Impact of front line demonstration on yield and economics of Wheat

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ABSTRACT

The present investigation was done by Krishi Vigyan Kendra, Manpur, Gaya in its 5 adopted villages (Bersima, Nawada, Mahmadpur, Sikihar and Sanaut) to know the Yield Gap, Economic Return, Extent of farmer’s satisfaction and Constraints faced by the farmers. In this study, 100 respondents selected were all those farmers on whose field FLD was conducted during the years 2015-16 and 2016-17. The plot size was 0.4ha for both Demonstration and Local Check. Before conducting FLD, the respondents were made abreast with the latest recommended package of practices of wheat. The demonstrated technologies under FLD resulted in an increase in yield by 19.15% over Local Check. It was also observed that there was technology gap (TG), extension gap (EG) and technology index (TI) of 9.11q/ha, 4.96 q/ha and 22.76 percent respectively. The economic performance of wheat under FLD showed an additional return of Rs.8085.5/ha and additional cost of cultivation of Rs. 1525/ha with BC ratio of 1.91 for demonstration and 1.70 for Local Check. The respondent satisfaction index (RSI) revealed that majority of respondent farmers expressed high (57.00%) level of satisfaction about Front Line Demonstration followed by medium (33.00%) and least under low category (10.00%). Unavailability of improved seed varieties of wheat in relation to climate change was found to be most confronting constraint as perceived by them and ranked I which was followed by Low technical knowledge about recommended package of practices (II) and Use of higher seed rate was identified as least important constraint and ranked as X in their priority list. The yield of demonstration was found higher than the local check but still lagging behind its potential yield. Thus, the yield could further be increased through effective extension methods like training and demonstration.

KEYWORDS

FLD, Yield, Economics, Technology Gap, Extension Gap, Technology Index, Respondent Satisfaction Index, Constraints

HOW TO CITE THIS ARTICLE


Agricultural activity in Gaya district is by and large confined to traditional cultivation depending primarily on monsoon rainfall and Rabi cultivation in localized patches where irrigation facilities are available. As per available statistics of the district, out of the gross cropped area of 203713 hectares, 164000 hectares are irrigated by different sources of irrigation e.g., tubewells, dugwells, tanks, rivers and age old ahar-pyne system (Dastidar et al., 2013). Major soil type is alfisols and entisols. KVKs are grass root level organizations meant for application of technology through assessment, refinement and demonstration of proven technologies under different ‘micro farming’ situations in a district (Das, 2007). Front line demonstration (FLD) is considered one of the most powerful tools for transfer of technology, as it establishes production potential of various crops and enterprises on farmers field through “learning by doing and seeing is believing”.

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The main objective of front-line demonstrations is to demonstrate newly released crop production and protection technologies and its management practices in the farmers’ field under different agro-climatic regions and farming situations. While demonstrating the technologies in the farmers’ field, the scientists are required to study the factors contributing higher crop production; fields constrain of production and thereby generate production data and feedback information.

Due to different limiting factors prevailing in the district and use of traditional seeds of wheat, farmers often fail to achieve the desired potential yield of new wheat varieties. Keeping these in view, FLDs of improved production technology on wheat were conducted to enhance the yield and economic returns and also to identify the constraints related to improved production technologies in wheat crop.

Material and Methods

The present investigation was done by Krishi Vigyan Kendra, Manpur, Gaya in its 5 adopted villages (Bersima, Nawada, Mahmadpur, Sikahar and Sanaut) to know the yield gap, economic return, extent of level of farmer’s satisfaction and constraints faced by the farmers. In this study, 100 respondents were all those farmers on whose field FLD was conducted during the years 2015-16 and 2016-17. The plot size was 0.4 ha for both demonstration and local check. Improved seed of wheat was supplied by the KVK under FLD programme. Before conducting FLD, through meeting and training, the respondents were made abreast with the latest recommended package of practices of wheat.

Time to time monitoring of FLD plots were carried out by the KVK scientists and farmers were advised to carry out different operations like sowing, weeding, fertilization, plant protection measures, harvesting etc. Data were collected with the help of personal contact. The collected data were calculated and analyzed to draw the inferences. The average yield of each FLD and farmer practice has been taken in both the years for interpretation of the results. The technology gap, extension gap and technology index were calculated using the following formula as suggested by (Samui et al., 2000).

\[
\text{Demonstration yield- local check yield} \times 100
\]

\[
\text{Local check yield}
\]

\[
\text{Extension gap (q/ha)} = \frac{\text{Demonstration yield (q/ha)}}{\text{Yield of local check (q/ha)}}
\]

\[
\text{Technology gap (q/ha)} = \frac{\text{Potential yield (q/ha)} - \text{Demonstration yield (q/ha)}}{\text{Potential yield (q/ha)}}
\]

\[
\text{Technology index (%)} = \frac{\text{Individual score obtained}}{\text{Maximum score possible}} \times 100
\]

The data on yield were recorded and analyzed to interpret the results. The economic parameters (cost of cultivation, gross return, net return and B: C ratio) were worked out on the basis of prevailing market prices of inputs and minimum support prices of outputs. The ultimate objective of generation of any technology, particularly in the field of agriculture, is its speedy diffusion and quicker adoption of by the farmers. But a number of constraints might be held responsible for slowing down the rate of adoption of that technology. Therefore, constraints in wheat were also identified through participatory approach. For this, the respondents were asked to identify 5 major constraints they face the most in wheat cultivation. Respondents were also asked to rank the constraints they perceive as limiting factor for wheat cultivation in order of preference.

Results and Discussion

Yield Analysis

The yield data of wheat obtained during two year of FLD presented in table 1 indicates mean yield of 30.89q/ ha and 25.93q/ ha for demonstration and local check respectively.
It was also found that the demonstrated technologies under FLD resulted in an increase in yield by 19.15% over Local Check. The results found to be in close conformity with the research results of (Sharma et al., 2016, Singh S. B., 2017). Table 1 showed mean extension gap of 4.96q/ha which is the gap between demonstrated technology and local check. Mean technology gap, the gap between potential yield and demonstration yield, found to be 9.11q/ha. This trend of results emphasizes the need to educate the farmers about latest recommended technology of wheat production in order to narrow down the extension gap.

The technology gap observed may be due to climate change and dissimilarity in soil fertility status. Therefore, variety wise location specific recommendation appears to be necessary to minimize the technology gap for yield level in different situations. As far as the technology index is concerned, indicating the feasibility of the evolved technology at the farmer’s field. It shows that lower the value of technology index more is the feasibility of the technology. In the present study, mean technology index was found to be 22.76%. This result was in conformity with the result of (Dhaka et al., 2010, Singh S. B., 2017).

Table 1. Yield performance of wheat under front line demonstration

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of Dem*</th>
<th>Area (ha)</th>
<th>Yield (qt/ha)</th>
<th>% Increase over Local Check</th>
<th>Technology Gap (qt/ha)</th>
<th>Extension Gap (qt/ha)</th>
<th>Technology Index (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015-16</td>
<td>50</td>
<td>20.00</td>
<td>30.38</td>
<td>18.90</td>
<td>9.62</td>
<td>4.82</td>
<td>24.02</td>
</tr>
<tr>
<td>2016-17</td>
<td>50</td>
<td>20.00</td>
<td>31.40</td>
<td>19.40</td>
<td>8.60</td>
<td>5.10</td>
<td>21.50</td>
</tr>
<tr>
<td>Mean</td>
<td>50</td>
<td>20</td>
<td>30.89</td>
<td>19.15</td>
<td>9.11</td>
<td>4.96</td>
<td>22.76</td>
</tr>
</tbody>
</table>

Table 2. Economic performance of wheat under front line demonstration

<table>
<thead>
<tr>
<th>Year</th>
<th>Cost of Cultivation (Rs/ha)</th>
<th>Gross Return (Rs/ha)</th>
<th>Net Return (Rs/ha)</th>
<th>Additional Cost of Cultivation (Rs/ha)</th>
<th>Additional Return (Rs/ha)</th>
<th>BC Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dem*</td>
<td>Local check</td>
<td>Dem*</td>
<td>Local check</td>
<td>Dem*</td>
<td>Local check</td>
</tr>
<tr>
<td>2015-16</td>
<td>26922</td>
<td>25222</td>
<td>50689</td>
<td>42678</td>
<td>23767</td>
<td>17456</td>
</tr>
<tr>
<td>2016-17</td>
<td>27762</td>
<td>25912</td>
<td>53960</td>
<td>45800</td>
<td>26198</td>
<td>19888</td>
</tr>
<tr>
<td>Mean</td>
<td>27342</td>
<td>25567</td>
<td>52324.5</td>
<td>44239</td>
<td>24982.5</td>
<td>18672</td>
</tr>
</tbody>
</table>

Table 3. Extent of Farmers Satisfaction about front line demonstration

<table>
<thead>
<tr>
<th>Satisfaction Level</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>10</td>
<td>10.00</td>
</tr>
<tr>
<td>Medium</td>
<td>33</td>
<td>33.00</td>
</tr>
<tr>
<td>High</td>
<td>57</td>
<td>57.00</td>
</tr>
</tbody>
</table>

Table 4. Constraints faced by the farmers under front line demonstration

<table>
<thead>
<tr>
<th>S. N.</th>
<th>Constraints</th>
<th>Percentage</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low technical knowledge about recommended package of practices.</td>
<td>85.00</td>
<td>II</td>
</tr>
<tr>
<td>2</td>
<td>Lack of irrigation facility.</td>
<td>82.00</td>
<td>III</td>
</tr>
<tr>
<td>3</td>
<td>Unavailability of improved seeds variety in relation to climate change.</td>
<td>92.00</td>
<td>I</td>
</tr>
<tr>
<td>4</td>
<td>Infestation of insects/pests/diseases.</td>
<td>50.00</td>
<td>IX</td>
</tr>
<tr>
<td>5</td>
<td>Lack of proper markets available for sale of their produce.</td>
<td>57.00</td>
<td>VIII</td>
</tr>
<tr>
<td>6</td>
<td>Low soil fertility status.</td>
<td>76.00</td>
<td>IV</td>
</tr>
<tr>
<td>7</td>
<td>Heavy weed infestation.</td>
<td>58.00</td>
<td>VII</td>
</tr>
<tr>
<td>8</td>
<td>Damage by wild animals (especially Blue cow).</td>
<td>73.00</td>
<td>V</td>
</tr>
<tr>
<td>9</td>
<td>Use of higher seed rate.</td>
<td>38.00</td>
<td>X</td>
</tr>
<tr>
<td>10</td>
<td>Unavailability of land for timely sowing of wheat.</td>
<td>65.00</td>
<td>VI</td>
</tr>
</tbody>
</table>
Economic Performance

Table 2 showing the economic performance of wheat under front line demonstration. Though the table reveals higher mean cost of cultivation (Rs. 27342/ha) of demonstrated technology as compared to cost involved in local check (Rs. 25567/ha) but the demonstration plots fetched higher mean gross returns (Rs. 52324.5/ha) and mean net returns (Rs. 24982.5/ha) with higher benefit: cost ratio (1.91) as compared to mean gross returns (Rs. 44239/ha), mean net returns (Rs. 18672/ha) and benefit: cost ratio (1.63) of Local Check. Similar result was reported by (Joshi et al., 2014, Singh S. B., 2017). The perusal of table 2 also reveals higher mean additional return of Rs. 8085.5/ha in comparison to mean additional cost of cultivation of Rs. 1525/ha. This indicates higher profitability and economic viability of wheat demonstrations under local agro-ecological situation.

Respondent Satisfaction Level

Table 3 indicates respondent satisfaction index towards front line demonstration and found that majority of them had high level of satisfaction index (57.00%) followed by medium level of respondent satisfaction index (33.00%). It was also observed that only 10.00% of respondent farmers had low level of satisfaction index. It is quite obvious from the table 3 that majority of respondent farmers fall under higher and medium level of satisfaction level towards performance of technology demonstrated, hence, it indicates a stronger conviction, physical and mental involvement in the frontline demonstrations which in turn would lead to easy and higher adoption of the technology demonstrated. These findings were in conformity with the findings of (Dhaka et al., 2010, Singh, S. B., 2017).

Constraints in Wheat Production

During the study, constraints in wheat production identified though participatory approach presented in table 4 shows that most confronting constraint faced by the farmers (92.00%) in FLD was unavailability of improved seeds variety in relation to climate change which ranked 1.85.00 percent of them ranked II as low technical knowledge about recommended package of practices. Followed by lack of irrigation facility (82.00%), low soil fertility status (76.00%), damage by wild animals (especially Blue cow) (73.00%), unavailability of land for timely sowing of wheat (65.00%), heavy weed infestation (58.00%), lack of proper markets available for sale of their produce (57.00%), Infestation of insects/pests/diseases (50.00%) and last ranked but not the least was use of higher seed rate (38.00%). Dhruv et al. (2012) and Singh S. B. (2017) also reported similar constraint.

Conclusion

From the above facts mention, it could be inferred that using improved production technology the yield and return of wheat can be increased substantially. The yield of wheat under frontline demonstration with improved variety found always greater than the yield of wheat in local check which could further be increased by adopting recommended production technology. However, demonstration yield of wheat is still less than its potential yield. Hence, there is need to disseminate recommended technologies of wheat through effective extension teaching methods i.e. need based training and FLD.

Implication

The findings obtained from the present study have far reaching implications which will have a definite bearing in planning, execution and designing of appropriate methodologies in order to have meaningful and fruitful result of demonstration not only to wheat growers but its impact should make visible to other sectors also which essentially provide feedback to agencies involved in various demonstration programme. It directly focuses about the importance of frontline demonstration by enhancing the yield and return of the farmers.

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