

## ENHANCEMENT OF PRODUCTION AND PRODUCTIVITY OF SOYBEAN THROUGH THE CLUSTER FRONT LINE DEMONSTRATION OF OILSEED

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**Abstract:** Cluster front line demonstrations on soybean were organized in the kharif seasons of year 2015-16 different villages of Ashoknagar district by Krishi Vigyan Kendra, Ashoknagar for creating awareness among the farmers to popularize the high yielding variety of soybean. In this context, centre was conducted demonstration to assess the improved varieties of soybean JS 9560 along with existing varieties used by the farmers as local check in the district. The farmers followed the full package of practices like proper seed rate, seed treatment with biofertilizer, fertilizer application on soil test value, weed management, IPM practices etc. Result of front line demonstrations indicated that on an average of 25% more yield of soybean was found as compared to farmer's practices. The number of productive pods per plant of JS 9560 soybean was found 52.7 and non-productive pods per plant 7.9 under package of improved practices. The economic analysis of data over the years revealed that the adoption of improved technology of soybean not only gives the opportunity of higher yield, but also provides higher benefit cost ratio i.e. 1.62 as compared to 1.37 in the farmer's practices.

**Keywords:** CFLDs, Soybean, Front Line Demonstration, Ashoknagar

### INTRODUCTION

Soybean (*Glycine max* Merrill) is a legume that grows in tropical, subtropical and temperate climate. It occupies third position among the oilseed crop in India after groundnut and rapeseed mustard. Madhya Pradesh has its major share in area (70%) and production (65%) of soybean in India (Sharma Saurabh, 2013), but productivity of soybean in M. P. is very low (10 qt/ha) as compare to genetic potential (25q/ha).

It has great potential as a *kharif* oilseed and has emerged as an important commercial oilseed in Madhya Pradesh. The main aim of Krishi Vigyan Kendras is to reduce the time lag between generation of technology at the research institution and its transfer to the farmers for increasing productivity and income from the agriculture and allied sectors on sustained basis.

The FLD is an important tool for transfer of latest package of practices in totality to farmers and the main objective of this programme is to demonstrate newly released crop production and protection technologies and management practices at the farmers' field under real farming situation. Through this practice, the newly improved innovative technology having higher production potential under the specific cropping system can be popularized and simultaneously feedback from the farmers may be generated on the demonstrated technology (Singh *et al.*, 2012).

To sustain the production system of soybean, the Department of Agriculture, Cooperation and Farmers Welfare had sanctioned the project "Cluster Frontline Demonstrations on oilseed to ICAR-ATARI, Jabalpur through National Mission on Oilseed and oilpalm (NMOOP). Under these cluster front line demonstrations (CFLD), introduction of improved

technologies/package of practices is the main objective with conductance of long-term educational activity in a systematic manner in farmers' fields.

This project was implemented by Krishi Vigyan Kendra, RVSKVV, Ashoknagar of Zone-IX with main objective to boost the production and productivity of Soybean through CFLDs with latest and specific technologies and varieties. The present study was carried out by the Krishi Vigyan Kendra, Ashoknagar with the following objectives:

1. To popularize the improved and high yielding varieties of soybean along with their production and plant protection technologies.
2. To study the technological gap, extension gap and technology index.
3. To work out the difference in input cost and monetary returns under Cluster Front Line demonstrations and farmers practice.

### MATERIAL AND METHOD

The present study was conducted by the Krishi Vigyan Kendra, Ashoknagar during Kharif season of year 2015-16 with the objective to identify the yield gap as well as to work out the difference in input cost and monetary returns. Improved varieties of soybean JS 9560 with full package of practice was demonstrated through cluster demonstration of soybean in the farmer's field of different villages of operational area of Krishi Vigyan Kendra. This variety was compared with the existing soybean variety JS - 335 used by the farmers as local check. Total 75 demonstration were conducted in 30 ha area. Each demo was conducted on an area of 0.4 ha and the same area adjacent to the demonstration plots was kept as a local check. Under the demonstrations, crop was fertilized with recommended dose of fertilizer @ 20:60:20:20:: N:P2O5:K2O: S kg/ha and

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full dose of fertilizer was added at the time of sowing. Seed (75 kg /ha ) were sown by the seed cum ferti drill after treating by Cabendezim @ 2gm /kg seed + rhizobium @ 5g/kg seed + PSB @ 5 g/kg of seed. Weed management (imazathyper @ 800 ml/ha at 21 DAS + one hand weeding at 40 DAS) and pest management were adopted as per requirement. Crop was sown in the first week of july at sufficient moisture content in the soil.

Under farmers practice existing variety JS 335, was sown without any seed treatment with fungicides and bio-fertilizers, using higher seed rate (110-120 kg/ha), broadcasting of DAP at 20 days after sowing (DAS), and following injudicious use of insecticide and weedicide.

Soybean seed of JS 9560 was provided by the Krishi Vigyan Kendra, whereas, the fertilizer, herbicide, insecticides and other inputs were born by the farmers themselves.

Before conducting the demonstrations, KVK has collected the soil sample from the demonstrations field and analyzed the sample and applied the fertilizer on the basis of soil test values, training to the farmers of respective villages was imparted with

respect to envisaged technological interventions. Site selections, farmer's selection, layout of demonstration and farmers participation were considered as suggested by Choudhury (1999). The observations on productive and non-productive pods per plant, seed yield per plant and seed yield per ha were recorded. Other parameters like harvest index, technology gap, extension gap and technology index (%) were worked out as suggested by Kadian *et al.* (1997) using following formulae.

$Harvest\ index\ (\%) = \frac{Grain\ yield}{Biological\ yield} \times 100$

$Technology\ gap\ (kg/ha) = Potential\ yield - Demonstration\ yield$

$Extension\ gap\ (kg/ha) = Demonstration\ yield - Farmers''\ yield$

$Technology\ index = \frac{Potential\ yield - Demonstration\ yield}{Potential\ yield} \times 100$

The economic analysis was done by working out cost of cultivation utilizing the inputs and output prices of commodities which prevailed during year of demonstration, gross and net returns, and benefit cost ratio.

**Table 1.** Description of Technological intervention and farmers practices under CFLD on Soybean

Particulars	Technological intervention (T1)	Farmers Practices (T2)	Gap
Variety	JS 9560	JS 335	Full gap
Seed Rate	75 kg/ha	120 kg/ha	Partial Gap
Soil Test	Soil Test Before demonstration	No soil test	Full Gap
Integrated Nutrient Management	20:60:20:20:: N:P2O5:K2O: S kg/ha + rhizobium @ 5g/kg seed + PSB @ 5g/kg of seed	Only N and P through DAP	Full Gap
Integrated Pest Management	Seed treatment with Cabendezim @ 2g/kg seed + one spray of propronophosh @ 1.5 lit/ha at the ETL	Two or three spray of Insecticide insufficient amount of water	Partial Gap
Weed Management	imazathyper @ 800 ml/ha at 21 DAS + one hand weeding at 40 DAS	imazathyper @ 800 ml/ha at 21 DAS	Partial Gap

## RESULT AND DISCUSSION

While evaluating the demonstrated variety and comparing with the farmer practice, it was observed result of front line demonstrations indicated that the cultivation practices comprised under CFLD viz., use of improved varieties, proper seed rate, seed inoculation by rhizobium and PSB culture, soil test based application of fertilizer, integrated pest management, irrigation and hand weeding produced on an average of 25% more yield of soybean as compared to farmer's practices. The result indicates that the CFLD has given a good impact over the farming community of Ashoknagar district as they were motivated by the improved agricultural technologies applied in the demonstration plots.

The number of productive pods per plant of JS 9560 soybean ranged from 48.6 to 55.1 with a mean of 52.7 and non-productive pods per plant range from

7.2 to 8.8 with a mean of 7.9 under package of improved practices. In case of farmer's practice the respective figures recorded were 40.5 to 46.3 with a mean of 43.8 and 6.0 to 6.8 with a mean of 6.4, respectively.

The result revealed that the seed yield of soybean recorded was in the range of 840 to 1250 kg per ha (average 1075 kg/ha) by adoption of improved package of practices as compared to farmer's practice of 730 to 960 kg per ha (average 860 kg/ha). In comparison to farmer's practice, an increase of 15 to 30 per cent (average 25 %) in seed yield was recorded during 2015-16 due to improved package of practices. Similarly, higher harvest index was recorded under improved package of practices (ranged from 32.3 to 38.1 % with a mean of 35.7 % as) compared to farmers'' practice (29.1 % to 34.6 % with a mean of 31.7 %). The higher number of productive pods and higher harvest index in imparted

package of practices justifies the higher yield achieved over farmer's practice. These results are in agreement with findings of Kumar *et al.* (2010), Jain *et al.* (1998) and Tiwari *et al.* (2013).

The technology gap is the gap in the demonstration yield over potential yield was found 9.25 qt/ha while extension gap was recorded 2.15 qt/ha. The technology gap observed dissimilar due to weather conditions, soil fertility status. Hence location specific recommendation appears to be necessary to bridge the gap between the yields. But to minimize the extension gap it is need to educate the farmers through various means for more adoption of improved high yielding variety and recommended practices to bridge the wide extension gap. This extension gap requires urgent attention from planners, scientists, extension personnel, development department and NGOs working in the agricultural fields.

The technology index shows the feasibility of the evolved technology at the farmer's field. The lower the value of technology more is the feasibility of the technology. The technology index was found 46.25% indicating the performance of this variety in Ashoknagar region was satisfactory.

The input and output prices of commodities prevailed during 2015-16 of demonstration were taken for calculating the cost of cultivation, gross return, additional net return and benefit cost ratio. The economic analysis of data over the years revealed that the adoption of improved technology of soybean not only gives the opportunity of higher yield, but also provides higher benefit cost ratio i.e. 1.62 as compared to 1.37 in the farmer's practices. This may be due to higher yield obtained under recommended practices compared to farmer's practices.

Similar results have earlier been reported on soybean (Sharma *et al.*, 2013; Tiwari *et al.*, 2013) and on chickpea (Tomar *et al.*, 1999), Tomar (2010), Mokidue *et al.* (2011) and Singh *et al.* (2014). It was also observed from the data of front line demonstration recorded higher gross return and net return as compared to local check. The gross and net returns were found Rs 34400 and Rs 13150 in CFLD while in farmer's practices these were found Rs 27520 and Rs 7555 respectively.

The result of front line demonstrations on the package of practices suggested that by its adoption, the farmers can realize higher yields and net profit in soybean cultivation.

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