

International Journal of Advanced Biochemistry Research



ISSN Print: 2617-4693
 ISSN Online: 2617-4707
 NAAS Rating (2026): 5.29
 IJABR 2026; SP-10(4): 387-389
www.biochemjournal.com
 Received: 08-01-2026
 Accepted: 13-02-2026

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Impact of Cluster Front Line Demonstration (CFLD) on productivity enhancement of sesamum (*Sesamum indicum* L.) in Dibrugarh district of Assam

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DOI: <https://www.doi.org/10.33545/26174693.2026.v10.i4Se.8128>

Abstract

Sesamum is one of the important oilseed crops during *kharif* season in Dibrugarh district of Assam. During 2023-24 and 2024-25, Krishi Vigyan Kendra, Dibrugarh conducted Cluster Front Line Demonstration (CFLD) programme on sesamum with high yielding variety champawati along with improved package of practices. The demonstration programme was conducted for a total area of 26 ha covering 33 numbers of farmers to study the impact of CFLD programme in terms of seed yield, extension gap, technological gap, technology index, additional return and benefit-cost ratio. The results revealed that, the mean yield of sesamum during both the years under demonstrated practice was 7.1q/ha as against 5.5 q/ha from the farmer's practice with mean percentage increase in seed yield of demonstrated plots over farmers plots was 29.09%. The mean extension gap (1.6 q/ha), technological gap (1.94 q/ha) and technology index (21.46%). The mean net return (Rs. 33475/ha) and benefit-cost ratio (2.33) of demonstrated practice were higher as compared to farmer's practice (Rs. 21275/ha) and (1.99) respectively. The results concluded that by the use of high yielding sesamum variety champawati along with improved package of practices remarkably increases the productivity of sesamum in Dibrugarh district of Assam.

Keywords: Cluster Front Line Demonstration (CFLD), sesamum, high yielding variety, productivity, yield, net return, extension gap, technological gap, technology index, benefit-cost ratio

Introduction

Sesame (*Sesamum indicum* L.) the queen of oil seed crop is one of the oldest crops grown in India. In Assam it is locally known as Til. After groundnut and rapeseed, it is an important edible oilseed crop in India. India contributed about 27 percent of the world's sesamum area, 23 percent of the world's production with a productivity of 322 kg/ha annually (Anonymous, 2021) ^[1]. However, the productivity of sesamum in India is low compared to other countries in the world mainly due to the cultivation of local varieties with inadequate crop management practices. In Assam, sesamum is an important *kharif* oilseed crop occupying an area of 12,128 ha with an average yield of 674 kg/ha (Anonymous, 2022) ^[2]. Besides its high oil content, it is also rich source of proteins and carbohydrates (Myint *et al.*, 2020) ^[3]. Sesame productivity in Dibrugarh district of Assam is also low mainly due to lack of good quality improved varieties seeds, inadequate nutrient management practices and untimely control of pest and disease infestations. There is more scope to improve the productivity of sesamum in Dibrugarh district as well as in Assam with proper intervention practices, such as the use of high-yielding varieties with improved packages of practices. Therefore, Cluster Frontline Demonstration (CFLD) programme on sesamum variety champawati with the improved package of practices was conducted in farmers field in a participatory mode with the objective to enhance the production as well as productivity of sesamum.

Materials and Methods

Krishi Vigyan Kendra, Assam Agricultural University, Dibrugarh conducted Cluster Front Line Demonstration (CFLD) programme on sesamum for a total area of 26 ha covering 33 numbers of farmers during *kharif* season of 2023-24 and 2024-25. A high yielding sesamum variety champawati along with other improved package of practices as prescribed by Assam

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Agricultural University were followed in demonstrated plots and comparisons were made with local variety along with farmers traditional practices (control plots). The detailed of demonstrated practice as well as farmers traditional practice were mentioned in Table 1. The soils of the farmers field were sandy loam in texture with pH 6.7 and medium in available nitrogen (313 kg/ha), available phosphorous (25.3 kg/ha), available potassium (201 kg/ha) and organic carbon (0.59%). At the time of threshing the data were collected during both the years (2023-24 and 2024-25) from both demonstrated plots and control plots. The technology gap, extension gap, technology index, % increase of demo yield over farmers yield and economics of production were worked out (Samui *et al.*, 2000) ^[4] and (Singh and Singh, 2020) ^[5] as mentioned below:

Technology gap (q/ha) = Potential yield (q/ha)-Yield of Demonstration plots (q/ha)

Extension gap (q/ha) = Yield of Demonstration plots (q/ha)-Yield of farmers Plots (q/ha)

$$\text{Technology Index (\%)} = \frac{\text{Technology gap (q/ha)}}{\text{Potential yield (q/ha)}} \times 100$$

$$\% \text{ increase in yield} = \frac{\text{Yield of demonstration plots} - \text{Yield of control plots}}{\text{Yield of control plots}} \times 100$$

Results and Discussion

Seed yield: The data presented in Table 2 revealed that the seed yield of Sesamum under demonstration plot varied from 6.9 q/ha to 7.3 q/ha whereas in farmers' practice, seed yield of local variety varied from 5.3 q/ha to 5.7 q/ha in 2023-24 and 2024-25, respectively. The mean seed yields recorded under demonstration and farmers' practice were 7.1 q/ha and 5.5 q/ha, respectively. The mean percentage increase in seed yield of demonstrated plots over farmers plots was 29.13%. Similar results were reported by Bezbaruah *et al.*, 2020 ^[5] and Gogoi *et al.*, 2020 ^[7]. The higher seed yield in demonstration plot was mainly due to

the adoption of improved (HYV) variety, seed treatment with biofertilizers, recommended dose of fertilizers and improved measures for insect pest and disease infestation (Kumar *et al.*, 2019 and Jamwal *et al.*, 2020) ^[8,9].

Technology gap: From the results presented in Table 2, it was observed that the sesamum variety champawati produced the mean yield of 7.1 q/ha under demonstrated plots as against potential yield of 9.04 q/ha. The mean technology gap of the study was 1.94 q/ha. This might be due to varied agro-ecosystems, soil fertility status, climatic conditions of the area and disease pest infestation. Similar finding was also reported by Singh *et al.*, 2021 ^[10].

Extension gap: The mean extension gap was recorded 1.6 q/ha (Table 2) clearly indicates that there is a need to motivate and aware the farmers for adoption of improved variety along with recommended package of practices in sesamum over the existing traditional farmers practices with local variety. Similar finding was also reported by Devi *et al.*, 2018.

Technology index: During the study period, a decline in the value of the technology index from 23.67% 2023-24 to 19.25% 2024-25 was observed (Table 2). Lower the value of technology index more is the feasibility and applicability of the tested technology evolved and technology adopted at farmers' field. Choudhary *et al.*, 2009 ^[13] and Rohit and Singh (2019) ^[12] also reported similar findings.

Economics: The data in Table 3 depicted that the mean net return and benefit cost ratio of demonstrated plots were Rs. 33475/ha and 2.33 as against Rs. 21275/ha and 1.99 in farmers plot respectively. Similarly, the gross return of demonstrated plots was higher as compared with farmers plots. The benefit-cost ratio under improved cultivation practices was higher than farmers' practices in both the years might be due to higher yield obtained under improved technologies compared to farmers' traditional practice. This result was reported by Bairwa *et al.* (2013) ^[14], Ambulkar and Dixit (2014) ^[15] and Gogoi *et al.* (2020) ^[7].

Table 1: Practices followed in demonstrated plots and farmers plots under CFLD on sesamum

S. No.	Practices	Demonstrated plots	Farmers plots
1.	Land preparation	4 ploughings followed by laddering	2 ploughings
2.	Method of sowing	Line sowing	Broadcasting
3.	Variety	Champawati	Local
4.	Seed rate (kg/ha)	4	
5.	Spacing	30x15	-
6.	Seed treatment	PSB and azotobacter @ 50 g/kg of seeds	-
7.	Sowing time	First fortnight of August	First fortnight of August
8.	Fertilizer dose	Vermicompost @ 1 ton/ha along with 50% recommended dose of fertilizers as basal	Imbalance use of fertilizer
9.	Plant Protection measures	IPM practices like need based foliar spray of Neem Seed Kernel Extract (NSKE) and installation of bird perch	More use of pesticides
10.	Weed management	One hand weeding at 20-30 days after sowing (DAS)	-
11.	Technical guidance	Time to time	

Table 2: Year-wise seed yield, technology gap, extension gap and technology index of sesamum under CFLD demonstrated plots and farmers plots

Year	Potential yield (q/ha)	Demo yield (q/ha)	Farmers yield (q/ha)	Increase yield (%)	Technology gap (q/ha)	Extension gap (q/ha)	Technology index (%)
2023-24	9.04	6.9	5.3	30.19	2.14	1.6	23.67
2024-25	9.04	7.3	5.7	28.07	1.74	1.6	19.25
Mean		7.1	5.5	29.13	1.94	1.6	21.46

Table 3: Year-wise economics of sesamum under CFLD demonstrated plots and farmers plots

Year	Cost of cultivation (Rs./ha)		Gross return (Rs./ha)		Net return (Rs./ha)		B-C ratio	
	Demo plot	Farmers plot	Demo plot	Farmers plot	Demo plot	Farmers plot	Demo plot	Farmers plot
2023-24	24100/-	21200/-	55200/-	39750/-	31100/-	18550/-	2.29	1.88
2024-25	26200/-	21600/-	62050/-	45600/-	35850/-	24000/-	2.37	2.11
Mean	25150/-	21400/-	58625/-	42675/-	33475/-	21275/-	2.33	1.99

Conclusion

From the above study it can be concluded that with the use of high yielding sesamum variety champawati along with improved production technology had positive effect on increasing the seed yield as well as the economic return of sesamum which motivated the farmers towards adoption of improved technologies in Dibrugarh district of Assam.

Acknowledgement

The authors are thankful to the ICAR-ATARI, Zone VI, Guwahati and Assam Agricultural University, Jorhat, Assam for providing the financial support required for the research study.

Disclaimer (Artificial intelligence)

Authors hereby declare that no generative AI technologies such as large language models (chat GPT, COPILOT etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

Competing Interests

Authors have declared that no competing interests exist.

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