Increasing the productivity through cluster frontline demonstrations on mustard

Rajesh Chandra Verma, Jai Prakash Singh, Shashank Shekhar, Narendra Pratap, Avinash Kumar Rai, Shashank Singh and Nimit Singh

Abstract

The study was conducted by Krishi Vigyan Ghazipur district of Uttar Pradesh to find out the yield gaps between scientific package and practices under cluster front line demonstration (CFLD oilseeds) and farmer’s practice (FP) of mustard crop. Cluster Front Line Demonstration on mustard were conducted on farmer’s fields during Rabi season of two sequential years i.e. 2020-2021 and 2021-2022 under National Food Security Mission (NFSM), Govt. of India to demonstrate the impact of enriched agro-techniques on production and economic benefits under irrigated conditions. CFLD’s were conducted in 12.0 ha and 21.2 ha area for two years with active involvement of 94 farmers and technical staff of Krishi Vigyan Kendra Ghazipur. According to observed data the highest grain yield was obtained in demonstrated plots with an average of 18.83 q/ha as compared to local check with an average of 15.69 q/ha. An average mean of extension gap, technology gap and technology index were calculated as 3.15 q/ha, 6.17q/ha, 24.68 percent, respectively. In Adoption of improved package of practices in mustard cultivation recorded average higher B:C ratio (5.97) as compared to Farmers Practice (5.43) during the period of study. Thus, the productivity of mustard could be increased with the adoption of recommended scientific package of practices. The study resulted in satisfying the farmers for maximum productivity and returns.

Keywords: Mustard, front line demonstration, technology gap, practices, yield, agriculture, production

Introduction

Mustard is an important Rabi oilseed crop of Ghazipur district of Uttar Pradesh. The productivity 1031 kg/ha of oilseed in the district is low as compared to National average (1203 Kg/ha) mainly due to poor crop management practices ultimately and inadequate availability of quality seed of improved mustard varieties and other inputs. Mustard is the second most important and most prominent Rabi season oilseed crops of India. It belongs to the group of cruciferae with several cousin species cultivated. In addition, mustard crop required 2-3 times less water (31-40 cm throughout the seasons) as compared to other cereal crops (Shekhar et al. 2017, 2019, 2020, 2021a, b, c, 2022, 2023; Shekhar 2022) [16, 12, 17, 18, 14, 10, 14]. The mustard crop of small brown or yellow seeds contains up to 45% of the de-oiled cake is used as animal feed. Giriraj & RH 749 is bold seeded variety crop duration 120-125 days depending on the environmental conditions. It is recommended for irrigated condition it contains 40-42% oil. Krishi Vigyan Kendra’s are grass root level organizations meant for spreading of technology through refinement, assessment and demonstration of proven production technologies under different micro-farming situations. The main objective of Krishi Vigyan Kendra is to minimize the time lag between generations of technology at the research and its transfer to the farmers for increasing productivity and income from agriculture and allied sectors. The main objective of Cluster Front Line Demonstration under National Food Security Mission was to demonstrate scientific crop production technologies of oilseeds on the farmers field and to popularize the newly notified improved varieties auto technologies for varietal diversification and efficient management of resources the present investigation was undertaken to study the impact of cluster frontline demonstration on yield enhancement of mustard (Brassica juncea) under irrigated condition in Ghazipur district of Uttar Pradesh with the objective of increasing productivity and executed to narrow down the time lag and insured speedy adoption of technologies in district.
Cluster Frontline Demonstrations (CFLDs) on improved farm technology (Table 1) were conducted by Krishi Vigyan Kendra Ghazipur of ANDUAT, Kumarganj, Ayodhya in mustard (Giriraj) during Rabi 2020-21 and Rabi 2021-22 under irrigated conditions on 33.2 ha area of Ghazipur district covering 94 farmers. The soil of CFLDs was Sandy loam to Sandy clay loam and the pH of soil is near about 6.18 to 7.11. The scientific technology such as improved varieties seed (Giriraj, RH-749) method of line sowing with seed treatment with thiram and bio control agents weed management and integrated pest management practices was maintained during period of study seed treatment was done with thiram 3 gm/kg seed trichoderma at @ 5 gm/kg and PSB @ 5 gm/kg of seed before sowing to protect the crop against fungal diseases up to 15 - 20 days after sowing the seed rate of mustard was kept 5 kg/ha in demonstrations plot the sowing of mustard was done during 25th October to 10th November during the study period the spacing between row to row and plant to plant was kept 30x20 for the Cluster Frontline Demonstrations. The fertilizers were also given in the ratio of 160:60:40:25 kg/ha as basal dose. The data were collected from beneficiary farmers through personal interviews and after that data was tabulated and analysed to find out the findings and conclusions. The yield increase in demonstrations over farmers practice was calculated by using following formula.

Estimation of technology gap, extension gap and technology index
Extension gap means adoption of improved transfer technology in demonstrations practice resulted in maximum grain yield than traditional farmer’s practice. The estimation of technology gap, extension gap and the technology index were worked out by using following formula (Kadian et al., (1997) [6] Samui et al., 2000) [9].

\[
\text{Technology yield gap} = \frac{\text{Potential yield} - \text{Demonstration plot average yield}}{\text{Potential yield}} \times 100
\]

\[
\text{Extension yield gap} = \frac{\text{Demonstration plot average yield} - \text{Farmer’s plot average yield}}{\text{Farmer’s plot average yield}} \times 100
\]

\[
\text{Technology index} = \frac{\text{Technology yield gap}}{\text{Potential Yield}} \times 100
\]

Results and Discussion
The findings of the study as well as relevant discussed as:

Table 1: Technology demonstrated in CFLD’s and Farmer’s practices

<table>
<thead>
<tr>
<th>S/No.</th>
<th>Intervention</th>
<th>Demonstrated Intervention</th>
<th>Farmers intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Field preparation</td>
<td>2 ploughings</td>
<td>Single plough</td>
</tr>
<tr>
<td>2</td>
<td>Seed sowing</td>
<td>Line sowing by seed drill &amp; Nari</td>
<td>Broad casting</td>
</tr>
<tr>
<td>3</td>
<td>Seed Variety</td>
<td>Arpan</td>
<td>Local Lotini Rai</td>
</tr>
<tr>
<td>4</td>
<td>Seed treatment</td>
<td>Thiram @ 2.5 gm/kg seed, PSB &amp; Trichoderma @ 5gm/kg seed</td>
<td>Not treated</td>
</tr>
<tr>
<td>5</td>
<td>Seed rate</td>
<td>5 kg/ha</td>
<td>10-15 kg/ha</td>
</tr>
<tr>
<td>6</td>
<td>Manures and fertilizers</td>
<td>PSB 500 ml, Rhizobium 500 gm with 100kg vermicompost and sulphor 100:60:40:25</td>
<td>No pre emergence used</td>
</tr>
<tr>
<td>7</td>
<td>Weed management</td>
<td>Pendimethaline @ 2.5-3.5 lit/ha</td>
<td>Nil</td>
</tr>
<tr>
<td>8</td>
<td>IPM measures</td>
<td>spray of Neem oil and pheromone traps, yellow sticky traps</td>
<td>Imbalance use of pesticides</td>
</tr>
<tr>
<td>9</td>
<td>Technical guidance</td>
<td>Time to time</td>
<td>Nil</td>
</tr>
</tbody>
</table>

Table 2: Year wise productivity, extension gap, technology gap and technology index of mustard under Demonstration and farmer’s practices.

<table>
<thead>
<tr>
<th>Year</th>
<th>Yield q/ha</th>
<th>Increase yield % over Control</th>
<th>Extension gap q/ha</th>
<th>Technology gap q/ha</th>
<th>Technology Index %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020-21</td>
<td>17.20</td>
<td>13.80</td>
<td>24.64</td>
<td>3.40</td>
<td>7.80</td>
</tr>
<tr>
<td>2021-22</td>
<td>20.46</td>
<td>17.57</td>
<td>16.45</td>
<td>2.89</td>
<td>4.54</td>
</tr>
<tr>
<td>Mean</td>
<td>18.83</td>
<td>15.69</td>
<td>20.55</td>
<td>3.15</td>
<td>6.17</td>
</tr>
</tbody>
</table>

Grain Yield
Data presented in Table 2 revealed that transfer of improved technology under Cluster Frontline Demonstrations in mustard resulted in higher yield as compared to farmer’s practice. The maximum yield in demonstration plot was due to improved variety of seed, seed treatment with bio control agent, integrated pest management practices. The average seed yield of demonstration plots was 18.83 q/ha (Table 2) which was higher as compared to farmers practice 15.69 q/ha. The increased yield percentage over control was 20.55% in Cluster Frontline Demonstration over local check. The yield enhancement through adoption of improved technology has also been reported in earlier studies of FLD’s (Kothyari et al. 2018 and Kumar et al. 2019 and Jamwal Anamika et al. 2020) [7, 8]. Yield of the Frontline Demonstration trials and potential yield of the crop was compared to estimate the yield gaps which were further classified into technology and extension gaps (Hiremath & Nagarju; 2009 and Jamwal Anamika et al. 2020) [9, 22].

3 Extension Yield gap
An average extension gap between demonstrated practices and farmers practices was recorded 3.15 q/ha (Table2). Higher extension gap in present study suggested that there is a need to motivate and aware the farmers for adoption of improved technologies in mustard over existing local farm practices. The similar results were also reported by (Bairwa et al. 2013 Gangadevi et al. 2018 Jamwal Anamika et al. 2020) [2, 23, 22].

Technology Yield gap and Technology Index
The technological gaps generally appear even if the CFLDS were conducted under the strict direction of farm scientists on the farmers field the data presented in table 2 showed that the value of technological gap was 6.17 q/ha. Technology index specified the feasibility of the generated Technology at the farmer's fields under existing agro climatic conditions (Vedna et al. 2007) [12]. The results of table 2 revealed that value of technology index was 31.20% and 18.16% during 2020-2021 and 2021-22 respectively. Where as the average value of technology index was recorded 24.68%. Lower the value of the technology index more is the feasibility and applicability of the tested technology. This showed that a gap existed between technology involved and technology adopted at farmer's field. The similar results were also recorded by Gangadevi et al. 2018 [23], Chaudhari et al. 2019 [24] and Jamwal Anamika et al. 2020 [22].
Economic analysis of Cluster Front Line Demonstrations

Average cultivation cost of demonstration plot (Rs 18880/ha) is more as compared to Farmer's practice (Rs 17255/ha). The data in table 3 clearly clarified the implication of Cluster Frontline Demonstration at Farmer's field during the period of investigation in which higher average net return rupees 94100 were acquired under Demonstration plots as compared to farmer's practice (Rs 80805 /ha). Benefit cost ratio recorded was also higher in demonstration plots (5.97) as compared to farmer's practice (5.43) increased monetary returns as well as Benefit cost (B:C) ratio through improved farm technology have also been reported by various scientists (Vedna et al., 2007, Bairwa et al. 2013 and Jamwal Anamika et al. 2020) [21, 22].

Conclusion

This study indicated that the incorporation of scientific farm technology practices along with active participation of farmer's of the area has positive effect on increasing the yield and economic return of mustard in Mandla district the economic viability of suitable technology for increasing the productivity of mustard motivated the farmers towards adoption of technologies demonstrated at farmer’s field.

References

