**IMPACTS OF CLUSTER FRONTLINE DEMONSTRATIONS ON YIELD AND ECONOMICS OF BLACKGRAM IN SOUTHERN PART OF TAMILNADU**

**ABSTRACT**

Cluster Frontline Demonstrations of blackgram were conducted by Krishi Vigyan Kendra, Virudhunagr, Tamilnadu (India) during rabi season from 2022-23 & 2023-24. A total 150 demonstrations were conducted on blackgram in 60 ha area by the active participation of the farmers with the objective of simproved technologies of blackgram productivity. The results of the demonstrations observed that on an average yield of blackgram under improved technology ranged from 8.4 to 8.6 q/ha with a mean of 8.5 q/ha; which was 25 per cent more yield as compared to farmer’s practices (6.4 q/ha). The study exhibited mean extension gap (2.32 q/ha), technology gap (5.07 q/ha) and technology index (42.58 %) assessed more than potential yield of demonstrated variety VBN 11. The average mean net return of Rs. 38049.5/ha with mean B: C ratio of 2.09 was obtained with improved technologies in comparison to farmers’ practices (Rs.21282.5/ha). The present study resulted to substantial the farming community for demonstration of new improved technologies, higher productivity and returns.

**Key words**: Cluster Front Line Demonstrations, pulses, Economics, Extension gap, Technology gap, Technology index,

**Introduction**

Pulses play a significant role in the group of food crops to address national food and nutritional security and tackle environmental challenges. Blackgram is an important pulse crop grown throughout the country. The crop can withstand adverse climatic conditions and improves the soil fertility by fixing atmospheric nitrogen in the soil. Black gram is a crucial part of the Indian diet since it is a supplement to a cereal-based diet and contains vegetable protein (Gnanasekaran *et al*.,2024). Blackgram is an important pulse crop in Virudhunagar district cultivated in an area of 3733 ha, but due to unavailability of improved varieties and non adoption of improved cultivation practices in the district, it’s productivity is very low compare to national productivity. It is identified that there are several factors responsible for low pulse productivity and high yield gap which are mostly related to inputs and their efficient management.

Venudevan *et al*. (2024) stated that the productivity of black gram per unit area could be boosted by adopting improved practices in a systematic manner along with high-yielding varieties. In this view, Krishi Vigyan Kendra, Virudhunagar, conducted the Cluster Front Line Demonstration (CFLD) for transferring the latest package of practices to the farmers of Virudhunagar district. The goal of the present study, conducted by Krishi Vigyan Kendra, Virudhunagar, was to increase blackgram production and productivity by showcasing improved technological practices through Cluster Frontline Demonstrations.

**Materials and Methods**

 The demonstrations were carried out at Kathalampatti, N.Mettupatti, Chithambarapuram villages of Virudhungar District of Tamil Nadu State during Rabi 2022-23 & 2023-24. Blackgram VBN 11 variety is resistant to Mungbean Yellow Mosaic Virus and Leaf Curl Virus diseases and suitable for all seasons of Tamil Nadu with an average yield of 8.4 to 9.5 q/ha and duration of 70-75 days. Before starting the demonstrations, farmers were trained on scientific cultivation practices by scientists of KVK, Virudhunagar. Each demonstration was laid out in an area of 0.4 ha area in cluster basis; the crop was cultivated with farmers’ practice. The package of improved technologies like required seed rate, improved variety, seed treatment with TNAU Vithai amirtham, nutrient management, TNAU Pulse wonder application and plant protection measures were followed by the farmers in the demonstrations. The method demonstrations on seed treatment with TNAU Vithai amirtham were conducted at each village to make the farmers aware about its effects and benefits on pulse crop production. Scientific interventions under cluster frontline demonstrations (Table 1) were taken as recommended by Krishi Vigyan Kendra, Virudhunagar. To study the impact of Cluster Front Line Demonstrations, data from CFLD and farmers’ practices were analyzed.

**Flowchart for conducting demonstration of CFLD**

Conducted training on ICM techniques in Pulses

Selection of farmer’s

Method demonstration of TNAU Vithai amirtham seed treatment & TNAU Pulse wonder

Distribution of critical inputs

Recorded observations and analyze the impact

Farm Advisory Services by Scientists of KVK Virudhunagar

Samui *et al*. (2000) were suggested the following formulae for calculating the technology gap, extension gap and technology index

Technology gap = Potential yield- Demonstration yield

Extension gap = Demonstration yield-Farmers’ yield

|  |  |  |
| --- | --- | --- |
|  |  | Technology gap |
| Technology index | = | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_X 100 |
|  |  | Potential gap |

The demonstration fields were monitored and observed by the scientists of KVK,Virudhunagar. During the harvest, yield parameters were recorded for both the demonstrated plots and the farmers’ practice. The cost of cultivation and profit details of both the systems were collected from the farmers for working out the benefit-cost ratio. The economics were calculated based on the local market prices of inputs and minimum support prices of outputs.

**Results and Discussion**

**Technology gap:** An average technology gap of 5.07 q/ha was calculated during the demonstration period. The data reflects that there is further potential for increasing yield by implementing better technological interventions, reducing the technological gap, and ultimately lowering the technology index. Mukherjee, (2003) stated that the technological gap may be attributed to the dissimilarity in the soil fertility status and weather conditions. Hence, variety wise location specific recommendation performs to be necessary to minimize the technology gap for yield level in different situations (Rachhoya *et al.,* 2018).

**Extension gap:** In CFLD demonstrations an extension gap of 2.41 to 2.23 q/ha was recorded during 2022-23 and 2023-24. On an average, extension gap observed during both the years was 2.32 q/ha which is a wide gap. This emphasized the need to educate the farmers through various means for the adoption of improved agricultural production technologies to reverse this trend of wide extension gap. More and more use of latest production technologies with high yielding variety will subsequently change this alarming trend of galloping extension gap. The new technologies will eventually lead to the farmers to discontinue the old technology and to adopt new technology. This finding is in confirmation with the findings of Meena *et al*., (2020); Singh *et al*., (2019).

**Technology index:** Another important tool for assessing the impact and adoption of various technologies is the technology index. Better technological intervention effectiveness is indicated by a lower technology index value. The technology index in this study varied from 44.03 to 41.12%. Based on the data, the technology that was showed better results in second year in comparison to the first year. Jha et al. (2020) also found similar results. Variations in the current weather, soil fertility, and insect-pest infestation may be the cause of the wide range in the technology index.

**Yield & Economics:**

It was observed that Cluster Frontline Demonstrations plots recorded higher yield (8.5q/ha ) higher gross returns (Rs. 52790/ha) and net returns (Rs. 38049.5/ha) in comparison to farmers practice (Rs.35438.5/ha and Rs. 21282.5/ha) (Table 2 & 3). Similar trend of yield enhancement under frontline demonstrations was documented by (Saikia *et al*., 2018 and Sheeba *et al*., 2024). The benefit cost ratio was also recorded higher in recommended practice with 2.09 as compared to 1.57 in farmer’s practice. Similar economic benefits after adoption of improved technologies like high cost benefit ratio, high yield and maximum net return under frontline demonstrations on pulses were documented by (Jha *et al*., 2020 and Singh *et al*., 2019). The results are also in conformity with the findings of Singh *et al*., 2018 and Krishna Kumar *et.al.,*2025 also reported higher net returns as well as benefit cost ratio in other pulses as compared to farmers practice.

**Table 1. Details of improved and Farmers practice of in blackgram VBN 11.**

|  |  |  |  |
| --- | --- | --- | --- |
| **S. No** | **Cultural practice** | **Improved practice** | **Existing practice** |
| 1. | Variety | VBN 11 |  VBN 8 |
| 2. | Land preparation | Ploughing and Levelling | Ploughing and Levelling |
| 3. | Seed rate | 8kg/ac | 6kg/ac |
| 4. | Seed treatment  | TNAU Vithai amirtham  | Not carried out any seed treatment  |
| 5. | Weed management | Two hand weeding on 15 and 30 days after sowing. | Improper weed control measures  |
| 5. | Foliar application of nutrient | TNAU pulse wonder @ 5 kg/ha | DAP 2 % Spray |
| 6. | Plant protection  | IPM | Indiscriminate application |

**Table 2.Impact of technological intervention on yield, technology gap,extension gap and technology index of CFLD and farmers practice in blackgram VBN 11**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Year | Yield (q/ha) | Increase over farmers practice (%) | Technology Gap  | Extension Gap  | Technology Index (%) |
| CFLD  | Farmers Practice  |
| 2022-23 | 8.4 | 6.2 | 26 | 5.31 | 2.41 | 44.03 |
| 2023-24 | 8.6 | 6.5 | 24 | 4.83 | 2.23 | 41.12 |
| **Mean** | **8.5** | **6.4** | **25** | **5.07** | **2.32** | **42.58** |

**Table 3. Economic analysis CFLDS and Farmers Practice in Blackgram VBN 11**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Year** | **Gross cost (Rs/ha)** | **Gross returns (Rs/ha)** | **Net Returns (Rs/ha)** | **BC Ratio** |
| **CFLD**  | **Farmers Practice**  | **CFLD**  | **Farmers Practice**  | **CFLD**  | **Farmers Practice**  | **CFLD**  | **Farmers Practice**  |
| 2022-23 | 24384 | 22050 | 52145 | 34852 | 37364 | 20140 | 2.13 | 1.58 |
| 2023-24 | 25835 | 23075 | 53435 | 36025 | 38735 | 22425 | 2.06 | 1.56 |
| **Mean** | **25109.5** | **22562.5** | **52790** | **35438.5** | **38049.5** | **21282.5** | **2.09** | **1.57** |

 **CONCLUSION**

Cluster Front Line Demonstrations on Blackgram VBN 11 results concluded that, by adopting scientific methods of blackgram cultivation, it would thus lead to reducing the technology gap and increasing the productivity of blackgram in the Virudhunagar district. It was observed that potential yield can be achieved by imparting scientific knowledge to the farmers. Horizontal expansion of improved technologies may be achieved by the implementation of various extension activities like training programs, field days, exposure visits, etc., organized in CFLD programs. As the gaps still exists, the CFLDs should be continued in coming years so that gaps may be minimized as more and more area is covered under blackgram. Therefore, cluster frontline demonstrations (CFLD) were effective in updating the knowledge, skills, and attitude of farmers and enhancing the production and productivity of black gram in the Virudhunagar district.

**Conflict of interest**

 All authors declare that they have no conflict of interest in publication of this article.

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