



Research Article

YIELD AND ECONOMIC ANALYSIS OF SOYBEAN IN INDORE DISTRICT THROUGH CLUSTER FRONT LINE DEMONSTRATIONS

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Abstract: To enhance the production and productivity of soybean 153 Cluster Front Line Demonstration (CFLDs) were organised during 2016-17 & 2017-18 in Indore district at eight adopted village by Krishi Vigyan Kendra Kasturbagram, Indore. Improved variety (JS-9560) seed treatment, soil test based fertilizer application, raised bed sowing method, seed rate and Integrated plant protection measure were major intervention of CFLD. Average soybean yield under cluster front line demonstration was recorded 15.94 q/ha against farmers practice (Local Var 1025) 12.8 q/ha. 24.4 percentage increases in soybean yield were recorded over farmers practice. The extension gap and technology gap were computed 3.14 q/ha and 4.06 q/ha respectively. Maximum net return (Rs. 27517 and Rs. 22824) were recorded under demonstration during both the year 2016-17 & 2017-18, respectively. Average Cost benefit ratio were observed higher than local check during both the year (2016 -17 & 2017 – 18) of CFLD programme. 2.0 under CFLD plots while it was 1.65 under farmers practice.

Keywords: Soybean Yield gap, technology gap, Economics

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Introduction

Oilseed and pulses are the important part of human diet as they are rich sources of proteins and quality nutrition. In Madhya Pradesh Soybean (*Glycine max* L.) Merrill) is generally referred to as golden as well as wonder bean because seeds are rich in oil (20%) and proteins (40-44%), amino acids, lysine (5%), which is deficient in most of the cereals. Contribution of Madhya Pradesh under soybean production is around (4.91 million tonnes) [7]. The area under soybean cultivation in Madhya Pradesh during 2015-16 was 59.06 lakh hectares with total production of 4.45 lakh tonnes. Average productivity of soybean in Madhya Pradesh was recorded 753 kg /ha during 2015-16 [8]. The area under soybean crop in Indore district was recorded 2.23 lakh ha during 2015-16 while production and productivity was 1.70 lakh tonne and 763 Kg per ha respectively. However, production and productivity were still lower than its potential yield (2000 Kg /ha). With help of field survey, farmers interaction, diagnostic visit it was observed that the poor yield of soybean is mainly due to, use of poor quality seed and indiscriminate use of inorganic fertilizers. To mitigate the problem of low yield of soybean, soil test value base nutrient application and bio-fertilizer (PSB And *Rizobium*) as seed treatment were followed as technical intervention. Cluster Front Line Demonstration were conducted under the supervision of scientist to disseminate the appropriate technology among the farmer and to get their feedback about the technology. Under Cluster front line demonstration (FLDs), introduction of improved technologies/package practices is the one of the mandate of Krishi Vigyan Kendra along with conductance of long-term educational activity in a systematic manner in farmers' fields. In the absence of knowledge of research emanated improved technologies among farmers, it was not feasible to harness the yield potentials of soybean in the state M.P. Hence, Krishi Vigyan Kendra, Kasturbagram was conducted cluster front line demonstration in its eight adopted villages with an objective to convince farmers on benefits of improved package of practices on soybean over practices followed by them.

Materials and Methods

158 Cluster front line demonstration were carried out by Krishi Vigyan Kendra during two consecutive year 2015-16 and 2016-17, at three block of Indore district under eight villages namely Basipipri, Mend, and Naharkheda of Mhow Block, Machukhedi and Makodia of Sanwer Block and Aankya, Garia and Panod of Indore Block. Area under each CFLD was 0.40 ha. Prior to conducting the demonstration base line survey were carried out for find out the problem under soyaben cultivation. With help of survey it was observed that lower yield was due to (i) use of poor quality of seed (ii) indiscriminate use of inorganic fertilizer and (iii) No use of bio fertilizers. Recommended practices were followed as intervention by Krishi Vigyan Kendra which was summarised under [Table-1]. Before conducting the demonstrations, training to the farmers of respective villages were imparted with respect to envisaged technological interventions, Group Discussion, Diagnostic visit, Site selection, farmers' selection, layout of demonstration and farmers participation were considered as suggested by Choudhary [1]. The yield and economic performance of both FLDs as well as farmers practice (Control) were analyzed.

Results and Discussion

Seed yield

The yield performance of both recommended and farmers practice were collected, analysed and presented in [Table-2]. Data reveals that average soybean yield under demonstrated plot were range from 14.05 to 19.50 q/ha during 2016-17 and 12.94 to 17.13 during 2017 – 18, with average yield of 16.77 q/ha and 15.1 q/ha during the same period. The average yield from recommended practice was recorded 15.94 q/ha as compare to 12.80 q/ha in farmer practices. Production of soybean Performance of soybean yield was occurring higher than in the local check (farmer practice). By adoption of recommended practice under cluster front line demonstration on average 24.4 % yield enhancement was recorded.

Table-1 Package of practices followed for recommended practices and existing farmer practices under Soybean CFLDs

Crop operations	Recommended practices	Farmers practice	Remarks
Variety	JS-9560	Local variety 1025	Full gap
Seed rate (Kg/ha)	75	100-120	Full gap
Seed Treatment	Trichoderma viridi @ 5 g/kg + Rhizobium + PSB @ 5 ml/kg	Thiram+mencozeb (Saaf) 3 gram/kg seed	Partial gap
Fertilizer dose (Kg/ha)	NPKS (25:60:40:20)	18:90:0:0	Partial gap
Sowing Method & spacing	Raised bed and 30-45x10 cm Row to row and plant to plant	30-45x10 cm Row to row and plant to plant	Partial gap
Plant protection	IPM module (Pheromone trap (10) + Bird percher 50/ha + Neem Oil 1500ppm@1.2 lt.+ NPV 250LE/ha	2-3 spray of insecticide (Over dose/un-recommended brands of insecticide)	Partial gap

Table-2 Productivity, technology gap, and extension gap of soybean (JS-9560) under Front Line Demonstrations on Farmers fields

Year	No. of Demonstration	Area (ha)	Potential Yield	Yield (q/ha)			Local Check	% Change in Yield	Technology Gap	Extension gap
				Highest	Lowest	Average				
2016-17	73	30	20	19.50	14.05	16.77	13.1	28.01	3.23	3.67
2017-18	80	32	20	17.93	12.94	15.1	12.49	20.8	4.9	2.61
Mean	150	62	20	18.71	13.49	15.94	12.8	24.4	4.06	3.14

Table-3 Gross return, cost of cultivation, net return and B: C ratio as affected by improved and local technology under FLDs on farmers' fields

Year	Demonstration				Local Check			
	Gross Cost (Rs/ha)	Gross Return (Rs./ha.)	Net Return (Rs./ha.)	B:C Ratio	Gross Cost (Rs/ha)	Gross Return (Rs./ha.)	Net Return (Rs./ha.)	B:C Ratio
2016-17	24883	52401	27517	2.1	23940	42033	18094	1.7
2017-18	25507	48330	22824	1.9	24606	39972	15366	1.6
Mean	25195	50365	25170	2	24273	41002	16730	1.65

It was also observed that the seed yield during *Kharif* 2017-18 was recorded lower than that of *Kharif* 2016-17 due to moisture stress during reproductive stage and Heavy rainfall in harvesting period in the district. From these results it is evident that the performance of the technology demonstrated was found to be effective than the farmers' practice under the same environment conditions. The farmers were motivated by seeing the results in term of productivity and they are adopting the technologies.

Technology gap

Technology gap is difference between potential yield and demonstration yield. The technology gap [Table-2] were observed during both the years of cluster front line demonstration and it was lowest 3.23 q/ha during 2016-17 and highest 4.90 q/ha during 2017-18. On average technology gap from 153 cluster demonstration was found to be 4.06 q/ha.

Extension gap

Extension gap is difference between Demonstration yield and Farmers yield under front line demonstration. Extension gap [Table-2] was recorded 3.67 and 2.61 q/ha during the period of 2016-17 and 2017-18 respectively under cluster front line demonstration. on average extension gap was found to be 3.14 q/ha. By observing this gap, might be attributed to adoption of improved technology by the farmer which resulted in higher soybean yield contrast to farmers' practices.

Economics

Economic analysis of both under Cluster front line demonstration and farmers practice were carried out and presented in [Table-3]. The result of economic analysis of soybean production revealed that front line demonstration recorded higher gross return range from Rs. 52401 to Rs. 48330 (average Rs 50365.00) and net return Rs. 27517 to Rs. 22824.00 (Rs. average 25170.00) with higher benefit cost ratio range 2.1 to 1.9 (average 2.0) due to package of improved practices, latest variety (JS-9560) balance nutrient management (soil test based) viz., NPKS (25:60:40:20) kg/ha, *Trichoderma viridi* @ 5 g/kg + Rhizobium + PSB @ 5 ml/kg) as compared to control plot [4,6]. The Front line demonstration produces significant positive results and provided the researcher an opportunity to demonstrate the productivity potential and profitability of the latest technology (intervention) under real forming situation, which they have been advocating for long time. This could be circumventing some of the constraints in the existing transfer of technology system in the district, Indore of Madhya Pradesh.

Application of research: The productivity gain under FLDs over existing

practices of soybean cultivation created greater awareness and motivated the other farmers to adopt various advance package and practices for soybean production.

Research Category: Impact of technology adoption

Abbreviations: q/ha (quintal /ha), ha (hectare), B: C Ratio (benefits and cost ratio)

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Sample Collection: Sample collection from villages of selected farmers field under cluster front line demonstration

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