

## Boosting Mustard Production through Front Line Demonstrations

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### ABSTRACT

*Mustard is an important Rabi oilseed crop of India. It occupies about 24.70 per cent of area and 48.28 per cent of production of the total oilseed production in India. Front line demonstrations on mustard variety Bio-902 (Pusa Jai Kisan) were conducted at farmers' fields in district Jhunjhunu (Rajasthan) during Rabi seasons of the year 2005-06, 2006-07, 2007-08 & 2009-10. On four years overall average basis about 15.9 per cent higher grain yield was recorded under demonstrations than the farmers' traditional practices. The extension gap, technology gap and technology index were 217.5 kg/ha, 375 Kg/ha and 18.8 %, respectively. An additional investments of Rs.1136.5 per ha coupled with scientific monitoring of demonstrations and non-monetary factors resulted in additional return of Rs. 3848 per ha. Fluctuating MSP sale price of mustard during different years influenced the economic returns per unit area. On four years overall average basis Incremental benefit: Cost ratio was found as 3.4.*

**Key words:** Mustard; Demonstration; Gap analysis; Economics; Grain yields;

**M**ustard is an important Rabi oilseed crop of India. It occupies about 24.70 per cent of area and 48.28 per cent of production of the total oilseed production in India. Its area, production and productivity in the country is 5.43 M. ha., 6.41 M.tonnes & 1159 kg/ha., respectively. In Rajasthan state the total area under mustard cultivation is 2.84 M.ha with the estimated production of 3.5 M. tonnes & average productivity of mustard in the state is 1234 kg/ha (*Anonymus, 2010*). So far as concerned with the Jhunjhunu district of Rajasthan, total area under mustard cultivation is 78.0 thousand hectares with the productivity of 1308 kg/ha.

The present average yield of oilseeds are just about 1.0 tonnes per hectare, which need to be increased to at least 1.5 tonnes per hectare by 2015 (*Hegde, 2005*) and this indicating the shortfall which is to be minimized either by increasing the area under oilseeds or by increasing the productivity levels of oilseeds. Till date the productivity level of mustard is not sufficient on account of several biotic and abiotic stresses besides unavailability of quality seeds of improved varieties in time and poor crop management practices due to unawareness and non-adoption of recommended production & plant protection technologies. Therefore, it is very essential to demonstrate the high yielding varieties, resistant to biotic and abiotic stresses and other

production technologies to whom the farmers generally do not adopt. Recognizing the importance of oilseeds in Indian Agriculture and urgent need to ensure household nutritional security, the Ministry of Agriculture, Govt. of India has taken the innovative methodology to boost up the production of oilseeds crops by establishment of Technology Mission on Oilseeds in 1986 which paved the way to meet different challenges and complexities in the oilseed sector (*Hegde, 2005*). A wide gap exists in oilseeds production between the available techniques and its actual application by the farmers which is reflected through poor yield in the farmers' fields. There is a tremendous opportunity for increasing the production and productivity of Mustard crop by adopting the improved technologies. There are so many appropriate technologies generated at agricultural universities and research stations but the productivity of Mustard is still very low due to poor transfer of technology from the points of its development to the points of its utilization and only a little new knowledge percolates to the farmers fields, hence a vast gap has been observed between knowledge production & knowledge utilization.

To achieve target of additional production of oilseeds, it is necessary to concentrate efforts on scientific cultivation of mustard, the most important

oilseed crop of India. Therefore, Front Line Demonstrations (FLD) of oilseeds on farmers' field was initiated during 1990-91 under the financial support of Department of Agriculture & Cooperation, Govt. of India. The basic objective of FLDs is to demonstrate improved proven technology of recently released, early maturing, high yielding, bold seeded, disease resistant varieties with IPNM, IWM & IPM at farmers field through KVKs to bring in enhanced application of modern technologies to generate yield data & collection of farmers feedback. Keeping the importance of FLDs, the KVK, Jhunjhunu conducted demonstrations on oilseed crops mustard at farmers field under irrigated situations in Rabi 2005-06, 2006-07, 2007-08 & 2009-10. The objectives were as follows:

1. To exhibit the performance of recognised & recommended high yielding Mustard varieties with full recommended package of practices for harvesting higher crop yields.
2. To compare the yield levels of local check (farmers' field) and FLD fields.
3. To collect feedback information for further improvement in research and extension programme.

## METHODOLOGY

Front line demonstrations on Mustard were conducted at farmers' field in district Jhunjhunu (Rajasthan) to assess its performance during Rabi seasons of the year 2005-06, 2006-07, 2007-08 & 2009-10. The soils of the district is generally sandy loam in texture which is low in nitrogen, low to medium in phosphorus and medium to high in potash. Each demonstrations were of one acre area and using recommended package of practices and the farmers were provided quality seed of Mustard variety Bio-902 (*Pusa Jai Kisan*) during all the years of the study. The

sowing was done during mid October to last week of October under assured irrigated conditions and harvested during first fortnight of March. The demonstrations on farmers' fields were regularly monitored by Krishi Vigyan Kendra, Jhunjhunu scientists right from sowing to harvesting. The grain yield of demonstration crop was recorded & analyzed. Different parameters as suggested by *Yadav et al. (2004)* was used for calculating gap analysis, costs and returns. The detail of different parameters is as follows:

Extension gap = Demonstration yield - Farmers practice yield

Effective gain = Additional return - Additional cost

Technology gap = Potential yield - Demonstration yield

Additional return = Dem. return - Farmers practice return

Incremental B:C ratio =  $\frac{\text{Additional return}}{\text{Additional cost}}$

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

## RESULTS AND DISCUSSION

*Grain yield:* The increase in grain yield under demonstration was 11.6 to 18.9 per cent than farmers' local practices. On the basis of four years, 15.9 per cent yield advantage was recorded under demonstrations carried out with improved cultivation technology as compared to farmers' traditional way of Mustard cultivation.

*Gap analysis:* An extension gap of 181-276 kg per hectare was found between demonstrated technology and farmers practices during different four years and on average basis the extension gap was 217.5 kg per hectare (Table 1). The extension gap was lowest (181 kg/ha) during 2007-08 and was highest (276 kg/ha) during 2009-10. Such gap might be attributed to adoption of improved technology in demonstrations which resulted in higher grain yield than the traditional farmers'

**Table 1. Grain yield and gap analysis of front line demonstrations on Mustard at farmers field**

Year	No. of Demo.	Variety	Potential Yield (Kg/ha)	Demo. Yield (Kg/ha)	Farmers practice yield (Kg/ha)	Increase (%)	Extension gap (Kg/ha)	Technology gap (Kg/ha)	Technology index (%)
2005-06	40	Bio-902	2000	1668	1456	14.6	212	332	16.6
2006-07	40	Bio-902	2000	1939	1738	11.6	201	61	03.1
2007-08	40	Bio-902	2000	1163	0982	18.4	181	837	41.9
2009-10	40	Bio-902	2000	1730	1454	18.9	276	270	13.5
Overall average	40	-	2000	1625	1407.5	15.9	217.5	375	18.8

\*- No allotment of Mustard FLD in 2008-09.

**Table 2. Economic analysis of front line demonstrations on Mustard at farmers field**

Year	Cost of cash input (Rs./ha)		Additional cost in demo. (Rs./ha)	Sale price (MSP) of grain (Rs./qtl.)	Total returns (Rs./ha)		Additional return in demo. (Rs./ha)	Effective gain (Rs./ha)	INC B:C ratio (IBCR)
	Demo.	FP			Demo.	FP			
2005-06	1803	785	1018	1715	28606	24970	3636	2618	3.6
2006-07	1986	993	993	1715	33254	29807	3447	2454	3.5
2007-08	1950	610	1340	1800	20934	17676	3258	1918	2.4
2009-10	2045	850	1195	1830	31659	26608	5051	3856	4.2
Overall average	1946	809.5	1136.5	1765	28613.3	24765.3	3848	2711.5	3.4

\*- No allotment of Mustard FLD in 2008-09. Demo.=Demonstration FP=Farmers practice INC=Incremental

practices. Wide technology gap were observed during different years and this was lowest (61 kg/ha) during 2006-07 and was highest (837 kg/ha) during 2007-08. On four years average basis the technology gap of total 160 demonstrations was found as 375 kg per hectare. The difference in technology gap during different years could be due to more feasibility of recommended technologies during different years. Similarly, the technology index for all the demonstrations during different years were in accordance with technology gap. Higher technology index reflected the inadequate proven technology for transferring to farmers and insufficient extension services for transfer of technology.

*Economic analysis:* Different variables like seed, fertilizers, bio fertilizers and pesticides were considered as cash inputs for the demonstrations as well as farmers practice and on an average an additional investment of Rs. 1136.5 per ha was made under demonstrations. Economic returns as a function of grain yield and MSP sale price varied during different years. Maximum returns (Rs. 5051 per ha) during the year 2009-10 was obtained due to higher grain yield and higher MSP sale rates as declared by GOI. The higher additional returns and effective gain obtained under demonstrations could be due to improved technology, non-monetary factors, timely operations of crop cultivation and scientific

monitoring. The lowest and highest incremental benefit: cost ratio (IBCR) were 2.4 & 4.2 in 2007-08 and 2009-10, respectively (Table 2) depends on produced grain yield and MSP sale rates. Overall average IBCR was found as 3.4. The results confirm the findings of front line demonstrations on oilseed and pulse crops by *Yadav et al (2004)* and *Lathwal (2010)*.

**CONCLUSION**

Front line demonstration program was effective in changing attitude, skill and knowledge of improved / recommended practices of Mustard cultivation including adoption. This also improved the relationship between farmers and scientists and built confidence between them. The demonstration farmers acted also as primary source of information on the improved practices of Mustard cultivation and also acted as source of good quality pure seeds in their locality and surrounding area for the next crop. The concept of Front line demonstration may be applied to all farmer categories including progressive farmers for speedy and wider dissemination of the recommended practices to other members of the farming community. This will help in the removal of the cross-sectional barrier of the farming population.

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