IMPACT OF TECHNOLOGICAL PRACTICES ON THE PRODUCTIVITY OF SOYBEAN IN FRONT LINE DEMONSTRATION

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ABSTRACT

Soybean (Glycine max L. merril) occupies third position among the oil seed crops in India after groundnut and rapeseed mustard. The present area under soybean in India is estimated to be around 5.00 million hectares. Madhya Pradesh is the leading state with first rank in the area (424 lakh ha.) and production (325 lakh tones) of soybean in India. Soybean cultivation area is under about 400 hectors in Balaghat district of M.P. However the average productivity is very less (7.25 q/ha) in comparison to the productivity of Madhya Pradesh (10.00 q/ha) and India (9.5 q/ha). Krishi Vigyan Kendra, Balaghat during the period from 1994-95 to 1998-1999 in 15 villages of three blocks, conducted frontline demonstrations of Soybean. The results were compared with the full package of practices given viz.- improved variety, seed treatment, timely line sowing, balanced fertilizer, weeding, plant protection etc and farmers practices included local/ old variety, broadcasting sowing method, imbalanced fertilizer doses, no weeding and no plant protection practice. The FLDs in soybean registered 60% higher yield over farmers practice on an average. The highest seed yield (1830 kg/ha) was recorded in the year 1995-96 in FLD, which was 46% more over the farmers practice (1250 kg/ha). The productivity and income gain under FLDs. over traditional practices of soybean cultivation created greater awareness and motivated the other farmers to adopt appropriate production technology of soybean in the district. Many farmers approached the FLD adopted farmers to procure the seed of high yielding varieties of soybean and now the area under these varieties have increased which will spread in the whole district including the adjoining area. The selection of critical input and participatory approach in planning and conducting the demonstration definitely help in the transfer of technology to the farmers.

Key word : Front Line Demonstrations (FLD),

INTRODUCTION

Soybean (glycine max L. merril) occupies third position among the oil seed crops in India after groundnut and rapeseed mustard. The present area under soybean in India is estimated to be around 5.00 million hectares. Madhay Pradesh is the leader with first rank in the area (424 lakh ha.) and production (325 lakh tones) of soybean in India. While the soybean acreage is predominant in M.P., other states likely to occupy important place in soybean map of India are Maharashtra, Rajesthan, Uttar Pradesh, Andhar Pradesh, Karnataka and Tamilnadu. Today India ranks fifty in the world. Soybean under cultivation area is about 400 hacters in Balaghat district. However the average productivity is very less (7.25 q/ha.) in comparison to productivity of Madhya Pradesh (10.00 q/ha.) and India (9.5 q/ha.). Soybean has recently commanded extensive area in India. Commercial exploitation of soybean in the country has been the result of dogged determination vision for profit and demands of the country. In nutshell, the role of soybean in changing the edible oil scenario from foreign dependence to near self-reliance had been notable.

The condition of soil and climate are suitable for soybean cultivation in the district which received good average rainfall of 1400 MM annually. Which is distributed mostly in 3 major Kharif month i.e. July, August and September. The soil of the district is classified as alluvial having 20-25% clay, 5% silt, 40-60 fined sand and 20% coarse sand, whereas revenue department classified the soils as Bhata, Sehari, Matasi, Morand, Kanhar and Kachhar. These soils are low in available nitrogen, medium in phosphorus and high in potassium with a pH range of 6.5 to 8.5. It is mainly due to growing of non-adoption of appropriate production technology of soybean. The main objective of FLD is as follows:-

1. To accelerate the yield of soybean through farmers participatory demonstration by introduction of soybean improved high yielding varieties and its production technology in the district
2. To generate the production data and to collect the production constraints as feed back information for research.

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METHODOLOGY

Frontline demonstrations (FLDs) on Soybean was conducted by Krishi Vigyan Kendra, Badgaon, Balaghat during the period from 1994-95 to 1998-1999 in 15 villages of three blocks Kirnapur, Lanji and Balaghat. The total number of farmers under this programme was 49. The demonstration of improved technology in an area of 1.25 ha of each farmer. The total area covered in 5 years was 44 hectares for demonstration of recommended improved practices of soybean. In the demonstration, one control plot was also kept where farmers practice was carried out. The results were compared with the full package of practices given viz.- seed treatment, line sowing in time, balance fertilizer, weeding and plant protection etc and farmers practices included local/ old variety, broadcasting method, imbalance fertilizers doses, no weeding and no plant protection practices. The yield data of FLDs were collected from each farmer and averaged out in each year. The interview schedule used as instrument of data collection, consisted of set of questions, which were asked to the FLD farmers. The investigator in a face-to-face situation filled in answers with the respondents. Tabular analysis was done for the interpretation of the data by using the following formula:

$$\% \text{ Increased in yield} = \frac{D - L}{L} \times 100$$

D = Demosntration yield, L = Local cheek yield

RESULTS AND DISCUSSION

Selection of Critical inputs under FLD

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

S. No.	Item	Recommended Practice	Existing (Local) practice	Gapin adoption	% of farmers not adoption recommended	Farmers prioritization for critical input
	Soybean					
1.	Variety	PK 472, J.S- 335	Ankur, Bragg	Full	90	I
2.	Seed Rate	80 Kg/ha.	125 kg/ha	Partial	95	II
3.	Seed treatment	2 gram /. seed	Nil Full	100	IV	
4.	Fertilizer	N- 30 kg/ha P- 60 kg/ha K-30 kg/ha	10 kg/ha 25 kg/ha -	Partial	85	III
5.	Culture	12 Pkt/ha	Nil	Full	100	VI
6.	Weed Control	Two hands weeding	One hand weeding without complete knowledge	Full	100	VII
7.	Plant protection	1. Need based insecticide spray 2. Use of correct dose of insecticide	1. Application of insecticide without complete knowledge 2. Use of incorrect dose	Partial	95	IV

Table 1 indicated the factors considered for selection of critical inputs under FLD. The gaps in package of which farmers were not adopting recommended practice were considered for the selection of critical inputs. There was partial gap in adoption of recommended practices over existing practice with regards to seed rate, fertilizers, and plant protection measures, whereas, complete gap (full) was noted for variety, seed treatment with fungicide and bio fertilizer weed control.

The results clearly indicate that due to adoption of appropriate production technology the yield of soybean could be increased by 46 to 74 percent over the yield obtained under farmers practice of soybean cultivation Dixit and Singh (2003), Patil et. al.(2003) and Singh (2002) also reported the similar type of findings.

Table: -2 Productivity of Soybean crop under front line demonstration and farmers practice

Year	Area under Demo. ha.	No. of Farmers Under Demonstration	Av. yield of demo-nstration yield (q/ha)	Av. yield of Local check (q/ha)	Yield gap (q/ha)	Percent increased in yield
1994-95	5	05	5.12*	3.40	1.72	51
1995-96	10	06	18.30	12.50	5.80	46
1996-97	10	11	14.66	08.50	6.16	72
1997-98	10	12	13.10	7.50	5.60	74
1998-99	09	15	6.25**	3.90	2.35	60
Mean	44 ha.	49	11.48	7.16	4.32	60

* Crop affected due to unusual heavy rains

** The weather condition was not favorable during crop season continuous rains occurred during sowing time and no rains occurs between July 3rd week to July 4th week, thus crop suffered due to dry condition. The germination percentage of seed was poor that resulted in poor plant stand. The demonstration was conducted at the farmers' field under the management of scientist and farmers on finalized package of practices. The results obtained during the 5 years are presented

in table-2 Results revealed that the highest yield in demonstration plot and farmers plot was noted during the year 1995-96 (18.30 q./ha. and 12.5q./ha) and lowest yield was in the year 1994-95 (5.12 q/ha. and 3.40 q./ha.)

Economic Analysis–The economic analysis presented in table-3 reveals that net income under demonstration plot was highest in the year 1995-96 (Rs. 12,752) and lowest net income (Rs. 956) was noted in the year 1994-95. Similarly the highest net income (Rs. 8812) in farmers field was observed during 1995-96. It was noted that the net income under demonstration plot increased to the tune of 45-188 percent over farmers practice. The unusual heavy rains and poor germination situation during the year 1994-95 and 1998-99 led to poor productivity of soybean which ultimately lowered the net income under both demonstration and farmers' practice of soybean cultivation. Similar findings were also reported by Bhatanagar (1997).

Table 3. Economy analysis of demonstration and farmers practice

Year	Demonstration			Farmers plot			Additional income over F.P. Rs./ha.	Percentage increase income
	Avg. cost of cultivation Rs. /ha.	Gross income Rs. /ha.	Net income Rs/ha.	Avg. Cost of Cultivation Rs. /ha.	Avg. Gross income Rs. /ha.	Net income Rs/ha.		
1994-95	3780	4736	956*	2570	3145	575	381	66
1995-96	4175	16927	12752	2752	11562	8812	3940	45
1996-97	4290	13560	9270	2944	7862	4918	4352	88
1997-98	4476	12117	7641	3128	6937	3809	3832	101
1998-99	4638	5781	1143**	3210	3607	397	746	188
Mean	4272	10624	6352	2920	6623	3702	2650	72

Problems Identified in Soybean Cultivation

1. Balaghat district gets heavy rains during July to September. Sometimes soybean crops destroy in such condition. A variety of soybean is required which can tolerate heavy rains as well as stress condition
2. The problem of Kans (Sacharum spontaneum) is too much in soybean, which is not controlled by weedicide. A new weedicide or technique should develop to control Kans.
3. Culture, P.S.B. and fungicide should be supplied in the bag of soybean seed.
4. Late sowing of soybean crop.
5. Lack of knowledge of timely weeding.
6. Poor crop vigour due to poor nutrient supply and imbalance use of fertilizers.
7. Unstable plant population due to broad casting system.
8. Heavy attack of insect and disease.

CONCLUSION

The productivity and income gain under F.L.D. over traditional practice of soybean cultivation created greater awareness and motivated the other farmers to adopt appropriate production technology of soybean in the district. Many farmers approached the FLD farmers to procure the seed of soybean high yielding varieties and now the area under these varieties have increased which will spread in the whole district including the adjoining area. The selection of critical input and participatory approach in planning and conducting the demonstration definitely help in the transfer of technology to the farmers.

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