

## INCOME ENHANCEMENT OF TRIBAL FARMERS OF JHABUA HILL ZONE THROUGH FRONT LINE DEMONSTRATION OF SOYBEAN (*Glycine max* L.)

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**Abstract:** Soybean (*Glycine max* (L.) Merrill) is most important oil seed crop of Madhya Pradesh. It is known as “Miracle crop” because of its multiple qualities. It provides 40% protein and 20% edible oil. It is grown over an area of 6.03 million hectare with productivity of 1293 kg/ha but in Jhabua hills zone of M.P. the productivity is merely 1150 kg/ha. (Agricultural Statistical at a Glance 2014). Although the ecological conditions of the district are congenial for soybean production, but the yield is substantial low due to unavailability of improved variety and non adoption of improved cultivation practices. Considering the scope of improvement in the productivity through the demonstrations of improved package of practices, 100 demonstrations (50 each during Kharif 2013 and 2014) were conducted by KVK, Jhabua in adopted villages at farmer’s field. Farmer’s practices were treated as control for comparison with recommended practices. Average yield of soybean under demonstration were higher by 33.82 and 48.10 per cent over farmer own practices. Net returns and B:C ratio were also reported higher during both the years of study. The study has shown that the FLD programme was found to be very effective to enhance the productivity and economics of soybean under hills zone of Jhabua district.

**Keywords:** Soybean, Front Line Demonstrations, Adoption, Yield, Economics.

### INTRDUCTION

Krishi vigyan Kendra play an important role to reduce the time lag between the technology generation at research institute and its transfer to farmer’s field for increasing productivity and net returns. Available agricultural technology does not serve its purpose till it reaches and adopted by its ultimate users, the farmers. The extent of adoption of improved agricultural technologies is a crucial aspect. Front line demonstrations bridge the gap between technology generation and its transfer to farmer’s field. FLDs educate farmers through results obtained in terms of higher yields and also provide an effective learning situation as farmers see the crops and participate in the discussion for getting maximum production. FLDs aims to demonstrate the production potentialities of newly developed crop production technologies on farmer’s field. FLDs educate farmers through results obtained in terms of higher yields and also

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provide an effective learning situations as farmers see the crops and participate in the discussion for getting maximum production. Front line demonstrations are a long term educational activity conducted in a systemic manner at farmer's field to prove the worth of new technologies.

Jhabua is a tribal district of M.P. and soybean is the most important kharif crop but its productivity is very low (1150 kg/ha) as compared to state average of 1293 kg/ha and national average of 1353 kg/ha. (Agricultural Statistical at a Glance 2014). Low productivity might be due to unavailability of improved variety seed, poor crop management practices due to unawareness and non adoption of recommended production and protection technologies. Therefore, it is very necessary to demonstrate high yielding varieties with recommended new production technologies. Keeping above points in view Front Line Demonstrations were conducted on Soybean by Krishi Vigyan Kendra, Jhabua. The main objectives of the study were to exhibit the performance of recommended package of practices for harvesting the potential yields.

## **METHODOLOGY**

The present study was conducted in Jhabua district of Madhy Pradesh where 100 demonstrations on soybean were conducted during khairf 2013 and 2014 through FLDs. These demonstrations were conducted in four blocks of Jhabua district viz., Rama, Jhabua, Ranapur and Meghnagar. For selection of respondents, a list of farmers to whom FLD soybean had been allotted with their control plots was selected for the study. 25 farmers from each block were selected to making a total sample size of one hundred. Each demonstration was of one acre (0.4 ha) area. Low yield due to unavailability of improved variety seed suited for the region, imbalance use of fertilizers, increased incidence of insect pest and heavy infestation of weeds were identified as major issue during survey, farmers meeting and field visit. In order to manage these problems improved variety seed of var. JS 95-60 and recommended packages of practices were followed as new interventions during front line demonstrations programmes. In this zone, there is problem of low rainfall, less water holding capacity of soil with undulated topography and early withdrawals of monsoon and farmers generally used old and long duration variety seed JS 335. Improved variety JS 95-60 is a short duration variety suitable for low rainfall areas where monsoon is early withdraw. Sowing was done during last week of June to first week of July. The data were collected after FLD by personnel interview technique with the help of interview schedule developed for the study.

**Table1:- Demonstrated package of practices and farmers practices for soybean cultivation**

S.No.	Particulars	Farmers practice ( Local check)	Front Line Demonstrations ( Improved technology)
1	Variety	Their own seed mixture/ Old variety JS 335	Improved variety JS 95-60
2	Seed rate (Kg/ha)	100	75
3	Seed treatment	No	Thiram+ Carbendazim @ 3 g/kg seed
4	Use of culture	No treatment	Seed treatment with Rhizobium and PSB culture
5	Nutrient management (N:P:K)	DAP @ 100 kg/ha	20:60:20:20 kg/ha NPK & S
6	Insect Pest management	Indiscriminate use of single insecticide either Quinolfos or Trizophos	Need based application of insecticide. For Hairy caterpillars Quinolfos @ 1.5 lt/ha, Girdle beetle & Semilooper Trizophos@ 800 ml/ha, Tobacco caterpillar Profenofos+ Cypermethrin 1.0 lt/ha
7	Integrated Weed management	No use of herbicide. Use only dora/ kulfa for 2 times	Use of post emergence herbicide- Imazithapyr @ 1.0 lt/ha f/b dora/ kulfa
8	Spray technology (amount of water spray)	1/2- 1/3 of recommended	400-500 l/ha

## RESULTS AND DISCUSSION

**Adoption of recommended package of practices:-** The data presented in Table 2 indicated that majority of farmers adopted weed management (86%) and short duration improved variety seed (83%) followed by insect pest management (79%) and use of proper seed rate (74%). The highest adoption was found in use of integrated weed management practices, as soybean is a rainy season crop and weeds causes substantial losses in the yield to the range of 25 to 70% depending upon the weed flora and intensity (Chandel and Saxena 1998, Kewat et al., 2000, Singh 2007). Before FLD merely 20 per cent farmers adopted integrated weed management. Next second highest adoption to the tune of 83.0% recorded in selection of suitable variety, as Soybean var. JS 95-60 is a short duration high yielding variety and it was much suitable for low rainfall soybean grown areas where monsoon is early withdraw. Further, before FLD only 41, 32 and 30 per cent adoption was there in IPM, proper seed rate

and nutrient management but after FLD there were 79, 74, 71 per cent adoption reported in IPM, proper seed rate and nutrient management, respectively.

**Table 2:- Extent of adoption of recommended technology (N=100)**

Improved technology	Before FLD		After FLD		Rank
	No.	Per cent (%)	No.	Per cent (%)	
Selection of suitable variety	47	47	83	83	2
Seed rate (Kg/ha)	32	32	74	74	4
Seed treatment	26	26	68	68	6
Use of culture	18	18	62	62	7
Nutrient management (N:P:K)	30	30	71	71	5
Insect Pest management	41	41	79	79	3
Integrated Weed management	20	20	86	86	1
Spray technology (amount of water spray)	11	11	61	61	8

**Yield and Economic impact:-** The data on yield and economics are presented in Table 3 revealed that under demonstration plot, yield of soybean was found to be substantially higher than the farmer practices during both the years. On an average 40.96 per cent higher yield was recorded under demonstration plots as compared to farmer's practices. The cumulative effects of technological interventions like improved variety, seed treatment, use of culture, integrated pest and weed management over two years enhanced the productivity significantly. Mukherjee (2003) reported that the innovative intervention may have superior implications in enhancing productivity. Similar results were also reported by Mishra et al. (2009), Tiwari et al. (2003) and Tiwari and Saxena (2001) in different crops.

In the study of Economic impact of demonstrated soybean crop, total gross return, net return and B:C ratio were calculated for FLD plots and farmers practices and presented in Table 3. The economic indicators clearly showed that the net return from the recommended practices were substantially higher than the farmers practices. The average net returns in the demonstrated FLDs were much higher (Rs. 30,502) in comparison to farmer practices (Rs. 18,028). An average Rs. 12,474 as additional income was earned through the improved packages of practices viz., improved variety JS 95-60, seed treatment, use of culture, balance use of fertilizer and integrated pest and weed management. Benefit: Cost ratios of demonstrated plots were significantly higher over farmer's practices during both the years. The average Benefit: Cost ratios in the demonstration plots were 2.51 as compared to 1.99 in farmers practices. The higher benefit: cost ration in FLDs proved the economic viability of the interventions made under demonstrations and convinced the farmers on the utility of the

interventions. Mishra et al. (2009), Sharma (2003) and Verma et al. (2016) have reported similar findings.

**Table 3:- Yield and economics of recommended technology (FLD)**

Season & Year	Crop & Variety	No. of Demo	Average yield (kg/ha)		% increase	Net Return (Rs)		B:C ratio	
			FLD	Farmer practice		Demo	Control	Demo	Control
Kharif 2013	Soybean JS 95-60	50	1372	1027	33.82	33029	21474	2.73	2.22
Kharif 2014	Soybean JS 95-60	50	1462	987	48.10	27975	14583	2.29	1.77
<b>Average</b>			<b>1417</b>	<b>1007</b>	<b>40.96</b>	<b>30502</b>	<b>18028</b>	<b>2.51</b>	<b>1.99</b>

## CONCLUSION

The results of front line demonstration showed that the yield of soybean could be increased by 40.96 per cent by innovative technology interventions coupled with the proper management of demonstrations field. Further improved practices captured net returns of Rs 30502/ha with B:C ratio of 2.51 as against Rs 18028 & B:C ratio of 1.99 only in farmers practices. Under FLD improved practices create great awareness and motivated the other farmers to adopt suitable oilseed production technologies. The selection of suitable variety, critical inputs and participatory approach in planning and conducting the demonstrations help in the transfer of technology to the farmers.

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