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Evaluation of Frontline Demonstrations on the Yield and Economic analysis of Summer Moong in Amritsar district of punjab

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ABSTRACT

The frontline demonstrations are being used by extension experts for speedy dissemination of improved technologies and testing under location specific situations. Punjab state is divided into six Agro-climatic regions and Amritsar district falls under Central Plain Region. Nine farmers were selected randomly for popularizing summer moong in the district. With the help of front line demonstration, it was demonstrated that the improved varieties of summer moong can be added in paddy-wheat rotation and additional 10.48 qt/ha pulses can be obtained with existing resources. As a result of addition of summer moong in the cropping system income of the farmers improved to the tune of ₹ 34,257.74 per hectare with the B:C ratio 1.82 in addition to the known benefits of pulses to the soil resources.

Key words : Frontline demonstrations, summer moong

INTRODUCTION

Pulses are important food crops for human consumption and animal feed. Being leguminous in nature, they are considered to be important components of cropping systems because of their ability to fix atmospheric nitrogen, add substantial amounts of organic matter to the soil and produce reasonable yields with low inputs under harsh climatic and soil conditions. Rice-wheat cropping system is predominant and is continuously practiced by the farmers in the Indo-Gangetic Plain (IGP) zone of India. There is evidence of system productivity stagnation, nutrient water imbalances and increased insect- pest and diseases incidence due to prolonged use of this cereal dominated system source.

Therefore there is increasing concern about the sustainability of intensively cropped cereal dominated crop rotation in India. The ameliorative effect of including legumes in such continuous cereal cropping and cereal dominated systems has long been known but, over time the acreage under legume crops have generally declined due to their low returns as compared to the Paddy Wheat.

The comparative short-duration (100 120 days of rice after transplanting and 135 to 150 days of wheat) varieties of rice and wheat have offered a unique opportunity for addition of pulses in rice-wheat sequence. Recent advances in genetic improvement and management techniques for legumes do raise the feasibility of their greater use in cereal dominated systems, so as to increase crop diversification and contribute to system sustainability.

Moong (*Vigna radiata* L. Wilczek.) is the third important pulse crop in India. It can be grown both as *Kharif* moong and summer moong. With the advent of short duration, MYMV (Mungbean yellow mosaic virus) tolerant and synchronous maturing varieties of summer moong (55-60 days), there is a big opportunity for successful cultivation of summer moong in wheat-rice rotation without affecting this popular cropping pattern. After wheat harvest and before the transplantation of paddy 60-70 days available provides an additional opportunity to add short duration summer moong crop in the cropping pattern. The biological nitrogen fixed by moong not only meets its own requirement but also leaves nitrogen after harvest, which is beneficial to the next crop. The moong crop fixes 31-85 kg N ha^{-1} (Sekhon *et al.*, 2002).

The rice-wheat system in Punjab, which produces more than 10 t ha^{-1} grains, removes 500-700 kg ha^{-1} major nutrients from the soil annually (Biswas *et al.*, 2001). Thus, there is a great need to sustain soil fertility and productivity by growing a pulse crop in cereal-based cropping systems. Moong occupies an area of 8.9 thousand hectares in Punjab and one hundred hectares in district Amritsar during 2008-09. Its Productivity was 888 kg per hectare in Punjab as well as in district Amritsar during the year 2008-09. Therefore there is a scope of more than 20 per cent increase in the average yield of

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pulses based on available potential of summer moong. Keeping this in view the present study was done to analyze the performance and to promote the pulse production in Amritsar district of Punjab with the help of front line demonstrations.

METHODOLOGY

Punjab state is divided into six Agro-climatic regions and Amritsar district falls under Central Plain Region and it is situated at 31^0 38' North latitude and 72^0 52' East longitude and at an altitude of 236 meters above mean sea level. Nine farmers of Amritsar district (Punjab) were selected randomly by Farm Advisory Service Scheme (FASS), Amritsar for popularizing summer moong in the district. Nine front line demonstrations (FLDs) of one acre each on summer moong were conducted on the selected farmer's field in the year 2010. Critical inputs alongwith seed of SML 668 variety were supplied to the farmers as per recommendations of Punjab Agricultural University (PAU), Ludhiana.

The sowing of SML-668 demonstration plots were done after harvest of wheat crop using seed rate of 15 kg $acre^{-1}$. In the absence of quality seed, investments on fertilizer, water, pesticides and other inputs will not pay the desired dividends. Thus, the seed was considered as critical input and was supplied by Punjab Agricultural University, Ludhiana. A basal application of 5 kg N and 16 kg P_2O_5 $acre^{-1}$ was made to the crop.

To protect the crop from seed-borne pathogen, seed treatment with thiram at 3g kg^{-1} seed was done. To keep the weed flora under check pre-emergence application of Pendimethalin (Stomp 30 EC) at the rate of one liter per acre was applied. Observations on various parameters like number of plants per m^2, plant height (cm), number of pods per plant, weight of 100 pods, weight of seeds in 100 pods, number of seeds per pod, biological yield (q/ha) and economic yield (q/ha) were taken to study its adoption ability and the economic benefits. Simple statistical tools were used to analyse the recorded data.

RESULTS AND DISCUSSION

With the help of new technology of short duration, MYMV (Mungbean yellow mosaic virus) tolerant and synchronous maturing varieties of summer moong (55-60 days), the area and productivity of the crop can be improved in district Amritsar as well as in the state.

The ameliorative impact of pulses can contribute towards the sustainability of natural resources. After harvesting of wheat crop in the month of April, summer moong SML 668 was grown in the selected farmers' fields. As a result of it without harming the on going cropping pattern of the selected farmers, on an average additional 1048 kg per hectare summer moong was obtained by the selected farmers of district Amritsar (Table 1).

It is clear from the table that the economic yield depends upon number of seeds per pod and number of pods per plant. It was also observed in the study that average 71 days were taken by the summer moong crop in district Amritsar with a range of 65 to 79 days.

In some cases the delay in the harvesting time of the summer moong was due to the onset of rains. Due to rains some of the farmers go for lesser number of irrigations and on an average two irrigations was performed by the farmers in contrast with four irrigations recommended by PAU, Ludhiana.

Table 1: Yield and yield contributing parameters of Summer Moong var. SML 668 frontline demonstrations conducted on selected farmers field in district Amritsar, Punjab

	No of plants/ m^2	Plant height (cm)	No of pods/plant	Weight of 100 pods (g)	Seed Weight (in 100 pods) g	No of seeds/pod	Crop Duration (days)	Irrigations applied
	45.8	41.7	24.0	80.5	55.0	9.2	70	2
	39.6	38.5	22.5	70.0	40.5	8.7	70	2
	47.2	46.0	25.0	90.4	60.0	10.5	68	1
	44.7	40.5	20.7	75.3	50.0	9.6	76	2
	47.0	47.2	25.4	85.0	55.7	10.2	79	4
	44.0	41.5	21.0	75.4	45.5	9.4	65	2
	45.2	44.9	25.4	80.5	55.2	10.0	72	1
	45.7	42.0	24.2	80.2	55.0	9.5	69	3
	44.2	42.1	21.8	70.5	45.0	9.0	70	1
Average	**44.82**	**42.71**	**23.33**	**78.64**	**51.32**	**9.57**	**71**	**2**

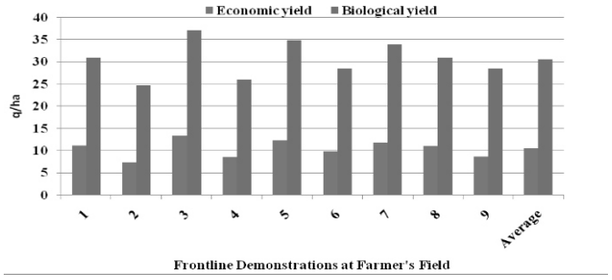

Fig.1. Graphical presentation of economic and biological yield of summer moong variety. SML 668 during the frontline demonstartion conducted at farmers' field

The adoption ability of any agricultural enterprise depends upon its cost and return structure. Therefore an effort was made to know the economic performance of the crop. The average economics of summer moong was studied and depicted in the table 2. Average gross return per hectare realized by the selected farmers was ₹ 53,098.70. Average total variable cultivation cost of summer monng on selected farmer's field was ₹ 18,840.96 per hectare. The major contributors towards the cost of cultivation of summer moong were human labour (₹ 88,67.16), cost of seed (₹ 3,706.55), tractors use (₹ 2,276.51) and transportation and marketing charges (₹1,062.54). Therefore the return over variable costs realized was ₹ 34,257.74 per hectare. The benefit cost ratio of summer moong under improved technologies was calculated as 1.82 in addition to the known benefits of pulses to the soil resources. This may be due to higher yields obtained under improved technologies compared to local check (farmers practice). This finding is in corroboration with the findings of Mokidue *et al,* (2011) and Raj et al (2013). Above results were also demonstrated to the large number of farmers through field days and various training camps. Farmers had shown great enthusiasm in the demonstrations due to additional income and employment generated by this technology and visible impact through increased demand of seeds of improved varieties of summer moong was observed in the district Amritsar. Besides this, in the Basmati growing area, the scope of summer moong cultivation is better due to the sowing time of the Basmati which falls in the month of July. It can also be inferred that for the promotion of pulse crops in the district as well as in the Punjab state there is a need for timely availability of good quality seeds of summer moong of short duration varieties at genuine or subsidized rates along with the timely dissemination of the new technology and market information.

Table 2: Economics analysis of frontline demonstration of Summer Moong conducted on selected farmers' field

Item	Per Hectare	
	Quantity	Value (₹)
Gross return		
Main Product (q)	10.48	53098.70
Variable costs		
1. Seed and Seed Treatment		
i) Seed (kg)	37.07	3706.55
ii) Thiram (g)	29.65	24.71
2. Fertilizers (kg)		
i) DAP	60.39	302.48
3. Pesticides		
i) Stomp 30 EC	2.47	617.76
ii) Zineb 75WP	2.47	652.35
iii) Thiodan 35 EC	2.47	642.47
4. Irrigations	4.94	494.21
5. Human Labour hours	411.28	8867.16
6. Tractor hours	8.23	2276.51
7. Transportation & marketing charges	-	1062.54
Sub total		18646.72
8. Interest on variable costs @ 12.5% for half crop period		194.24
Total variable cost (1 to 8)		**18840.96**
Return over variable cost		**34257.74**
Benefit Cost Ratio (B/C ratio)		**1.82**

CONCLUSION

It can be concluded that addition of 10.48 qt/ha yield summer moong in the cropping system improved the income of the farmers at the tune of Rs 34257.74 per hectare in the addition to the known contribution of pulses to the soil. The B:C ratio of summer moong cultivation was calculated as 1.82. It also helps to generate extra 411.28 hours of employment. Front line demonstrations are really helpful in creating awareness among the farmers and speedy dissemination of the technology.

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