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# Evaluation of recommended package of practices in enhancing yield and economics of oil seed and pulses in India

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**ABSTRACT**

Latest and recommended cultivation practices have an impact on yield and economics of oil seeds and pulses. Present compiled summary across India revealed that under demonstration plots, yield improvements across various states include a 42.7% average increase in pulses and oilseeds, showcasing their transformative impact on agricultural yields. Across different states, demonstration plots showed varied economic gains: groundnut in Tamil Nadu achieved ₹ 35,077/ha with a B:C ratio of 2.95, while chickpea and green gram in Madhya Pradesh recorded gains of ₹ 6,757/ha and ₹ 22,571.4/ha, with B:C ratios of 2.91 and 4.78, respectively. Rajasthan and Haryana reported ₹ 10,180/ha for cluster bean (B:C, 4.99) and minimal gains for demonstration plots (B:C, 1.22), respectively.

***Keywords:*** Oilseeds, Pulses, Demonstration, Yields, Effective gains, B:C ratio

## INTRODUCTION

A novel strategy called Cluster Front Line Demonstrations (cFLDs) aims to close the gap between agricultural practice and scientific research. In order to demonstrate cutting-edge, scientifically advised farming techniques to increase productivity and profitability, especially in the production of oilseeds and pulses, they provide a useful platform for bringing farmers and agricultural researchers and extension agents together (Bhatt *et al.*, 2024; Prasad *et al.*, 2022). In addition to aiding in the spread of new agricultural technologies, this program makes sure that farmers get hands-on experience with contemporary growing techniques, which eventually boosts adoption rates and improves farming results. The Indian Council of Agricultural Research (ICAR) first proposed the idea of Front-Line Demonstrations (FLDs) in the middle of the 1980s as a component of the Oilseed Crop Technology program. Cluster Front Line Demonstrations eventually emerged from this campaign, which gradually expanded to encompass pulses and other crops. cFLDs are intended to demonstrate how well enhanced cultivars, cutting-edge agronomic techniques, and contemporary technological advancements work in farmers' fields under actual circumstances. Agricultural scientists and extension agents can interact with a greater number of farmers by using cFLDs in cluster mode, which increases the demonstrations' impact and visibility.

As ICAR's extension arms at the grassroots level, Krishi Vigyan Kendras (KVKs) are essential to the implementation of cFLDs. Based on the soil types, agroclimatic conditions, and current agricultural methods, KVK experts choose appropriate demonstration sites. These locations have been carefully selected to guarantee that the outcomes of the demonstrations are applicable to the larger farming community in the area. The chosen farmers receive instruction and direction on post-harvest methods, pest and disease control, nutrient and water management, soil health management, and enhanced seed varieties (Chejara *et al.*, 2021). This method boosts their confidence in embracing new agricultural advancements while also solidifying their technical expertise. Grain yield, the technology index, the extension yield gap, and economic indicators including additional costs, benefits, effective gains, and incremental benefit-cost (B:C) ratios are some of the primary metrics used to assess

the efficacy of FLDs (Bhardwaj *et al*., 2023). By contrasting demonstration yields with possible yield levels, the technology index aids in evaluating the viability and efficacy of suggested practices. The productivity disparity between demonstration plots and conventional farmer-managed fields is emphasized by the extended yield gap. These measurements offer important information about the shown practices' scalability and economic feasibility. The capacity of cFLDs to illustrate the superiority of scientific interventions over conventional farming practices is one of its main advantages. Improved crop performance, resilience to pests and diseases, and overall farm output are all visible to farmers taking part in the demonstrations. Therefore, by encouraging a wider segment of the farming community to embrace best practices that increase yields and profitability, cFLDs work as a persuasive instrument for technology transfer.

Beyond increasing production, cFLDs support sustainability by encouraging resource-efficient and ecologically friendly farming practices (Malik *et al*., 2022). Many of these demonstrations highlight the use of precision agriculture instruments, water saving methods, integrated pest management (IPM), and biofertilizers (Mishra *et al*., 2015). cFLDs ensure sustainable farming methods, lower input costs, and promote long-term soil health by reducing an over-reliance on chemical inputs (Bhatt *et al*., 2022; Bhardwaj *et al*., 2019). Furthermore, cFLDs have financial advantages that go beyond just individual farmers. The nation's food security and agricultural commodity self-sufficiency are enhanced by increased local production of oilseeds and pulses. India is a significant consumer of pulses and edible oils, therefore increasing domestic supply through better farming practices helps lessen reliance on imports, improving the agricultural sector's economic stability. The function of farmer-to-farmer knowledge sharing is another essential component of cFLDs. Farmers who have successfully adopted the strategies that have been demonstrated frequently tell their peers about their experiences, which spreads the word and results in broad adoption. This unofficial method of exchanging knowledge boosts the overall efficacy of agricultural technology transfer and supports official extension programs.

Additionally, the cFLD model encourages cooperation between different stakeholders, such as private agribusiness companies, government organizations, research institutes, and agricultural colleges. These collaborations guarantee that farmers receive the newest advancements and technical assistance while also facilitating the ongoing development of agricultural technologies. Notwithstanding the many advantages of cFLDs, there are still several obstacles to overcome in their application. These include a lack of finance for large-scale demonstrations, logistical challenges in reaching far-flung farming communities, some farmers' reluctance to adapt, and climate variability that may affect the results of demonstrations. More funding for agricultural extension services, improved farmer engagement tactics, and targeted policy assistance are needed to address these issues. Hence, Cluster Front Line Demonstrations are an effective tactic for hastening farmers' adoption of better farming methods. Crop yields, economic returns, sustainable farming, and national food security are all improved by cFLDs, which close the gap between research and field-level application. For India to achieve long-term productivity gains and rural development, the cFLD effort must be strengthened and expanded as the country continues to concentrate on upgrading its agricultural sector.

## MATERIALS AND METHODS

To evaluate the effect of recommended package of practices in enhancing yield and economics of oil seed and pulses in India, fourteen research papers evaluated, where percent yield enhancements (equation 1) followed by economics through different parameters viz. effective gain, and B:C ratios (equation 2 and 3) computed using economic principles (Bhatt *et al*., 2024; Prasad *et al*., 2022) and their calculations shown as per under in equation no. 5, 6.

% Increase in the yield= (Yield in demonstration plots – Yield in farmers' practice plots)/ Yield in farmers' practice plots) × 100 …(1)

Effective gain (₹ $ha^{-1}$) = Additional returns (₹ $ha^{-1}$)- Additional cost (₹ $ha^{-1}$) …(2)

Incremental B:C ratio = Additional returns (₹ $ha^{-1}$) ÷ Additional cost (₹ $ha^{-1}$) …(3)

## RESULTS AND DISCUSSION

### Yield enhancements

In Jammu & Kashmir, under the KVK initiatives, black gram productivity in Kathua increased by 52.41% (Jamwal *et al*., 2020) while in

**Table 1.** Effect of recommended package of practices on the grain yields/land productivity of oil seed and pulses

| Sr. No. | District | State | FLD conducted by | Crop | Percent increase (%) | Reference |
|---|---|---|---|---|---|---|
| 1 | Amritsar | Punjab | KVK, Amritsar *(100 FLDs)* | Gobhi Sarson | 9.87 | Bhatt *et al.* (2024) |
| 2 | Kathua | Jammu (J&K) | KVK, Kathua under NFSM | Black gram | 52.41 | Jamwal *et al*. (2020) |
| 3 | Poonch | Jammu (J&K) | KVK, Poonch of SKUAST | Chickpea<br>Moong<br>Mash Uttara<br>Rajmash | 40.60<br>35.50<br>49.71<br>28.73 | Kumar *et al*. (2017) |
| 4 | Sonepat | Haryana | KVK, Sonepat *(159 FLDs)* | Summer Mung | 21.3 | Singh *et al*. (2021) |
| 5 | Ayodhya | Uttar Pradesh | KVK, Mau *(400 FLDs)* | Pigeonpea<br>Chickpea<br>Blackgram<br>Greengram | 29.7<br>31.0<br>29.4<br>30.4 | Prasad *et al*. (2022) |
| 6 | Shivamogga | Karnataka | Zonal Agricultural and Horticultural Research Station, Shivamogga | Yardlong bean | 36.75 | Adivappar *et al*. (2018) |
| 7 | Pali | Rajasthan | KVK, Pali-Marwar *(40 FLDs)* | Greengram | 35.4 | Meena and Singh (2017) |
| 8 | Morigaon | Assam | KVK, Morigaon *(60 FLDs)* | Greengram | 71.67 | Bezbaruah and Deka (2020) |

Poonch increase in Chickpea (40.60%), Moong (35.50%), Mash (49.71%), and Rajmash (28.73%) reported (Kumar *et al*., 2017) (Table 1). In Haryana, FLDs on summer moong in Sonepat showed a 21.3% yield increase, from 8.9 q/ha to 10.8 q/ha (Singh *et al*., 2021). In Uttar Pradesh, FLD plots reported with improved pigeon pea and green gram yields by 29.7% and 30.4% (Prasad *et al*., 2022). In Punjab, FLDs on Gobhi sarson resulted in 9.6% hike in FLD plots (Bhatt *et al*., 2024), while in Karnataka, yardlong bean showed a 36.75% improvement in Shivamogga (Adivappar *et al*., 2018). Other notable results include a 35.4% increase for green gram in Rajasthan (Meena & Singh, 2017) and an exceptional 71.67% increase for green gram in Assam (Bezbaruah & Deka, 2020) (Table 1). These results highlight the transformative potential of FLDs in boosting agricultural productivity of oilseed and pulses.

### Enhancement in economics

In Tamil Nadu, demonstrations on groundnut reported effective gains of ₹ 35,077/ha with B:C ratio of 2.95 outperformed the FP ratio of 1.90 (Sasikumar & Rathika, 2023). In Madhya Pradesh, in Sidhi for chickpea showed yielding ₹ 6,757/ha as effective gains, with a demo B:C ratio of 2.91 (Singh *et al*., 2022) (Table 2). In Harda, green gram demonstrations reported high effective gains of ₹ 22,571.4/ha, with an exceptional demo B:C ratio of 4.78 (Bharti *et al*., 2024). In Rajasthan, cluster bean recorded effective gains of ₹ 10,180/ha and a B:C ratio of 4.99 (Jain *et al*., 2017). Demonstrations at Bharatpur and Jodhpur also showed strong economic performance in chickpea and green gram, respectively, with demo B:C ratios above 3.0 (Puniya *et al*., 2020). In Haryana, demonstration plots reported with low economic returns, with a demo B:C ratio of 1.22, reflecting minimal improvement over FP (Satyajeet *et al*., 2021) (Table 2).

## CONCLUSIONS

Finally, above discussion concludes that improved practices for growing oilseed and pulses in demonstration plots significantly enhance yields and benefits as compared to the farmer's age-old indigenous practices. However, regional variations in performance highlight the need for context-specific interventions.

## REFERENCES

Adivappar, N., Manjesh, M. and Sharanabasappa. (2018). Impact of frontline demonstrations on productivity and economics of yardlong bean, *Vigna unguiculata subsp sesquipedalis (L) Verde*. *International Journal of*

**Table 2.** Effect of recommended package of practices on Economic parameters of oil seed and pulses

| Sr. No. | District | State | FLD conducted by | Crop | Effective gains (Rs/ha) | B:C ratio | | Reference |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Demo | FP | |
| 1. | Amritsar | Punjab | KVK., Amritsar | Gobhi Sarson | 9142 | 2.78 | 2.32 | Bhatt *et al.* (2024) |
| 2. | Vellore | Tamil Nadu | KVK, Virinjipuram | Groundnut | 35077 | 2.95 | 1.90 | Sasikumar and Rathika (2023) |
| 3. | Sidhi | Madhya Pradesh | KVK, Sidhi | Chickpea | 6757 | 2.91 | 2.46 | Dhananjai *et al*. (2022) |
| 4. | Harda | Madhya Pradesh | KVK, Kolipura Tappar | Greengram | 22571.4 | 4.78 | 3.86 | Bharti *et al*. (2024) |
| 5. | Barmer | Rajasthan | College of Agriculture, Sumerpur | Clusterbean | 10180 | 4.99 | 1.95 | Lokesh Kumar Jain *et al*. (2017) |
| 6. | Jodhpur | Rajasthan | KVK, Jodhpur | Green gram | 17,565 | 3.86 | 2.78 | Manmohan Puniya *et al*. (2020) |
| 7. | Fatehabad | Haryana | KVK, Fatehabad. | Clusterbean | 8882 | 1.22 | 1.03 | Satyajeet *et al*. (2021) |

*Farm Science*s, *8*(1), 86-89. https://doi.org/10.5958/2250-0499.2018.00020.

Bezbaruah, R. and Deka R.S. (2020). Impact of Cluster Frontline Demonstration on Productivity and Profitability of Green gram in Morigaon District of Assam. *J Krishi Vigyan*, *9* (1), 164-169.

Bhardwaj, A. K., Malik, K., Chejara, S. and Rani, M. (2023). Enhancing nutrient use efficiency and productivity through scientific interventions under field conditions. *Journal of Natural Resource Conservation and Management*, *4*(1), 1–9.

Bhardwaj, A. K., Rajwar, D., Mandal, U. K., Basak, N. and Singh, A. K. (2019). Impact of carbon inputs on soil carbon fractionation, sequestration and biological responses under major nutrient management practices. *Scientific Reports*, *9*, 9114. https://doi.org/10.1038/s41598-019-45585-5\

Bharti, O.P., Jatav, R.C., Tiwari, S.K., Baraiya, B.R., Chouhan, P. and Singh, S.R.K. (2024). Impacts of cluster frontline demonstrations on yield and economics of green gram in Madhya Pradesh, India. *Legume Research*, *47*(11), 1944–1950. https://doi.org/10.18805/LR-5250.

Bhatt, R., Astha, Kaur, R. and Singh, B. (2024). Impact of scientific interventions on gobhi-sarson yields, different yield gap indices and profitability in tropics. *Journal of Soil and Water Conservation 23*(3), 320-327. https://doi.org/10.5958/2455-7145.2024.00038.4

Bhatt, R., Singh, P., Majumder, D. and Kaur, G. (2022). Climate-smart technologies for reducing water footprints in different cropland ecosystems-A meso analysis. *Proc. Indian Natl. Sci. Acad.* (PINS-D-22-00194). https://doi.org/10.1007/s43538-022-00148-4

Chejara, S., Malik, K., Rani, M. and Bhardwaj, A. K. (2021). Integrated nutrient management: Concept, constraints and advantages for sustainable agriculture. *Journal of Natural Resource Conservation and Management*, *2*(2), 85–94.

Jain, L.K., Parewa, H.P. and Nandan, B. (2017). Productivity and profitability analysis of cluster bean at farmers' field in Barmer District of Rajasthan. *Journal of Food Legumes*, *31*(2), 119–122.

Jamwal, A., Mahajan, V., Ajrawat, B., Kumar, A. and Sharma, V.K. (2020). Impact of cluster frontline demonstrations (CFLD) on yield of black gram (*Vigna mungo*) under rainfed conditions in Kathua district of Jammu and Kashmir. *International Journal of Chemical Studies*, *8*(4), 3314-3316.

Kumar, S., Mahajan, V., Sharma, P.K. and Parka, S. (2017). Impact of front-line demonstrations on the production and productivity of moong (*Vigna radiata L*), mash (*Vigna mungo L*), rajmash (*Phaseolus vulgaris L*), lentil (*Lens culinaris L*) and chickpea (*Cicer aeritinum L*) under rainfed ecology in mid hills of J & K, India. *Legume Research*, *42*(1), 127-133. https://doi.org/10.18805/LR-3816.

Malik, K., Rani, M., Sharma, P. and Bhardwaj, A. K. (2022). Rice straw compost: A sustainable residue recycling solution for soil health and productivity enhancement. *Journal of Natural Resource Conservation and Management*, *3*(2), 143–151.

Meena, M.L. and Singh, D. (2017). Impact assessment of front-line demonstrations on green gram: Experience from rainfed condition of Rajasthan. *Journal of Applied and Natural Science, 9*(4), 2456–2460.

Mishra, V. K., Srivastava, S., Bhardwaj, A. K., Singh, Y. P. and Singh, R. (2015). Resource conservation strategies for rice–wheat cropping systems on partially reclaimed sodic soils. *Natural Resources Forum*, *39*(2), 110–122. https://doi.org/10.1111/1477-8947.12063

Prasad, A., Verma, L.C., Kumar, V., Singh, L.P.K., Singh, V.K. and Anand, R.K. (2022). Impact of front-line demonstrations (FLD) on the yield of pulses. *The Pharma Innovation Journal, 11*(7), 2100-2102.

Puniya, M., Chandawat, M.S., Nagal, G., Jeetarwal, R., Ola, B. and Kumar, A. (2020). Scaling up of green gram production under frontline demonstrations in Jodhpur District of Rajasthan, India. *International Journal of Current Microbiology and Applied Sciences*, *9*(1), 1982–1989. https://doi.org/10.20546/ijcmas.2020.901.224.

Sasikumar, K. and Rathika, K. (2023). Impact of cluster front-line demonstrations (CFLDs) oilseeds on yield enhancement of groundnut (Arachis hypogaea L.) in Vellore District of Tamil Nadu, India. *International Journal of Environment and Climate Change*, *13*(11), 3678–3682. https://doi.org/10.9734/ijecc/2023/v13i113547.

Satyajeet, Satpal, Dhanda, S.K. and Kumar, J. (2021). Yield and gap analysis of improved crop production technology in cluster bean through farmer's participatory approach. *Forage Research*, *47*(2), 245–248.

Singh, D., Singh, R.K., Patel, A.K. and Baghel, M.S. (2022) Performance of chickpea (*Cicer arietinum* L.) var. JG 14 under late sown condition of rice-chickpea cropping system in Sidhi district of Madhya Pradesh. *Pharma Innovation*, *11*(3):1096-1101.

Singh, J., Singh, K., Hemender and Premdeep. (2021). Impact assessment of front-line demonstrations on summer mung productivity under irrigated agro-ecosystem of Haryana. *Legume Research*, *44*(12), 1470-1474. https://doi.org/10.18805/LR-4517.