ECONOMIC EVALUATION OF FRONT LINE DEMONSTRATION ON SOYBEAN CULTIVATION IN MADHYA PRADESH

ABSTRACT

Krishi Vigyan Kendra, Shajapur conducted 60 front line demonstrations of soybean cultivation on the farmer's field for a period of 4 years from 2012-13 though 2015-16 to transfer scientific soybean cultivation technology among the famers of Shajapur district. The result revealed that the improved varieties of soybean JS- 335, JS-93-05 and JS-95-60 recorded 9.06 per cent, 14.03 per cent and 10.14 per cent higher yield respectively in demonstration plot compared to farmer practices. The increase in productivity was observed under recommended technology over the check plots i.e. 18.18 per cent, 7.63 per cent, 11.50 per cent and 13.04 per cent during 2012-13, 2013-14, 2014-15 and 2015-16 respectively. The productivity was found better under demo plots as compared to local practices. Therefore, soybean cultivation has broad scope to increase the area and production in Shajapur district. The demonstration has raised an additional income of the farmer Rs 4500 to 11000 per ha and 3.49 to 4.68 increment benefit cost ratio.

Key words: Extension gap, Front line demonstration, Krishi Vigyan Kendra, Soybean cultivation, Technology gap.

INTRODUCTION

Soybean is the major oilseed crop of Madhya Pradesh that boosted the economy of the state. It is legume crop but widely grown for oil purpose. It has great potential as a kharif season oilseed. Besides being a rich source of protein, they are also important for sustainable agriculture enriching the soil through biological nitrogen fixation. These crops fit well in the various cropping system without disturbing the main cereal crops. Hence, it is need of the day that we concentrate in developing high yield varieties with matching production technologies. During 2019-20 the area under the soybean crop was 12198.71 thousand ha with production of 11225.85 thousand MT with productivity level of 921 kg/ha in Madhya Pradesh state (www.sopa.org). A wide gap existed in the potential yield and farmers' yield on soybean crop in Madhya Pradesh. In view of this, Krishi Vigyan Kendra, Shajapur conducted the Front line demonstration (FLD) on soybean crop to know the yield gaps between FLDs and farmers' field, extent technology adoption. The area under soybean was very high in Madhya Pradesh but productivity is but very low due to non availability of seeds of improved variety, poor management and biotic and a biotic stress. The main aims of organizing these FLDs in farmers field is to bridge wide gap between demonstration field yield and famers yield and popularizing the cultivation of soybean in large area of Shajapur district of Madhya Pradesh.

METERIAL AND METHOD

A total of 60 front line demonstrations (15 demonstrations in each year) were organized by the Krishi Vigyan Kendra in the Shajapur district of Madhya Pradesh to demonstrate the impact of research emanated production technology on soybean productivity over a period of four years during kharif season from 2012-13 to 2015-16. The year 2012-13, 2013-14, 2014-15 and 2015-16 were laid out covering 05 adopted villages of the Shajapur district. The improved package of practices included improved varieties (JS-335, JS-93-05 and JS-95-60) seed treatment with fungicides (thiram carbendazim in 2:1 ratio @ 3gm/kg seed) and inoculated with bio fertilizer (phosphorus solubilizing bacteria cultures) recommended dose of fertilizer (20:60:20 NPK) and need based pest management (one spray at imadachloropid at 25 DAS + one spray of trizophos at 45 days). The soil of the demonstrations belongs to verity soils like black cotton soil, laterite soil and alluvial soil with low to medium fertility. The area under each front line demonstration was on 0.4 ha.

The demonstrations were planted between 20 June to 5th July with seed rate 80-100 Kg/ha. The recommended dose of NPK through 12:32:16 NPK per hectare was applied as basal. The selection of cultivators was done on the basis at Participatory Rural Appraisal (PRA) action plan and care has been taken to lay out the demonstration on road side to facilitate the demonstration of technology.

To evaluate the performances of soybean cultivation under these demonstrations and the farmers' practices, the yield data were collected from the same practices by random crop cutting method and analysis was done by using simple statistical tools. The farm profitability and B: C ratio was calculated by using the formula as given below:

1: Percent increase=Demonstration yield- farmers yield/ Farmers yield X 100
2: Technology Gap= Potential yield – Demonstration yield
3: Extension Gap = Demonstration yield – farmer's yield
4: Technology Index= Potential yield – Demonstration yield/ Potential yield X 100
2: For estimation of cost of cultivation, Cost concepts were used
3: Net Farm Income= Gross income – Cost 'C3'
4: Benefit Cost Ratio= Gross income / Total expenses (Cost C3)

RESULT AND DISCUSION

Varieties

Among soybean varieties presented (Table-1), variety JS-335 has reported highest yield 17.88 q/ha. The next best was JS-93-05 (17.34 q/ha) followed by JS-95-60 with (16.17 q/ha). Varieties JS-93-05, JS-95-60 and JS 335 recorded 14.30, 10.14, land 9.06% respectively higher seed yield under recommended package at practices over local checks with farmer practices.

Table -1 Performance of improved soybean varieties against local varieties on farmer's fields.

Varieties	Yield (q/ha)	Yield of local Checks	Percentage increase in yield over check

			(q/ha)	
	Highest	Average		
JS-335	20.40	17.88	16.32	9.06
JS-93-05	18.60	17.34	15.17	14.30
JS-95-60	19.50	16.17	16.17	10.14

Grain yield

The productivity of soybean cultivation ranged from17.30 q/ha to 28.50 q/ha with highest yield 28.50 q/ha under recommended improved production and production technologies. The data indicated that (Table-2) the productivity was found to be increased under the demonstration plots over the check plots 18.18%, 7.63 %, 11.50 % and 13.04% during 2012-13, 2013-14, 2014-15 and 2015-16 respectively. The higher yield of soybean could be attributed to adoption of high yielding varieties, seed treatment, balance dose of fertilizer, weed control, integrated pest management and integrated disease management control measures. The technology gap was observed 1.50 to 12.70 q/ha may be attributed to dissimilarity in the soil fertility status, local climatic condition, soil fertility status. The extension gap was found 3.07 to 10.00 q/ha during the four years of demonstrations. Similarly, yield enhancement, technology and extension gap in different crops under FLD were supported by Raut *et al*. (2021) in green gram, Raghav *et al*. (2021) in chick Pea, Sangeetha *et al*. (2020) in major pulse, Singh *et al*. (2020) in pulse, Bora *et al*. (2020) in rapeseed, Dwivedi *et al*. (2018) in blackgram, Patil *et al*. (2018) in oilseed crops, Saikia *et al*. (2018) in blackgram, Raj *et al*. (2013) in soybean, Hiremath *et al*. (2010) in chilli, Mishra *et al*. (2009) in potato, Raghuwanshi *et al*. (2010) in soybean, Jeengar *et al*. (2006) in maize and Tiwari *et al*. (2006) in gram.

Table -2 Performance of improve technologies of soybean cultivation on productivity through demonstrations

Year	No. of demos	Yield (q/ha)			Increase over local check (%)	Technology gap (q/ha)	Extension gap (q/ha)	Technological Index (%)
		Potential	Demos plot	Local check				
2012-13	15	30.00	20.40	16.50	18.18	9.60	3.90	32.00
2013-14	15	30.00	28.50	18.50	7.63	1.50	10.00	05.00
2014-15	15	30.00	19.30	16.23	11.50	10.70	3.07	35.00
2015-16	15	30.00	17.30	12.33	13.04	12.70	4.97	42.33

Economic parameter

The economic analysis made on the basis prevailing market rates (Table-3) showed that the demonstration gave higher net return of Rs. 46000/ha, Rs.44000/ha Rs. 41863/ha and Rs.32376/ha as compared to Rs. 35000/ha, Rs. 39500/ha, Rs.35700.ha and Rs. 25446/ha under local practices in the corresponding seasons. An additional income per ha was generated Rs.11000 in the year 2012-13, Rs.4500 in 2013-14, Rs.6163 in 2014-15 and Rs.6910 in 2015-16. As far as cost of cultivation was concerned, on an average 830 Rs per ha addition cost was

observed under improved practices. Incremental benefit cost ratio under demonstration was observed 4.68, 3.75, 4.22 and 3.49 as compared with local check 3.85, 3.59, 3.81 and 3.29 during 2012-13, 2013-14, 2014-15 and 2015-16 respectively years.

Table-3 Cost of cultivation, net return and B: C ration under improved and local management practices

Year	Cost of cultivation (Rs/ha)		Net return (Rs/ha)		Additional cost of cultivation (Rs/ha)	Additional net Return Rs/ha	Incremental Benefit Cost ratio	
	Demo	Local check	Demo	Local check			Demo	Local check
2012-13	12500	12200	46000	35000	300	11000	4.68	3.85
2013-14	16000	15200	44000	39500	800	4500	3.75	3.59
2014-15	13000	12700	41863	35700	300	6163	4.22	3.81
2015-16	13000	11080	32376	25466	1920	6910	3.49	3.29

CONCLUSION

The result of front line demonstration of soybean have clearly showed that growing of soybean variety JS-335, JS-93-05 and JS-95-60 under improved management practices including proper seed rate, seed treatment weed control, recommended fertilizer, integrated pest management , integrated disease management proved more productivity and remunerative then that grown with additional practices. On the basis of result, farmers were motivated to adopt new technology which applied under front line demonstration

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