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# ASSESSING THE INFLUENCE OF CLUSTER FRONT LINE DEMONSTRATIONON MUSTARD

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**ABSTRACT**

Krishi Vigyan Kendra, Manpur, Gaya (Bihar) studied on influence of Cluster Front Line Demonstration (CFLD) on Mustard to know its impact via Yield Gap, Economic Return, Extent of farmer's satisfaction, and Constraints faced by the mustard growers. In the present investigation, 100 respondents selected randomly were all those farmers where CFLD on Mustard (Var. RH 0749) was conducted on their fields during the years 2020-21 and 2021-22. The inputs like improved seed, Biofertilizers, sulfur, fungicide, etc. were provided by KVK, Manpur. Before conducting CFLD, the respondents were made acquainted with the latest recommended package of practices of Mustard. The demonstrated technologies under CFLD resulted in an increase in yield by 45.7 percent over Local Check. It was also observed that there was a technology gap (TG), extension gap (EG), and technology index (TI) of 10.25q/ha, 7.42 q/ha and 39.42 percent respectively. It was also revealed that there was anadditional return of Rs.32098/ ha with the additional cost of cultivation of Rs.4081/ha &and BC ratio of 2.91 for demonstration and 1.90 for Local Check. The respondent satisfaction index (RSI) revealed that maximum of the respondents expressed a high level of satisfaction (61.00 percent) about CFLD followed by medium (36.00 percent) and least had a low (3.00 percent). Out of many constraints identified, the main hurdle in increasing acreage under mustard cultivation was the lack of availability of irrigation water ranking I.

**Keywords:** Technology gap, Extension gap, Technology index, Respondent Satisfaction Index and Constraints.

## Introduction

Mustard is one of the most important oilseed crop grown in the country. In Bihar, it is mainly cultivated for oil but also used as green vegetable and fodder. There are 3 species i.e. pale yellow (*Brassica hirta*), brown mustard (*Brassica juncea*), and black mustard (*Brassica nigra*) grown widely in Bihar. According to the Directorate of Oilseed Development (DOD), Oilseeds play an important role in the Indian economy as they account for 14 percent of the gross cropped area and contribute more than 4 percent to the Gross National Product (GNP. The area under rapeseed-mustard in the country was 6.23 Million hectares, producing about 9.34 million tonnes with 1499 kg/ha productivity during the year 2018-19. Though, the area under rapeseed and mustard increased from 61.96 ha. in 2021 to 77.74 ha. in 2022(SEAI, Nov. 2023), the production and productivity of oilseeds and oils in the country are not in tune with the increasing demand for edible oils which may be due to the effect of climate change on crops. Because of the widening demand-supply gap, we are still continuing to import edible oils. Availability of irrigations water in the Gaya district of Bihar has been of great concern for a long time which forced the farmers to go for paddy- fallow cropping systems in large areas. To sort out these issues, Cluster Frontline Demonstration (CFLD) on Oilseeds was initiated by DAC & FW, GOI to demonstrate newly released crop production and protection technologies on various oilseed crops. ICAR, New Delhi, initiated Cluster Front Demonstration on Oilseed with the main objective of demonstrating the production potential of new oilseed varieties and related technologies. The project also

aimed to enhance the oilseed production of the country. With these views, the objectives for the present investigation were to (i) increase the production and productivity of mustard and (ii) to find out the constraints related to the production potential technologies of mustard cultivation.

## Material and Methods

The study was carried out by Krishi Vigyan Kendra, Manpur, Gaya in those villages of Gaya District in Bihar where improved Mustard seed, Biofertilizers, Suphur, fungicide, etc. were distributed (during the years 2020-21 & and 2021-22) among 202 farmers under CFLD. To be well acquainted with the latest recommended production technologies of mustard cultivation, the farmers were made abreast with it by applying different extension teaching methods like providing literature on mustard production technology, group meetings and training. In this study, 100 of them were selected randomly as respondents. Time to time, the plots under CFLD were monitored and valuable suggestions were also given by the KVK experts. Data were collected with the help of personal contact through a pre-structured interview schedule comprising literature related to the present study. Applying different statistical methods, the collected so data were arranged systematically, calculated and analyzed to draw the inferences. Technology Gap, Extension Gap and Technology Index were calculated by formulae developed by Samui *et al*. (2000).The yield and the potential yield of mustard were compared to estimate the yield gaps termed Technology Gaps and extension gaps (Hiremath and Nagaraju, 2009).

$$\text{Percent increase yield} = \frac{\text{Demonstration yield - local check yield}}{\text{Local check yield}} \times 100$$

Extension gap (q/ha) = Demonstration yield (q/ha) – Yield of local check (q/ha).

Technology gap (q/ha) = Potential yield (q/ha) – Demonstration yield (q/ha).

$$\text{Technology index (\%)} = \frac{\text{Potential yield Demonstration yield}}{\text{Potential yield}} \times 100$$

To know the performance of technology demonstrated, the satisfaction level of respondents was also assessed using the formula developed by Kumaran and Vijayaragavan, 2005 as below.

$$\text{Respondent satisfaction index} = \frac{\text{Individual score obtained}}{\text{Maximum score possible}} \times 100$$

Based on prevailing market prices of inputs, the economic parameters like Cost of cultivation, Gross Return, Net Return, Benefit-Costratio, etc. were analyzed. Lastly, the respondents under study were also asked to identify five constraints they felt were the most important in mustard cultivation and arrange them in decreasing order of their severity.

## Results and Discussions

### Yield analysis

The data related to the yield of mustard under CFLD with other parameters (technology gap, extension gap, and technology index)have been presented in Table- 1.A glance over the table reveals that the mean yield of mustard of demonstration was found higher (15.8 qt/ha.) than local check (8.3 qt/ha.) and also the demonstrated technologies resulted in an increase of yield by 45.7 percent over the Local Check. This result conformed with the results of Kashyap, S. and Singh, M. (2021) and Singh, *et al*. (2021).

**Table 1 :** Yield performance of mustard under Cluster Front Line Demonstration

| Year | Item | Variety | No. of Demⁿ. | Area (ha.) | Yield (qt/ha.) | | % increase over Local check | Technology Gap (qt/ha.) | Extension Gap (qt/ha.) | Technology Index (%) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Demⁿ. | Local check | | | | |
| 2020-21 | Mustard | RH-0479 | 75 | 30 | 15.9 | 8.7 | 45.16 | 10.01 | 7.20 | 38.85 |
| 2021-22 | | | 127 | 40 | 15.6 | 8.0 | 46.15 | 10.40 | 7.64 | 40.00 |
| Mean | | | **202** | **70** | **15.8** | **8.3** | **45.70** | **10.25** | **7.42** | **39.42** |

The extension gap is defined as the gap between demonstrated technology and local checks. The table shows that there was a mean extension gap of 7.42 qt/ha. This gap was due to the lack of availability of irrigation water and Unfavorable weather at critical stages of crop growth resulting in poor yield. A similar result was found by Meena *et al*. (2016), Singh *et al*. (2017). Table 1 also reveals that the Mean technology

gap (the gap between potential yield and demonstration yield) was 10.25 qt/ha. The result shows there is a need to motivate the farmers towards scientific cultivation of mustard in order to minimize the extension gap. These findings were in line with the findings of Kashyap and Singh (2021) and Singh *et al*. (2021). The technology gap observed may be due to a Lack of reliable technical guidance as and when required and weed infestation. The technology index indicates the feasibility of the evolved technology at the farmer's level. It shows that the lower the value of the technology index more is the feasibility of the technology. In the present study, the mean technology index was found to be 39.42 percent. This result is confirmed by the results of Hiremath and Nagaraju (2009), Meena *et al*. (2016) and Kashyap and Singh (2021).

**Economic performance**

The data presented in Table 2 indicates the economic performance of mustard under cluster front-line demonstration. It was found that for demonstrated technology the mean cost of cultivation was Rs. 24534/ha. While the cost involved in the local check was Rs.20453/ha showing higher for Demonstrated technologies but the demonstration plots fetched higher mean gross returns of Rs.7133/ha. and mean net returns of Rs.46859/ha. with a higher benefit-cost ratio of 3.72 as compared to mean gross returns of Rs.39295/ha., mean net returns of Rs. 18842/ha.and benefit-cost ratio of 2.91for the local check. A similar result was reported by Hiremath and Nagaraju (2009); Raj *et al*. (2013); Verma *et al*. (2016); Suryavanshi *et al*. (2020); Kashyap & Singh (2021) and Singh *et al.* (2021).

**Table 2 :** Economic performance of Mushroom under Front Line Demonstration

| Year | Cost of cultivation (Rs/ha.) | | Gross Return (Rs/ha.) | | Net Return (Rs/ha.) | | Additional cost of cultivation (Rs/ha.) | Additioal Return (Rs/ha.) | BC Ratio | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Dem$^{n}$ | Local check | Dem$^{n}$ | Local check | Dem$^{n}$. | Local check | | | Dem$^{n}$ | Local check |
| 2020-21 | 18818 | 16882 | 53924 | 29580 | 35106 | 12698 | 1936 | 24344 | 2.87 | 1.75 |
| 2021-22 | 30250 | 24024 | 88861 | 49009 | 58611 | 24985 | 6226 | 39852 | 2.94 | 2.04 |
| Mean | **24534** | **20453** | **71393** | **39295** | **46859** | **18842** | **4081** | **32098** | **2.91** | **1.90** |

The data in the table also points out a higher mean additional return of Rs.32098/ha. and is found more when compared to mean additional cost of cultivation of Rs.4081/ha. This indicates higher profitability and economic viability of mustard demonstrated. This result conformed with the result of Raj *et al*. (2013); Verma *et al*. (2016); Badaya *et al*. (2017); Suryavanshi *et al*. (2020); Kashyap & Singh (2021) and Singh *et al.* (2021).

**Respondent Satisfaction Level:**

**Table 3 :** The extent of Farmers Satisfaction with Cluster Front Line Demonstration of mustard

| Satisfaction Level | Frequency | Percentage |
|---|---|---|
| Low | 13 | 13.00 |
| Medium | 36 | 36.00 |
| High | 61 | 61.00 |

Respondent satisfaction level towards front line demonstration of mustard has been presented in Table 3. The perusal of data in the table indicates that the majority of mustard growers had a high level of satisfaction index (61.00 percent) while only 36.00 were found to have a medium level of respondent satisfaction and the least was 13.00 percent under a low level of satisfaction index about CFLD on mustard. It could be predicted that the majority of mustard cultivators fall under higher and medium levels of satisfaction level towards the performance of mustard technology demonstrated, hence, it indicates a stronger conviction in the cluster frontline demonstrations which in turn would lead to easy and higher adoption of the technology demonstrated. The results are corroborated with the results of Kumaran and Vijayaragavan (2005).

**Constraints faced by Mustard growers:**

Mustard cultivators faced many constraints which were identified and illustrated in Table 4 under sub-heads Technological constraints, Agro-climatic constraints, Economic constraints and Communicative constraints.

**Table 4 :** Constraints faced by mustard growers during CFLD.

| S. No. | Constraints | Frequency Response | Frequency responses in different ranks | | | | | Total Score | Ranking | Overall Ranking |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | I | II | III | IV | V | | | |
| **A** | **Technological constraints** | | | | | | | | | |
| 1. | Lack of reliable technical guidance as and when required. | 13 | 1 | 4 | 1 | 4 | 3 | 35 | IV | XII |
| 2. | Fear of duplicity of inputs purchased from unreliable sources. | 21 | 7 | 3 | 2 | 8 | 1 | 70 | III | VIII |
| 3. | Unavailability of improved HYV mustard seeds in the local market. | 63 | 16 | 14 | 23 | 7 | 3 | 222 | I | II |
| 4. | High weed infestation due to unavailability of post–emergent weedicide in the markets. | 16 | 1 | 0 | 4 | 5 | 6 | 33 | V | XIII |
| 5. | No Soil Testing Lab nearby. | 35 | 3 | 3 | 8 | 10 | 11 | 82 | II | VI |
| **B** | **Agro - Climatic Constraints** | | | | | | | | | |
| 1. | Lack of availability of irrigation water. | 102 | 28 | 22 | 18 | 11 | 23 | 327 | I | I |
| 2. | Undulated topography of crop fields. | 21 | 0 | 1 | 7 | 0 | 13 | 38 | III | XI |
| 3. | Unfavorable weather results in critical stages of crop growth resulting in poor yield. | 45 | 11 | 12 | 7 | 10 | 5 | 149 | II | IV |
| **C** | **Economic constraints** | | | | | | | | | |
| 1. | Lack of credit facilities. | 15 | 1 | 4 | 5 | 4 | 1 | 45 | III | X |
| 2. | Damage by wild animals especially Blue cows. | 72 | 17 | 17 | 3 | 21 | 14 | 218 | I | III |
| 3. | Forced to sell produce at low prices due to unavailability of regulated markets. | 26 | 4 | 7 | 2 | 8 | 5 | 75 | II | VII |
| **D** | **Communicational Constraints** | | | | | | | | | |
| 1. | Poor marketing system and access to the market. | 37 | 8 | 10 | 3 | 9 | 7 | 114 | I | V |
| 2. | High cost of transportation. | 22 | 2 | 0 | 15 | 2 | 3 | 62 | II | IX |
| 3. | Poor contact with the extension personnel. | 12 | 1 | 3 | 2 | 1 | 5 | 30 | III | XIV |

The data in the table-4 shows that under Technological constraints, the unavailability of improved HYV mustard seeds in the local market ranked I (Kushwaha *et al*., 2016; Sharma *et al*., 2019 and Vahora *et al*., 2023) which was followed by No Soil Testing Lab nearby, Fear of duplicity of inputs purchased from unreliable sources, Lack of reliable technical guidance as and when required (Kushwaha *et al*., 2016) then High weed infestation due to unavailability of post–emergent weedicide in the markets. Under Agro – climatic constraints identified by them, the most confronting constraint with the rank I was the Lack of availability of irrigation water (Lakhera *et al*., 2011) followed by Unfavorable weather at critical stages of crop growth resulting in poor yield (Sharma *et al*., 2019) and Undulated topography of crop fields (Kushwaha *et al*., 2016). So far as the Economic constraints are concerned, it was found that Damage by wild animals especially Blue cows (Kushwaha *et al*., 2016)ranked I which was followed by other important constraints as being Forced to sell produce at low prices due to unavailability of regulated markets and Lack of credit facilities (Kushwaha *et al*., 2016 and Vahora *et al*., 2023). Last but not least were Communicational constraints in which Poor marketing system and access to the market ranked I followed by High cost of transportation (Sharma *et al*., 2019 and Vahora *et al*., 2023) and Poor contact with the extension personnel ranked II and III respectively. It was also revealed that on the whole when arranged on a priority basis, the most severe constraints faced by mustard growers were the Lack of availability of irrigation water, the Unavailability of improved HYV mustard seeds in the local market and Damage by wild animals, especially Blue cow ranking I, II, and III respectively.

## Conclusions

From the data presented in the above tables, it could be said that Cluster Frontline demonstration has a positive impact on yield and economics of mustard by which net profit from mustard can be increased substantially as compared to farmer practice. This may be due to proper management by adopting recommended production technologies of mustard. Hence, there is a need to disseminate recommended technologies of mustard production through effective

extension teaching methods i.e. CFLD, FLD, group formation, need-based training, etc.

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