Indian Journal of Extension Education
Vol.47, No. 3 & 4, 2011 (100-103)

Impact of Improved Technology on Soyabean Productivity in Frontline Demonstration

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ABSTRACT

Krishi Vigyan Kendra, Raisen (M.P.) during the period from 2004-05 to 2008-09 conducted a total 73 frontline demonstration of soybean crop. Cultivation practices comprised under FLD *viz.* use of improve variety (JS-93-05), seed treatment, seed inoculation, spacing 30cm, balance application of fertilizers (20:60:20kg N:P:K per ha), weed control and plant protection measures show that percentage increase in the yield of soybean ranged from 55.26% to 80.00% over farmer's practice. The highest seed yield 17.48 q ha^{-1} was recorded in the year 2008-09 in FLD, which was 80.50% more over the farmer's practice (9.66 q ha^{-1}). The highest extension gap which ranged from 5.25 q ha^{-1} to 7.82 q ha^{-1} during the period. The additional cost Rs. 2148 to Rs. 2348 gave additional net return, it was ranged from Rs. 4283 to Rs. 7470 per hectare with 1:1.87 to 1:3.24 incremental benefit : cost ratio.

Soybean (*Glycine max*L. merril) occupies third position among the oilseed crop in India after groundnut and rapeseed-mustard. Soybean is the number one oilseed crop in the world has recently occupied on important place in the edible oil and agricultural economy of the country. Soybean is established as major rainy season in India particularly in central part of the country. Madhya Pradesh has its major share in Area (70%) and production (65%) of soybean in India and hence knows as soyabean state. In Madhya Pradesh the average productivity of soybean in very low (10q ha^{-1}) as compare to genetic potential (25q ha^{-1}). The adoption of recommended production technology among farmers is not very encouraging. The reason may be that the most of the technology have not yet reached to the farmer's fields. Hence an efficient technology transfer system is required out of these conduct of demonstration on farmer fields have proved effective for creating awareness and acceptance of improved technologies. Keeping in this view the present study was carried out to find out the impact of improved technologies on soybean productivity in Raisen district of Madhya Pradesh.

METHODOLOGY

The present study was carried out by the Krishi Vigyan Kendra, Raisen (M.P.) during kharif season from 2004-05 to 2008-09 in farmer's field of 3 adopted villages *viz*. Baroda, Bankhedi and Hinotiya Mahalpur. The total number of farmers under this programme was 73. The demonstrations of improved technology in an area of 0.4 ha of each farmer. The total area in 5 years was 30 hectare for demonstration of recommended improve practices of soybean. In the demonstration, one control plot was also kept where farmer's practice was carried out. Data were collected with the help of personal contact and observations on yield data was also recorded at the time of separate threshing. The yield of each demonstration was recorded in a systematic manner and the yield of farmer's practices was also recorded at the same time.

The results were compared with full package of practices given *viz*. variety, seed treatment, seed inoculation, spacing, balanced fertilizers, weed control and plant protection measures. The yield data were collected from both the demonstration and farmer's practice and

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their technology gap; extension gap and the technology index were worked out (Samui *et al.*, 2000) as given below.

Technology gap = Potential yield-demonstration yield

Extension gap = Demonstration yield-farmer's yield

$$\text{Technology index} = \frac{\{(\text{potential yield} - \text{demonstration yield})\} \times 100}{\text{Potential yield}}$$

RESULTS AND DISCUSSION

Total 73 frontline demonstrations were conducted at farmer's field in their farming situation. Table 1 indicated the factor considered for selection of critical input under FLD. There was partial gap in adoption of recommended practices over farmer's practices with regards to seed rate, fertilizers, weed control and plant protection measures. Whereas complete gap (full) was noted for variety, seed treatment, seed inoculation and spacing.

Table 2 revealed that the highest yield of soybean (17.48 q ha^{-1}) was obtained during the 2008-09 with the additional amount of Rs. 2305 over farmer's practices, which yield 9.66 q ha^{-1}. The average yield under demonstration fluctuated and ranged from 14.0 q/ha to 17.48 ha^{-1} during the 2004-05 to 2008-09. The results clearly indicated that the yield of soybean could be increased by 55.26% to 80.95% over the yield obtained under farmer's practices of soybean cultivation due to adoption of appropriate production technology. Dixit and Singh (2003), Patel *et al.* (2003) and Singh (2002) were also found the similar type of findings.

The results indicated that the frontline demonstration has given a good impact on the farming community of Raisen district as they were motivated by the new agricultural technology applied in the FLD plots.

The highest extension gap which ranged from 5.25 q ha^{-1} to 7.82 q ha^{-1} during the period of study emphasized the need to educate the farmers through various means for adoption of improved agricultural production technologies to reverse this trends of wide extension gap. More and more use of latest production technologies with high yielding varieties will subsequently change this alarming trends galloping extension gap.

The technology gap observed ranged from 7.52 q ha^{-1} to 11.0 q ha^{-1}. The technology gap observed may be attributed to the dissimilarity in the soil fertility status and weather condition. Hence variety wise location specific recommendation appears to be necessary to minimize the technology gap for yield level of different situations.

The technology index shows the feasibility of the evolved technology at the farmer's fields. The lower value of technology index more is the feasibility of the technology. As such, reduction of technology index from 44.0%(2004-05) to 30.08%(2008-09) exhibited the feasibility of technology demonstrated. The variation in yield from location to location can be accounted for varying climatic condition, prevailing microclimatic and variation in agricultural practices followed. More or less similar reasoning was provided by other workers (Sagar and Chandra, 2004).

Table 3 showed that the total cost of demonstrations was Rs. 6508 to Rs. 6668 per hectare while the cost of farmer practice (FP) Rs. 4254 to 4363 ha^{-1}. The table 3 also revealed that the net return from demonstration was Rs. 10965 to Rs. 15182, while net return from farmers practice was Rs. 5746 to Rs. 7712 hectare. It means the net return from demonstration was higher than farmer's practices.

The additional cost Rs. 2148 to Rs. 2348 gave additional net return, it was ranged Rs. 4283 to Rs. 7470 per hectare. The increased benefit:cost ratio was also calculated, it was ranged from 1:1.87 to 1:3.24.

Thus, it was clearly showed that the demonstration of soybean with full package was better to farmer's practices.

Table 1 : Adoption gap of recommended soybean technology and percentage of farmers of non-adoption recommended practices.

S.N.	Items	Existing practices	Recommended practices	Gap in adoption	% of farmers	Farmers prioritization for critical input
1.	Variety	JS-335, Samrat, PK-1044	JS-93-05, NRC-7, NRC-37	Full	90	I
2.	Seed rate	100 Kg ha^{-1}	75 Kg ha^{-1}	Partial	80	V

3.	Seed treatment	No use of fungicide	Seed treatment with Thirum 2g+ Carbendazim 1g	Full	85	III
4.	Seed inoculation	No use of culture	Seed inoculation with Rhizobium 5gm+PSB gm per kg of seed	Full	85	IV
5.	Spacing	9" (22.5cm)	12"(30cm)	Full	90	VIII
6.	Fertilizers	50 kg DAP ha^{-1}	20:60:20 Kg N:P:K (100 Kg DAP ha^{-1})	Partial	75	II
7.	Weed control	One hand weeding	One spray of post emergence weedicide+ one weeding	Partial	80	VI
8.	Plant Protection	1.Application of insecticide without knowledge	1.Need based insecticide spray	Partial	90	VII
		2.Use of incorrect dose	2. Use of correct dose and time of insecticide	Partial		

Table 2 : Productivity, extension gap, technology gap and technology index of soybean as grown under FLD and existing package of practices.

Year	Area	No. of Demo	Yield q/ha FLD	Yield q/ha FP	% increase over FP	Extension gap q/ha	Technology gap q/ha	Technology index%
2004-05	10ha	25	14.00	8.00	75.00	6.00	11.00	44.00
2005-06	5ha	12	14.75	9.50	55.26	5.25	10.25	41.00
2006-07	5ha	12	16.05	9.50	68.94	6.55	8.95	35.80
2007-08	5ha	12	14.82	9.10	62.85	5.72	10.18	40.72
2008-09	5ha	12	17.48	9.6	80.95	7.82	7.52	30.08
Mean	**30ha**	**73**	**15.42**	**9.15**	**68.60**	**6.26**	**9.58**	**38.32**

Table 3: Economics analysis of demonstration and farmers practice.

Year	Demonstration			Farmer practices			Additional cost of cultivation Rs ha^{-1}	Additional net return Rs ha^{-1}	Incremental benefit cost ratio
	Cost of cultivation Rs ha^{-1}	Gross returns Rs ha^{-1}	Net return Rs ha^{-1}	Cost of cultivation Rs ha^{-1}	Gross return Rs ha^{-1}	Net return Rs ha^{-1}			
2004-05	6535	17,500	10965	4254	10,000	5746	2281	5219	2.28
2005-06	6610	18,437	11827	4331	11,875	7544	2279	4283	1.87
2006-07	6640	20,062	13422	4292	11,875	7583	2348	5839	2.48
2007-08	6508	18,525	12017	4360	11,375	7015	2148	5002	2.32
2008-09	6668	21850	15182	4363	12,075	7712	2305	7470	3.24

CONCLUSION

The frontline demonstration (FLDs) plays a very important role to disseminate recommended technology because it shows the potential of technologies resulting in an increase in yield at farmers level. Many farmer approached the FLD farmers to procure the seed of soybean high yielding variety and now the area under these varieties have increased which will spread in the whole including the adjoining area.

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