Evaluation of mustard productivity under front line demonstration in Bundelkhand region

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ABSTRACT
Rani Lakshmi Bai Central Agricultural University, Jhansi conducted 40 front line demonstrations on mustard crop under the varieties - DRMR IJ-31, NRCHB -101, RH-749, NRC2-2 and RH-406 during 2016–17. The critical reasons were identified in existing production technology through surveys and meetings with farmers. Sowing time, use of higher seed rate which resulted into high plant population, uneven plant population, more weeds, in balance dose of fertilizers and less use of plant protection measures were main causes of low productivity of oilseeds in district Jhansi. The results of study showed that the yield under demonstration plots was 12.82 q/ha as compared to 9.78 q /ha in traditional farmer practices plots. The results clearly indicate the positive effects of FLDs over the existing farmer’s practices. Benefit: cost ratio was also recorded higher under demonstrations against farmer practices during the year of experimentation.

Key words: Front Line Demonstration, Improved Package of Practices, Mustard, Yield.

INTRODUCTION
Fats and oils are valuable food ingredients in human diet. They contain the saturated and unsaturated fatty acids. Oilseeds are primarily the source of extraction of edible oil for human diet. Oilseeds also serve as an important raw material for the manufacturing of a number of products like soap, lubricants, greases, paints, medicines etc. The oil cake is used as cattle feed and manure. Among the annual major crops under oilseeds, groundnut and rapeseed mustard contribute about 2/3rd of the production and also dominate the edible oil economy of India. Indian mustard is most important oil seed crop of India. Mustard crop is grown in the Rabi season from September-October to February- March.

The front line demonstration (FLD) is an applied approach to accelerate the dissemination of proven technologies at farmer’s fields in a participatory mode with an objective to explore the maximum available resources of crop production. It is now realized that training of farmers increases the technical knowledge and awareness regarding cultivation practices. India is an important rape seed mustard growing country in the world, occupying largest area and has second position in production after China. Front line demonstration is one of the most important components of extension because by seeing it gives more impact on the farmers.

In Bundelkhand region in district Jhansi, total area of mustard grown were not high and the production per ha was also low. Important crop management practices can play effective dual role both in increasing the productivity and enhancing production stability. Major emphasis in the adoption of new technology was high yielding varieties, assured irrigation, balanced fertilizer management and use of chemical (Kikar et al., 2005). Organization of front line demonstration is most effective tool for transfer of cost effective technologies among the farmers (Srinivas et al., 2015 and Jeendar et al., 2006). Therefore, front line demonstration were conducted during rabi seasons of the year 2016-17 on selected farmers field of the operational area of Rani Lakshmi Bai Central Agricultural University, Jhansi with the objective of exhibiting the performance of improved varieties of Indian mustard crop under recommended package of practices.

MATERIALS AND METHODS
Forty front line demonstrations were conducted at Rani Lakshmi Bai Central Agricultural University Jhansi on mustard crop at farmer’s field in different adopted villages. The number of FLD conducted in Kanchanpur, Dhikauli, Koat, Sarmui and Mavai villages were 12,10,8,5 & 5 respectively year 2016-17 in Jhansi district. For conducting FLDs, farmers were identified/ selected following the survey suggested by Choudhary (1999). The required inputs were supplied and regular visits to the demonstration fields by the Rani Lakshmi Bai Central Agricultural University Scientists and teaching associates ensured proper guidance to the farmers, non monetary inputs like timely sowing, seed rate, plant spacing, weeding, thinning, harvesting, threshing, chemical use, etc, practices were taken care through farmers
training, field visit, etc. The sowing was done during 15th to 30th October under assured irrigated conditions and were harvested during month of March and April. Seeds were sown in rows 45 cm apart by drill and placed at 3 cm depth. However, the practices followed by farmers in general used local verities, seed rate @ 5-6 kg/ha, no seed treatment, sowing from last week of October to last week of November, in broadcasting manner, no use of fertilizer pattern to under dose application that’s only use of urea and DAP, no weed, and plant protection measures followed. Production data of Mustard were observed with separate farmer after threshing. Group meetings and trainings were also arranged to give the opportunities to the farmers to see the benefits of demonstrated technologies.

The data output were collected from both front line demonstration plots as well as farmers plots and cost of cultivation, net income and benefit cost ratio were also worked out (Samui et al., 2000).

Packages of practices followed are mentioned below in the Table:

| Particulars | Improved technologies | Farmers practice |
|-------------|-----------------------|-----------------|
| Varieties   | DRMR II-31, NRCHB -101, RH-749,NRCDR-2, RH-406 | Local |
| Seed rate   | 4kg/ ha               | 5-6 kg/ha       |
| Sowing time  | 15th-30th October     | Last week of October to last week of November |
| Sowing method | Line sowing by seed drill | Broadcasting |
| Water management | Two irrigation | Four irrigation |
| Plant protection | Need based application of Insecticide for the control of aphids. | No use |

Farmer practices: 60 kg nitrogen per hectare, 40 kg/ha phosphorus and no application of potash. Front Line Demonstration (FLD): Recommended dose of fertilizers 80 kg nitrogen, 60 kg phosphorus, 40 kg potash.

The technology gap, extension gap and technological index were calculated by using following Formula as given below:

\[
\text{Technology gap} = \frac{\text{Potential yield} - \text{Demonstrated yield}}{\text{Potential yield}} \times 100
\]

\[
\text{Extension gap} = \frac{\text{Demonstrated yield} - \text{Yield under existing practice}}{\text{Demonstrated yield}}
\]

Technology index =

\[
\text{Potential yield} - \text{Demonstrated yield} \times 100
\]

The BCR was calculated with the help of formula given below:

\[
\text{BCR} = \frac{\text{Gross return}}{\text{Gross cost}}
\]

RESULTS AND DISCUSSION

Front line demonstrations were laid out on mustard to assess the yield and economics at farmers’ field. Table 1 clear showed the positive effect of front line demonstrations over the existing practices and significantly enhanced the yield of mustard in the study area due to use of high yielding varieties, timely sowing, balance does of fertilizers, Substantially. The average yield of mustard grain under demonstration was 12.82 quintal / ha in comparison to 9.78 quintal / ha over farmer’s local practices.

Yield of the front line demonstration and potential yield of the crop was compared to find out the yield gaps which were further simplified into technology and extension gap. The data of Table 3 showed the technology gap in the demonstration yield against potential yield during the study year and reflects the farmer’s cooperation in carrying out such demonstrations with encouraging results. The technology gap observed may be attributed to the dissimilarity in soil fertility status, timely sowing and weather conditions. Similar finding were recorded by Mitra and Samajdar (2010). Further, the higher extension gap was observed. The extension gap in the table states the need to educate the farmers through various means for adoption of improved production technologies to reduce the extension gap.

The data of Table 2 imparted that the gross return, net profit and benefit cost ratio recorded were Rs. 30,338/ ha, Rs. 14117/ha and 1.9 respectively during 2016-17 under farmers practices. While, Rs.41553/ha gross return Rs.22176/ha, net profit with 2.1 benefit cost ratio were recorded during 2016-17 under FLD. The dominance of recommended package of practices under frontline demonstration over farmers’ practice was also reported by Mitra and Samajdar (2010) and Balai et al., (2012). From the results of FLD on mustard, it can be concluded that use

| Table 1: Average yield on demonstration and farmer practices Kg/ha. |
|---------------------------------------------------------------|
| Treatments | Mean |
|-------------|------|
| Front Line Demonstration Technology | 1,282.500 |
| Farmer practice | 978.650 |
| C.D. at 5% | 26.156 |
| S.Em+ | 9.110 |
| C.V. (%) | 5.096 |

| Table 2: Economics and B:C ratio of demonstration and farmer practices (j /ha). |
|---------------------------------------------------------------|
| Treatments | Average cost of cultivation (Rs/ha) | Average gross return (Rs/ha) | Average net profit (Rs/ha) | Benefit cost ratio (j /ha) |
|-------------|-----------------------------------|-----------------------------|---------------------------|--------------------------|
| Farmer Practices | 16221.7 | 30338 | 14117 | 1.9 |
| Front Line Demonstration Technology | 19376.5 | 41553 | 22176 | 2.1 |
of latest improved technologies of mustard cultivation can reduce the technology gap to increase the productivity of mustard in the district. Before the front line demonstration of Mustard adoption was less but after conducting the FLD on farmer’s field by Rani Lakshmi Bai Central Agricultural University, farmers become aware about cultivation practices of mustard crop. Majority of framers agreed and adopted the improved package of practices of mustard after FLD.

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