

IMPACT OF CLUSTER FRONTLINE DEMONSTRATION OF SCIENTIFIC CULTIVATION PRACTICES OF MAJOR PULSES IN NAVSARI DISTRICT OF GUJARAT

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ABSTRACT

The cluster frontline demonstrations (CFLDs) on pigeon pea, chickpea and rabi green gram and summer green gram were conducted by Krishi Vigyan Kendra, Navsari – Gujarat during the year 2017-18 in three talukas of Navsari district, i.e., Chikhli, Khergam and Vandsa. Total 630 demonstrations on pigeon pea, chickpea, rabi green gram and summer green gram pulse crops were carried out in an area of 100 ha by the active participation of farmers with the objective to demonstrate the scientific cultivation practices of major pulses. The scientific cultivation practices consisting use of improved varieties, seed treatment with Thiram, rhizobium and PSB culture, and management of weeds, insects and diseases. CFLD recorded higher yield as compared to farmer's local practice. The scientific cultivation practices recorded highest yield of pigeon pea, chickpea, rabi green gram and summer green gram was 11.49, 12.32, 8.27 and 8.45 q/ha, respectively. By incorporating proven scientific technologies of pigeon pea, chickpea, rabi green gram and summer green gram, yield potential and net income from black gram cultivation can be enhanced to a great extent with increase in the income level of the farming community of the district.

Keywords : CFLDs, demonstration, Yield, NFSM, BC ratio

INTRODUCTION

India is the largest producer (25% of global production), consumer (27% of world consumption) and importer (14%) of pulses in the world. 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. Pulses are a good source of protein, carbohydrates, water, fat, fiber and ash etc. Besides being a rich source of protein, it maintains soil fertility through biological nitrogen fixation in soil and thus plays a vital role in furthering sustainable agriculture (Kannaiyan, 1999). In addition, it also provides nutritious fodder and feed for livestock.

Pulses are drought resistant and prevent soil erosion due to their deep root and good ground covers, because of these good characters, pulses are called as “Marvel of Nature”. Pulses can also be referred to as “mini fertilizer factory”, as they fix atmospheric nitrogen through symbiosis. Pulses are the most important component of the balanced diet in vegetarian country like India. The steady increase in Indian population together with stagnant production of pulses over the past four decades compared to cereals has naturally resulted in decreased per cent availability of pulses.

Due to low and unstable production and increasing the population pressure, per capita availability of pulses

decreasing from 69 g in 1961 to about 31.6 g in 2010-11, against the minimum requirement of 80 g per capita per day. (Anonymous, 2012). To make up minimum 50 g pulses per capita per day and further demand from burgeoning population at least 24 m tones of pulses are required in 2020-21 (Anonymous, 2016). Therefore, much attention has been given to boost pulse production in India. To satisfy the demand of pulses requirement of ever increasing population, the production of pulses has to be increased only by increasing the yield/unit area/day.

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 tonnes (Raj et al., 2013). The productivity of pulses in India (868 kg/ha) is lower than most of the major pulse producing countries. Pulses account for around 20 per cent of the area under food grains and contribute around 8-10 per cent of the total food grains production in the country. In Gujarat, pulse crop were cultivated in an area of 0.94 million ha with production 0.82 million tones and yield of 868 kg/ha during the year 2016-17 (Anonymous, 2016). 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.

Therefore, considering above facts, Government of

India has decide to increase the productivity of major pulses crops by implementing the cluster front line demonstration of pulses crop through the Krishi Vigyan Kendra in a entire country under the National Food Security Mission project. With above mention problem, Krishi Vigyan Kendra, Navsari was planning to implement the cluster front line demonstrate of pulses on farmers field of Navsari districts with a objective of increase the productivity and profitability of pulses growing farmers.

OBJECTIVE

To know impact of cluster frontline demonstration of scientific cultivation practices of major pulses in Navsari district of Gujarat

METHODOLOGY

Three talukas namely Chikhli, Khergam and Vandsa were selected for this project. Total 163, 160, 100 and 207 CFLDs in a area of 20, 30, 20 and 30 hectare were selected for the project.

Table 1: Area cover and number of participant benefited under CFLDs organized on scientific cultivation practices of major pulses under NFSM project during year 2017-18 (n=630)

Sr. No	FLD organized			Area (ha)	Participant		
	Crop	Variety	Season		SC/ST	Others	Total
1	Pigeon pea	BSMR-853	Kharif-17	20	58	105	163
2	Chick pea	GG-3	Rabi-17	30	160	0	160
3	Green gram	Co-4	Rabi-17	20	38	62	100
4	Green gram	Meha	Summer-18	30	128	79	207

Farmers were trained by organizing various training and field day programmes to follow the package and practices for pigeon pea, chickpea, rabi green gram and summer green gram cultivation as recommended by the Navsari Agricultural University, Navsari and need based input materials provided to the farmers. The demonstration conducted in irrigated condition and having good drainage facility. The necessary step for selection of site and farmers, layout of demonstration were followed as suggested by Choudhary (1999). The farmers of both the Chikhli, Khergam and Vandsa talukas followed the package of practices like soil testing, Seed Treatment with Thiram @ 3 gram per kg seed, seed treatment with biofertilizer @ 5 gram per kg seed each by Rhizobium and PSB Culture, fertilizer application, weed management by Application of herbicide (Pendimethaline @ 1kg a.i/ha) and Insect Pest Management by Application of Insecticide (Indaxocarb 14.5 % SC and Triazophos 35 % EC).

meeting and specific skill trainings were imparted in the form of practicing the farmer’s training at farmer’s field or at KVK campus regarding the different aspect of scientific cultivation practices and plant protection measures. Certified seeds of major pulse along with fungicide and liquid bio-fertilizers viz., rhizobium, phosphate solublizing bacteria and potash mobilizing bacteria for the seed treatment were given to each farmer. The traditional practices followed by farmers were maintained in case of local checks. The yield data were collected from both CFLD plots as well as check plots and finally the benefit cost ratio were work out. The yield gap-I and yield gap-II was calculated by using bellowed mention formula.

$$\text{Yield gap-I (\%)} = \frac{\text{Potential yield} - \text{Demo yield}}{\text{Potential yield}} \times 100$$

$$\text{Yield gap-II (\%)} = \frac{\text{Demo yield} - \text{Check yield}}{\text{Demo yield}} \times 100$$

Before conducting the CFLDs, a list of farmer of different village were prepared through survey and farmer’s

RESULTS AND DISCUSSION

Table 2 : Yield performances of CFLDs organized on scientific cultivation practices of major pulses under NFSM project during year 2017-18 (n=630)

Sr. No.	Name of crop and variety demonstrated	Yield obtained (q/ha)						Yield increase (%)
		Demo			Check			
		Max.	Min.	Av.	Max.	Min.	Av.	
Kharif pulses								
1	Pigeon pea BSMR-853 (Vaishali)	12.36	7.62	11.49	9.34	6.48	8.87	29.53
Rabi pulses								
2	Chickpea (GG-3)	13.46	8.19	12.32	11.34	6.48	10.79	14.18
3	Green gram (Co-4)	9.89	6.9	8.27	-	-	-	-
Summer pulses								
4	Green gram (Meha)	8.36	6.74	8.45	6.12	4.07	5.72	47.12

The perusal data (Table-2) clearly indicated that yield of different major pulses crop were found higher in CFLDs plots as compared to farmer practices (control plot). The maximum yield of 12.36 13.46, 9.89 and 8.36 q/ha were recorded in cluster front line demonstration of pigeon pea, chickpea, rabi green gram, and summer green gram, respectively. The average yield of CFLDs plots of pigeon pea, chickpea, rabi green gram and summer green gram were 11.49 12.32, 8.27 and 8.45 q/ha, whereas, control plots recorded 8.78, 10.79, 0.0 and 5.72 q/ha, respectively. The increase in the yield under CFLDs of pigeon pea, chickpea, and summer green gram were obtained 29.53, 14.18 and

47.12 per cent higher over farmer’s practices, respectively. The reason for higher yield in CFLDs plots of major pulses is due to use of recommended practices in demonstration plots and seed treatments with fungicide and bio-fertilizer at appropriate time and methods, in addition to these utilized the natural resources efficiently by these method. Similar type of results in increase the yield of Rabi onion FLDs was reported by Arora *et al.* (2014), in cumin FLDs was found by Sondarva, *et al.*, (2014), in paddy FLDs was reported by Dhenge *et al.* (2014) and Tandel *et al.* (2014) reported increase in the yield of brinjal FLDs plots.

Table 3: Economic parameters of CFLDs organized on scientific cultivation practices of major pulses under NFSM project during year 2017-18 (n=630)

Sr. No.	Name of crop and variety demonstrated	Expenditure and returns (₹/ha)								Net returns increase (%)
		Demo				Check				
		Gross Cost (₹/ ha)	Gross return (₹/ ha)	Net Return (₹/ha)	B:C ratio	Gross Cost (₹/ ha)	Gross return (₹/ ha)	Net Return (₹/ha)	B:C ratio	
Kharif pulses										
1	Pigeon pea (BSMR-853)	25050	63209	38159	2.52	23550	48796	25246	2.07	51.14
Rabi pulses										
2	Chickpea (GG-3)	24550	61107	36557	2.49	27650	53518	25868	1.94	41.32
3	Green gram (Co-4)	26050	58717	32667	2.25	-	-	-	-	-
Summer pulses										
4	Green gram (Meha)	26450	59995	33545	2.27	27650	43477	15827	1.97	112.0

The data show in Table-3 clearly indicated that cost of cultivation, gross and net return as well as benefit cost ratio were observed higher the cluster front line demonstration plots. The cost of cultivation was observed higher in demonstration plot because of whole recommended package of practices were adopted including the integrate nutrient and weed management practices, which was generally farmers were not followed in pulses crop. The maximum gross return and net return of 63209 and 38159, 61107 and 36557, 58717 and 32667 and 59995 and 33545 Rs/ha were found under the CFLDs of pigeon, chickpea, rabi green

gram and summer green gram, respectively. The benefit cost ratio of 2.52 and 2.07, 2.49 and 1.94 and 2.27 and 1.97 were incurred under the CFLDs of pigeon, chickpea, and summer green gram, respectively. There was 51.14, 41.32 and 112.0 per cent increasing in the net return under the CFLDs of pigeon, chickpea, and summer green gram, respectively. The gross and net return as well as BC ratio were found higher under demonstration plots might be due to increase in the yield under the demonstration plots because of adoption of recommendation scientific cultivation practices helps in increase the growth and yield attributing characters.

Table 4: Yield gap of CFLDs organized on scientific cultivation practices of major pulses under NFSM project during year 2017-18 (n=630)

Name of the crop	Demos (No.)	Variety		National average yield (q/ha)	State average yield (q/ha)	District average yield (q/ha)	Potential yield of the demo variety (q/ha)	Yield gap – I (%)	Yield gap – II (%)
		Check	Demo						
Rabi pulses									
Pigeon pea	163	Local (Deshi)	BSMR-(853)	859	1044	931	1500	23.4	22.80
Gram (GG-3)	160	Local (Dahod Yellow)	GG-3	951	1330	880	1600	23.0	12.42
Green gram	100	-	Co-4	500	439	433	1000	17.3	-
Summer pulses									
Green gram	207	G. green gram 1/2	Meha	500	439	433	1200	29.58	32.30

The data presented in Table-4 revealed that yield gap-I and yield gap-II of cluster front line demonstration of pigeon pea chickpea, *rabi* green gram and summer green gram crops of 23.4, 23.0, 17.3 and 29.58 and 22.80, 12.42, 0.0 and 32.30 per cent were observed, respectively. Similar type of results were found by Rai *et al.* (2016) and Bhoraniya *et al.* (2017).

CONCLUSION

Forgoing discussion it is concluded that the cluster front line demonstration of major pulse *viz.*, pigeon pea, chickpea, *rabi* green gram and summer green gram on farmer's field produced higher yield and incurred maximum income against the farmers' practices thus leads to productivity and profitability of farmers in the Navsari district of Gujarat.

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