LR-4850
[1-4]

RESEARCH ARTICLE Legume Research- An International Journal, Volume Issue : ()

Increasing Productivity and Profitability of Summer Mungbean through Cluster Frontline Demonstrations in Sonipat, Haryana

Parminder Singh, Ramesh Kumar, J.S. Bamel, Vinay Mehla,
Ajay Kumar, Jagat Singh, Satpal Singh

10.18805/LR-4850

ABSTRACT

Background: Cluster frontline demonstrations on summer mungbean were conducted at farmers' fields in 2018-19 and 2019-20 in Sonipat district of Haryana state. Crop yield and returns of demonstrations were compared to those obtained in the local check plots. Adoption of improved practices of crop production in demonstration plots increased the crop yield by 30% over local check.

Methods: A total number of 150 cluster front line demonstrations (CFLDs) were conducted in 60 ha. area during 2019 and 2020. A survey to get information on summer mungbean cultivation practices was undertaken before conducting the demonstrations. Selection of farmers and improved practices for demonstrations were done on the basis of survey information.

Result: The average yield recorded in the demonstration and local check plots was 580 kg/ha and 447 kg/ha, respectively. This increase in yield was recorded with additional expenditure of Rs. 2285/ha. Net returns, additional returns and benefit cost ratio in demonstrations came out to be Rs. 13076 /ha, 3073 /ha and 1.77, respectively. The extension and technology gaps were recorded as 132.5 and 920.0 kg/ha, respectively. The technology index of 61.3% strongly indicated the technology inadequacies in the crop cultivation. The results of demonstrations revealed that low level of productivity at farmers' fields could be increased to sustainable level by adoption of improved practices.

Key words: B:C ratio, Net return, Technology gap, Yield.

INTRODUCTION

Pulses are integral part of Indian vegetarian diet. Though, India is one of the largest producers of pulses in the world, yet unable to meet the demand of its population for the pulses. Despite record production of 23.01 mt of pulses in 2020-21, 3 mt of pulses were imported. Still there is gap between requirement and production of pulses in the country. Low productivity of pulse crops at farmers' fields is one of the reasons of this gap. Many factors, responsible for low productivity have been identified. Low level of adoption of improved crop production practices is one of the major factors. Govt. of India has taken initiatives to increase the production and productivity of pulses by implementing National Food Security Mission Project. The project aims at increasing the production and productivity of pulses by conducting cluster frontline demonstrations. Improved crop production practices are to be demonstrated in cluster frontline demonstrations. Green gram is an important pulse crop grown mainly in Kharif season. Growing of green gram in summer season not only adds in pulse production but improves soil health also. Summer season crop finds ample space in rice-wheat sequence. Cultivation of crop in summer season is possible in rice-wheat sequence. Many farmers have undertaken cultivation of summer green gram crop, but the productivity of the crop is very low which needs to be increased. As mungbean is a popular pulse in diet in Punjab, increase in area in general will not only boost farmer's income but also tackle the protein rich food availability and nutritional security for rural community in future (Shalendra *et al.*, 2013). Suryavanshi *et al.* (2020) revealed that the improved technologies recorded mean yield of 13.00 q/ha, which was 18.3 per cent higher grain yield in demonstration plots as compared to the farmer's practices, however SML 832 performed better than SML 668. The average extension gap, technology gap and technology index recorded were 0.42 q/ha, 2.0q/ha and 2.3 per cent, respectively.

Krishi Vigyan Kendra, Sonipat-131 029, Haryana, India.

Corresponding Author: Parminder Singh, Krishi Vigyan Kendra, Sonipat-131 029, Haryana, India. Email: pmalik279@gmail.com

How to cite this article: Singh, P., Kumar, R., Bamel, J.S., Mehla, V., Kumar, A., Singh, J. and Singh, S. (2022). Increasing Productivity and Profitability of Summer Mungbean through Cluster Frontline Demonstrations in Sonipat, Haryana. Legume Research. DOI: 10.18805/LR-4850.

Submitted: 08-12-2021 **Accepted:** 27-01-2022 **Online:** 17-03-2022

MATERIALS AND METHODS

Cluster front line demonstrations of summer mungbean were conducted at farmers' fields in Sonipat district during 2018-19 and 2019-20. The demonstrations were conducted at 75 fields of farmers in each year covering 30.0 ha. A survey to get information on summer mungbean cultivation practices were undertaken before conducting the demonstrations. Selection of farmers and improved practices for demonstrations were done on the basis of survey information. Critical inputs were provided to farmers to conduct the demonstrations. The critical inputs used to conduct the demonstrations were: Quality seed of improved variety *i.e.*, (MH-421), biofertilizers (Rhizotika and PSB), thiram for seed treatment, pendimethalin for weed management and thiomethoxam for management of sucking pests. Chemical fertilizers (NPK) were applied by the farmers themselves. Analysis of soil of demonstration plots was done to know the nutrient status. Fertilizers were applied on the basis of soil test report. Recommended practices of summer mungbean cultivation were followed in the demonstration plots. The plot size for demonstration each plot was kept 0.4 ha. The demonstrations were conducted with active participation of KVK scientists and farmers. Field operations such as sowing, herbicide, fertilizer and pesticide application *etc.* were carried in presence of KVK specialists. Field visits were made regularly to record the observations and to address field problems. Local check plots were selected in each village to record the yield of farmers' practice .Yield of demonstration plots was compared with yield of local check plots. The yield gap, cost and returns were calculated in the way suggested by Prasad *et al.,* 1993 and Yadav *et al.,* 2007 by using the following formulae:

(a) Extension gap = Demonstration yield - Local check yield

(b) Technology gap = Potential yield - Demonstration yield

(c) Technology index =

$$\frac{\text{Potential yield - Demonstration yield}}{\text{Potential yield}} \times 100$$

(d) Additional returns = (Demonstration yield − Local check yield) × Sale price

(e)
$$\text{Benefit cost ratio} = \frac{\text{Gross returns}}{\text{Cost of cultivation}}$$

RESULTS AND DISCUSSION

Assessment of gaps

The information collected on technology adoption revealed that there was huge gap between farmers' practices and recommended practices. The information collected on cultivation of varieties by the farmers indicated that majority of farmers did not use quality seed of improved varieties which is one of the major factors responsible for low crop yield. Information on seed rate use pattern revealed that half of the farmers used half quantity (12.5-15.0 kg/ha) of recommended seed rate (25.0 kg/ha). The information further revealed that seed treatment for root rot disease management was not a common practice. All the farmers (100%) did not go for seed treatment and, therefore, there was a big gap of 100%. Fertilizer usage pattern was also not proper at farmers' level. One fourth of the farmers were reluctant in application of phosphatic fertilizers. Half of the farmers apply phosphatic fertilizers less than the recommended dose. Recommended dose of phosphatic fertilizers was applied only by 20% of farmers. As far as application of potassium was concerned, almost all the farmers did not apply the nutrient and hence there was 100% gap (Table 1). Biofertilizers play on important role in enhancing yield of pulse crops. The information on biofertilizers use revealed that use of biofertilizers was almost negligible (5-7%). Majority of farmers' (93-95%) were not using biofertilizers. Incidence of sucking pests *viz.* thrips, white fly, jassid, *etc.* was another major factor affecting crop yield adversely. The practices for management of sucking pests were adopted only by 7-10% of the farmers. Similarly, disease management practices were not adopted by majority of farmers.

Adoptions of improved practices in demonstration plots increased crop yield over crop yield recorded under farmers' practice (local check). The average increase in crop yield over local check was 30% (Table 2). The average yield recorded in demonstration and local check plots was 580 and 447 kg/ha, respectively (Table 2). However, maximum yield recorded in demonstration plots was 605 kg/ha. The increase in yield in demonstration plots could be attributed to adoption of improved practices of crop production. The low productivity of crop at farmers' fields (local check) was due to poor management of these factors. These findings are in line with those of Kumar and Kispotta (2017).

Table 1: Assessment of gaps.

Technology	Farmers' practice	Recommended practice	% Gap
Variety	Local seed	MH-421, MH-318, SML-668	100
Seed rate(kg/ha)	12.5-15.0	25.0	50
Seed treatment	No application	Thiram (4 g/kg seed)	100
Fertilizers (Kg/ha)			
N	20	20	0
P	40 kg/ha = 20% 20 kg/ha = 55% No application = 25%	40	25-50
K	No application	20	100
Biofertilizers	5-7%	Rhizotica PSB	93-95
Insect-pest management (Thrips, White fly, Jassid)	7-10%	Malathion (100 ml/ha) Dimethoate (625 ml/ha)	90-93
Disease management (Bacterial spot)	No Application	Mancozeb (1.5 kg/ha) Copperoxychloride (1.5 kg/ha)	100

Table 2: Performance and gap analysis of cluster frontline demonstrations at farmers' fields.

Year	Number of demo*	Yield (kg/ha)			% increase	Extension gap(kg/ha)	Techno* gap(kg/ha)	Techno* index (%)
		Potential	Demo*	Farmers' practice				
2018-19	75	1500	605	485	24.7	120	895	59.6
2019-20	75	1500	555	410	35.3	145	945	63.0
Average		1500	580	447	30.0	132.5	920	61.3

*Demonstration and Technological.

Table 3: Economic analysis of cluster frontline demonstrations on summer mungbean at farmers' fields.

Year	Cost of cultivation (Rs/ha)		Gross returns (Rs/ha)		Net returns (Rs/ha)		Additional cost (Rs/ha)	Additional net returns (Rs/ha)	B:C ratio	
	Demo	Farmers' practice	Demo	Farmers' practice	Demo	Farmers' practice			Demo.	Farmers' practice
2018-19	17500	14850	33275	26675	15775	11825	2650	3950	1.90	1.79
2019-20	16190	14270	26567	22450	10377	8180	1920	2197	1.64	1.57
Average	16845	14560	29921	24562	13076	10002	2285	3073	1.77	1.68

Extension gap

The difference between yield of demonstration and local check plots was determined to know the extension gap. The average extension gap was 132.5 kg/ha with a maximum of 145 kg/ha in 2019-20 and minimum of 120 kg/ha in 2018-19. This gap was the attribute of poor management of key factors such as quality seed, phosphorus and biofertilizers use, management of sucking pests, *etc.* The extension gap so found speaks about scope of increasing crop yield by management of these factors. These findings are in line with those of Hiremath and Hilli (2012).

Technology gap and technology index

The basic purpose of conducting cluster frontline demonstrations was to realize maximum possible crop yield at farmers' fields. The demonstrations were conducted with close monitoring and recommended technologies. A wide gap existed between potential and average demonstration yield. The average technology gap was 920 kg/ha (Table 2). It means potential effect of technology could not obtained in real farming situation. The technology index showed the feasibility of important technology on farmers' fields. The lower the value of the technology index more is the feasibility of the technology. The average technology index was 61.3% (Table 2). These findings are in agreement with that of Sandhu and Dhaliwal (2016). The causes for such a large total yield gap might be attributed to environmental differences between research stations, extension worker and farmer's fields and non-adoption of production technology. Due to this location specific recommendations are necessary to decrease this gap. The results of the present study are in recurrence with the findings of Lalit *et al.* (2015).

Economic returns

Evaluation of yield was done to work out economic returns. The analysis of results indicated that better returns were realized in demonstrations in comparison to farmers' practice. Average gross returns of Rs. 29921/ha and Rs. 24562/ha were obtained in the demonstrations and local check plots, respectively. Similarly, average net returns of Rs. 13076 and 10002 /ha were obtained in demonstrations and local check plots (Table 3), respectively. Investment of additional Rs. 2285/ha on purchase of critical inputs in demonstrations provided additional net returns of Rs. 3073/ha. The average effective gain was Rs.788/ha. The effective gain was though marginal, yet it was bonus received with improvement in soil fertility. The average benefit cost ratio indicating the returns per unit of investment was found to be 1.77 and 1.68 in demonstration and local check plots (Table 3), respectively. Higher benefit cost ratio in demonstration could be the result of higher yield due to adoption of improved practices which were missing in local check plots. The results confirmed the findings by Singh *et al.*, (2018) on chickpea.

CONCLUSION

The productivity enhancement under front line demonstration over traditional method of summer mung bean cultivation created greater awareness and motivated the other farmers to adopt appropriate production technology of summer mungbean in adopted district. The selection of specific technology like improved variety, seed treatment, seed inoculation with biofertilizers *i.e.* Rhizobium and PSB, 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 mungbean with improved technologies has increased the skill and knowledge of the farmers. Front line demonstration also helped in replacement of local unrecommended varieties with improved recommended varieties. This also improved the relationship between farmers and scientist and built confidence between them.

Conflict of interest: None.

REFERENCES

Hiremath, S.M. and Nagaraju, M.V. (2010). Evaluation of on farm front line demonstrations on the yield of chilli. Karnataka Journal of Agricultural Science. 23(2): 341-342.

Kumar, S. and Kispotta, W. (2017). Impact of frontline demonstration on summer moong through improved technology in Bhadohi district of Uttar Pradesh, India. Plant Archives. 17(1): 423-426.

Lalit, Patil, M., Modi, D.J., Vasava, H.M. and Gomkale, S.R. (2015). Evaluation of front line demonstration programme on green gram variety Meha (IPM 99-125) in Bharuch district of Gujarat. IOSR Journal of Agriculture and Veterinary Science. 8(9): 01- 03.

Prasad, Y., Rao, E., Manchar, M. and Vijaybhinanda, R. (1993). Analysis of on farm trials and level of technology on oilseeds and pulse crops in Northern Telangana Zone of Andhra Pradesh. Indian Journal of Agricultural Economics. 48: 351-56.

Sandhu, B.S. and Dhaliwal, N.S. (2016). Evaluation of Front Line Demonstration Programme on Summermoong in south western Punjab. Journal of Food Legume. 29: 245-248.

Shalendra, K., Gummagolmath, C., Sharma, P. and Patil, S.M. (2013). Role of pulses in the food and nutritional security in India. Journal of Food Legumes. 26(3 and 4): 124-129.

Singh, S.P., Paikra, K.K. and Patel, C.R. (2018). Performance of cluster frontline demonstration on productivity and profitability of Blackgram (*Vigna mungo*) in Raigarh District of Chhattisgarh, India. International Journal of Current Microbiology and Applied Sciences. 7(6): 1325-1330.

Suryavanshi, P., Sharma, M., Kaur, H. and Singh, Y. (2020). Effect of frontline demonstrations of improved crop management practices on yield and economics of summer moong. Plant Archives. 20(2): 5072-5076.

Yadav, V.P.S., Kumar, R., Deshwal, A.K., Raman, R.S., Sharma, B.K. and Bhela, S.L. (2007). Boosting pulse production through frontline demonstrations. Indian Research Journal of Extension Education. 7(2 and 3): 12-14.