



## Research Article

# PERFORMANCE OF FRONTLINE DEMONSTRATIONS ON MUSTARD (*Brassica juncea*) IN RAIGARH DISTRICT OF CHHATTISGARH

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**Abstract-** Frontline Demonstration was conducted to study the evaluating the performance of improved cultivar, seed treatment, sulphur application, diseases, insect and pest management on production as well as productivity of mustard. Frontline demonstrations were conducted during 2015-16, 2016-17 and 2017-18 with evaluation the performance of Chhattisgarh Sarson-1, variety of mustard in Raigarh, Pusore and Kharsia blocks of the district and record the feedback information of farmer's. The results revealed that average yield of mustard under frontline Demonstrations were 11.50, 10.75 and 10.50 qha<sup>-1</sup> as compare to 8.25, 7.90 and 7.85qha<sup>-1</sup> recorded in farmer's practice, average yield increase of 39.39, 36.07 and 33.75 percent and additional return of 11180.00, 9895.00 and 9105.00 Rsha<sup>-1</sup>, respectively. Therefore, the results clearly indicate that the use of improved varieties and package and practices with scientific intervention under frontline demonstration programme contribute to increase the productivity and profitability of oilseeds in Chhattisgarh state.

**Key words-** Frontline demonstrations, improved variety, Mustard.

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## Introduction

Indian mustard is important oilseed crop and determinant of agricultural economy of the country. However, productivity is low due to lack of awareness in farming community regarding improved package and practices of oilseed crops. Frontline demonstrations are important dissemination process for transfer of technology and to establish its production potentials on the farmer's fields. Rapeseed-mustard is the second most important edible oilseed crop in India, next only to groundnut and accounts for nearly 30 per cent of the total oilseeds produced in the country [2]. India is one of the largest rapeseed mustard growing country in the world, occupying the first position in Area and second position in production after China [11]. In India, oilseeds account for 3 per cent to the Gross National Product and 10 per cent to the total value of all agricultural products. India is the largest producer of oilseeds in the world and accounts for about 14 per cent of the global oilseeds area, 7 per cent of the total vegetable oil production and 10 per cent of the total edible oil consumption. The total oilseed cultivated area, production and productivity of nine oilseed crops in India during 2014-15 were 25.6 mha, 27.5 mt and 1075ha-1, respectively [13]. Presently, India's annual edible oil consumption is about 17.5 mmt, which in the last decades has increased steadily at a compounded annual growth rate of 4.6 per cent. The growth in per capita consumption is attributable to both rising income levels and living standards. However, the current per capita consumption of 14.3 kg year<sup>-1</sup> in 2012-13 in India is considerably lower than the global average of 24 kg year<sup>-1</sup>. Indian mustard is an important oilseed crop of Indian subcontinent contributes more than 80 per cent of the total rapeseed-mustard production in India [9 &12]. This group of oilseed crops offers higher return with low cost of production and low water requirement, so it has greater potential to increase the availability of edible oil from the domestic production. In spite the high quality of oil and also its wide adaptability for varied agro-climatic conditions, the area, production and yield of rapeseed-mustard have

been fluctuating due to various biotic and abiotic stresses together with domestic price support programme. In *Brassica* breeding programme is one of the most important objectives for improvement of seed quality. High yielding new varieties are also imperative to meet potential edible oil requirement of the country which is still increasing due to increase in population, increase in per capita consumption and slow increase in local production of oilseed crops [3]. Krishi Vigyan Kendra are grass root level organization meant for application of technology through assessment, refinements and dissemination of proven technologies under different micro farming situation in the district [6]. Front line demonstrations were conducted on mustard (Chhattisgarh Sarson-1) during 2015-16, 2016-17 and 2017-18 with disseminate the technology in the district, establish production potentials on the farmers' fields, assessment of adoption and yield gaps and record feedback information from farmers for further improvement in the research and extension programme.

## Material and Methods

The study was carried out in the Raigarh district is located on the Northern part of Chhattisgarh state and lies at 21°54' N latitude and 83°24' E longitude with an altitude of 215 m above the mean sea level (MSL). Frontline demonstrations were conducted during 2015-16, 2016-17 and 2017-18 with evaluation the performance of Chhattisgarh Sarson-1, variety of mustard in Raigarh, Pusore and Kharsia blocks of the district. In this study, 36 farmers were selected from aforesaid blocks during consecutive years under frontline demonstration of mustard. All the technological intervention was taken as per prescribed package and practices for improved variety of mustard crop [Table-1]. The grain yield, gap analysis, input cost, net return and additional gain parameters were recorded [Table-2 and 3]. Assessment of gaps in adoption of recommended technology before laying out the frontline demonstrations (FLDs) through personal discussion with selected

farmers. The awareness programme (training) was organized for selection of farmer's and skilled development about detailed technological intervention with improved package and practice for successful mustard cultivation. Scientists visited regularly frontline demonstrations fields and farmer's field also. The feedback information from the farmers was also recorded for further improvement in research and extension programmes. The extension activities i.e. awareness programme (training), farmer's seminar and field days were organized at the frontline demonstrations sites. The basic information was recorded from the farmer's field and analyzed to comparative performance of frontline demonstrations (FLD's) and farmer's practice. Different parameters were calculated to find out technology gaps [4].

**Table-1 Detail of package and practices for mustard cultivation**

| S.No. | Technological intervention          | Farmer's practice  | Recommended Practice (FLD's)  |
|-------|-------------------------------------|--|---|
| 01.   | Variety                             | Existing / old recommended cultivar  | Chhattisgarh Sarson-1   |
| 02.   | Seed rate (kg ha <sup>-1</sup> )    | 6.0  | 5.0   |
| 03.   | Seed treatment                      | Not practice   | Carbendazime50 WP @ 3kg <sup>-1</sup> seed, Thiamethoxam 25WG 2gkg <sup>-1</sup> and 5-10 ml PSB culture  |
| 04.   | Sowing method/Spacing               | Broadcasting /un uniform plant population  | 30 x 10 cm,<br>Sowing with seed cum fertilizer drill  |
| 05.   | Time of Sowing                      | November-December  | 15 October- 15 November   |
| 06.   | Nutrient management                 | Imbalance use of fertilizers and 150 kg urea/ha at first and second irrigation and 100 kg DAP at sowing. | Balance fertilization as per soil test values (STV) 275 kg Urea/ha ( in 3 split application at I <sup>st</sup> , II <sup>nd</sup> and III <sup>rd</sup> irrigation), 525 kg SSP and 60 kg MOP at sowing |
| 07.   | Weed management                     | No weeding/ manually   | Quinalofop-p-ethyl a.i.50gha <sup>-1</sup> at 15-20 DAS.  |
| 08.   | Insect, pest and disease management | No/ injudicious use of and insecticides and fungicides   | Two sprays of Thiamethoxam 25WG @0.5ml l <sup>-1</sup> of water at 45 &85 days for sucking pest and one spray of Metalaxyd 35% WS 2gl <sup>-1</sup> of water for white blister                          |

Extension gap = Demonstrated yield-farmer's practice yield

Technology gap = Potential yield- Demonstration yield

Additional return = Demonstration return –farmer's practice return

Potential yield-Demonstration yield

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

## Results and Discussion

The improved package and practices is more important with technological intervention for productivity and profitability of oilseeds. Detailed package and practices with technological intervention for recommended practice [Table-1]. Sulphur is an important supplement for oilseed crops and it is recommended that farmers should apply single super phosphate fertilizers to meet the requirement of both phosphorus and sulphur in mustard. It was also observed that farmer's use injudicious and un-recommended insecticides and mostly farmers didn't use fungicides [8].

## Grain Yield

The grain yield of demonstrated field and farmer's practice is presented in [Table-2]. Data revealed that average grain yield of demonstrated fields was higher from farmer's practice in all blocks of Raigarh district. The results revealed that average yield of mustard under frontline demonstrations were 11.50, 10.75 and 10.50 qha<sup>-1</sup> as compare to 8.25, 7.90 and 7.85 qha<sup>-1</sup> recorded in farmer's practice, average yield increase of 39.39, 36.07 and 33.75 per cent, and additional return of 11180, 9895 and 9105 Rsha<sup>-1</sup>, respectively. The average yield of Chhattisgarh Sarson-1 ranged from 10.50-11.50 qha<sup>-1</sup> as compared to 7.85-8.25 qha<sup>-1</sup> of existing variety in all blocks indicating suitability of variety and farming system of district. The average yield of frontline demonstrations (FLD's) field was highest in Raigarh block (11.50 qha<sup>-1</sup>) followed by Pussore (10.75 qha<sup>-1</sup>) and Kharsia blocks (10.50 qha<sup>-1</sup>). The similar results were in accordance with findings of other workers [7 & 8]. The better yield in frontline demonstrations (FLD's) field may be due to awareness and adoption of package and practices accordingly [Table-1]. The present findings are also found that the yield levels under farmers' practices were always lower than obtained under frontline demonstration [10]. The results revealed that extension gap ranged from 2.65-3.25qha<sup>-1</sup> in blocks of Raigarh district which indicated that farmers should be aware for adoption of improved production technology in mustard. There is a vast gap between the farmer's yield and improved variety yield as per recommended practice through frontline demonstrations on farmers' field. The result was also supported that frontline demonstrations is better than farmer practices [5]. Technology gaps were also recorded of each blocks and these ranged from 3.50-4.50qha<sup>-1</sup>. These gaps may be attributed to the variation in soil fertility status. Similarly, technology index was ranged 23.33-30.00 per cent and average figure comes out to be 27.22per cent. The results revealed that additional return of mustard under frontline demonstrations were ranged 9105.00-11180.00 Rsha<sup>-1</sup> of each block. However, the adoption levels for the improved technology in oilseeds necessitate the need for better dissemination [1]. The programme of frontline demonstration could be popularized for other oilseed crops also in order to increase farmer's income and attain self-sufficiency in oilseeds production.

**Table-2 Grain yield and gap analysis of frontline demonstrations on mustard**

| S.No. | Block   | No. of demonstration | Average yield (ha)        |                        | % Increase in Recommended Practice (RP) | Extension gap (q ha <sup>-1</sup> ) | Technology gap (q ha <sup>-1</sup> ) | Technology index |
|-------|---------|----------------------|---------------------------|------------------------|---|-------------------------------------|--------------------------------------|------------------|
|       |         |                      | Recommended Practice (RP) | Farmer's Practice (FP) |   |                                     |                                      |                  |
| 01.   | Raigarh | 12                   | 11.50                     | 8.25                   | 39.39                                   | 3.25                                | 3.50                                 | 23.33            |
| 02.   | Pussore | 12                   | 10.75                     | 7.90                   | 36.07                                   | 2.85                                | 4.25                                 | 28.33            |
| 03.   | Kharsia | 12                   | 10.50                     | 7.85                   | 33.75                                   | 2.65                                | 4.50                                 | 30.00            |

**Table-3 Economic analysis of the frontline demonstrations on mustard**

| S.No. | Block   | Total returns(Rs.ha <sup>-1</sup> ) |                       | Input cost(Rs.ha <sup>-1</sup> ) |                       | Net return(Rs.ha <sup>-1</sup> ) |                       | Additional gain (Rs.ha <sup>-1</sup> ) FLD's |
|-------|---------|-------------------------------------|-----------------------|----------------------------------|-----------------------|----------------------------------|-----------------------|--|
|       |         | Recommended Practice (RP)           | Farmer's Practice(FP) | Recommended Practice (RP)        | Farmer's Practice(FP) | Recommended Practice (RP)        | Farmer's Practice(FP) |  |
| 01.   | Raigarh | 42550                               | 30525                 | 13060                            | 12215                 | 29490                            | 18310                 | 11180  |
| 02.   | Pussore | 39775                               | 29230                 | 12500                            | 11850                 | 27275                            | 17380                 | 9895   |
| 03.   | Kharsia | 38850                               | 29045                 | 12075                            | 11375                 | 26775                            | 17670                 | 9105   |

## Economics analysis

Economic analysis of frontline demonstration on mustard revealed that the total return from recommended practice (FLD's) were 42550.00 Rsha<sup>-1</sup>as compared to 30525.00 Rsha<sup>-1</sup> farmer's practice of Raigarh block. The net returns ranged from

26775.00-29490.00 Rsha<sup>-1</sup> in recommended practice in comparison to 17380.00-18310.00Rsha<sup>-1</sup>in farmer's practice. It was economically observed that additional gain ranged from 9105.00-11180.00 Rsha<sup>-1</sup> in recommended practice proved beneficial in respect of yield and economics of mustard in consecutive blocks of

Raigarh District in Chhattisgarh Plains.

### Conclusion:

The present study revealed that Chhattisgarh Sarson-1, variety of mustard gave higher yield and net returns in recommended practice (FLD's) than farmers practice in all block's Raigarh district. The highest grain yield was attributed to higher potential with improved variety, timely sowing, nutrient management, weed management and insect, pest and disease management in accordance of package and practice. Economic analysis of different parameters revealed that net returns and additional gain were recorded highest with recommended practice (FLD's). The study was concluded that Chhattisgarh Sarson-1 in recommended practice proved beneficial in respect of yield and economics of mustard.

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**Research Category:** Oilseed crop

### Abbreviations:

FLD: frontline demonstrations

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