of summer moong created greater awareness and motivation in the other farmers to adopt the improved package of practices of summer moong. These demonstrations have also built the relationship and confidence between farmers and scientists. The beneficiary farmers of FLDs also played an important role as source of information and distribution of quality seeds for wider dissemination of the high yielding varieties of summer moong for other nearby farmers. The selection of specific technology like improve variety, seed treatment, seed inoculation with biofertilizers i.e. Rhizobium, recommended dose of Phosphorus, Pre-emergence

weed management and plant protection measure were undertaken in a proper way. Frontline demonstration was effective in changing attitude of farmers towards pulse cultivation. Cultivation of demonstrated plots of summer moong with improved technologies has increased the skill and knowledge of the farmers. There is steady increase in yield and area under summer moong in district Amritsar (Fig 1) in last eight years.

REFERENCES

Ahlawat I P S, Sharma Purushottam and Singh Ummed. 2016. Production, demand and import of pulses in India. Indian Journal of Agronomy 61 4th IAC Special issue: S33-S41 2016

Asiwal B L and Hussain Akhter 2008. Demonstration- An effective technology for increasing The productivity of gram. Rajasthan Journal Extension Education, **6**.

Balai C M , Bairwa R K, Verma L N, Roat B L, and Jalwania R . 2013. Economic impact of front line demonstrations on cereal crops in Tribal Belt of Rajasthan International Journal of Agricultural Sciences **3**(7): 566-570.

Food and Agriculture Organization of the United Nations (FAO). 2004. "FAOSTAT."

Jagmohan Singh, Dhillon B S, Astha and Parvinder Singh. 2012. Front line demonstration – An effective tool for increasing the productivity of summer moong in Amritsar district of Punjab. An Asian Journal of Soil Science **2**(7): 315-318.

Kirar B S, Nashine R, Gupta AK and Mukharjee SC. 2006. Demonstration: An effective tool for increasing the productivity of urd. Indian Research Journal Extension Education.63.

Kumar P, Singh K and Kaur P. 2015. Economic impact of frontline demonstration on pulses in Punjab a step towards diversification. Indian J Econo & Develop, 11(1): 111-116.

Lalit M, Patil D J, Modi H M,Vasava and S R Gomkale. 2015. Evaluation of Front Line demonstration programme on green gram variety Meha IPM 99 – 125 in Bharuch district of Gujrat. Journal of Agri and Vet Science, 89 : 01 – 03.

Lathwal O P (2010). Evaluation of front line demonstrations on blackgram in irrigated agro ecosystem. Annals of Agricultural Research 31 (1&2) : 24-27.

Raj A D , Yadav V and Rathod J H. 2013 . Impact of front line demonstrations on the yield of pulses. Interernat. J Sci & Res Public, 3 (9): 1-4.

Roy Burman, Singh R, Singh, S K, Lakhan and Singh, AK. 2006. Adoption of improved pulses production technologies and related constraints in Uttar Pradesh. Indian J Pulses Res, 191 : 104-106.

Samui S K, S Mitra, D K Roy, A K Mandal and D Saha. 2000. Evolution of front line demonstration on groundnut. Journal Indian Soc. Coastal Agric. Res., **18** (2): 180 – 183.

Yadav D B, Kamboj B K and Garg R B .2004. Increasing the productivity and profitability of sunflower through front line demonstrations in irrigated agro ecosystem of eastern Haryana. Haryana Journal of Agronomy, **20** (2): 33-35.