



# Yield and Economics Enhancement of Toria (*Brassica campestris* L Var. Toria) through Cluster Front Line Demonstration (CFLD) in Dibrugarh District of Assam, India

Chayanika Thakuria <sup>a\*</sup>, Hemchandra Saikia <sup>a</sup>  
and Shantonu Paul <sup>a</sup>

<sup>a</sup> Krishi Vigyan Kendra, Assam Agricultural University, Dibrugarh, Assam, India.

## Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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## ABSTRACT

Rapeseed (toria) is one of the most important oilseed crops in Dibrugarh district of Assam. Krishi Vigyan Kendra, Dibrugarh conducted Cluster Front Line Demonstration (CFLD) programme in two consecutive years ie. 2022-23 and 2023-24 during *rabi* season on toria variety TS 38 to evaluate its impact on yield and income gap through recommended package of practices. The demonstration was conducted in total thirteen villages covering 200 numbers of farmers in Dibrugarh district to find out the extension gap, technology gap, technology index and economic indexes of the crop before and after the intervention. The results revealed that, average yield of toria under demonstrated plots

\*Corresponding author: E-mail: [chayanika\\_thakuria@yahoo.com](mailto:chayanika_thakuria@yahoo.com);

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were 10.23 q/ha against 7.05 q/ha from farmers plots with the average yield increase was 45.44 per cent. The average technology gap, extension gap and technology index were 1.78 q/ha, 3.20 q/ha and 14.79 per cent respectively. Also average net return and B: C ratio under demonstration packages were recorded as Rs. 27285.00 per hectare and 2.25:1 respectively against Rs. 16123.00 per hectare and 1.84:1 B:C ratio under farmers practices. Therefore, the results indicated that by the use of high yielding toria variety TS 38 along with recommended package of practices help to enhance yield and economics of toria in Dibrugarh district of Assam.

**Keywords:** Cluster front line demonstration (CFLD); economics; Toria; yield.

## 1. INTRODUCTION

In the world, rapeseed-mustard (*Brassica spp.*) crop belongs to genus *Brassica* of the family cruciferae is the third vegetable oilseed crop after soybean (*Glycine max*) and palm oil (*Elaeis guineensis*) (Shekhawat et al., 2012; Chauhan et al., 2020; Kumar et al., 2008). Rapeseed-mustard is an important group of oilseed crops in India also (Priyamedha et al., 2015; Chauhan et al., 2007). India is the third largest rapeseed-mustard producer in the world after China and Canada with 19.8 per cent of world's total production (Kumar et al., 2018). In India, rapeseed-mustard contributes about 26.2 and 23.2 per cent to the total oilseed production and acreage, respectively and in Assam the crop contributes about 1.98 and 4.06 per cent, respectively (Anonymous, 2019). However, the productivity 617 kg/ha of the crop in Assam is much lower than that of national average 1980 kg/ha. The basic reasons for lower productivity of toria may be due to lack of knowledge about high yielding crop varieties and their package of practices like improper tillage practices, seed rate, imbalance nutrient management, weed management, lack of water management and high disease pest incidence of the crop etc. in the farmers' field (Jena et al. 2024).

The main objective of Cluster Front Line Demonstration (CFLD) programme is to transfer the technical message to farmers' field that if they use high yielding crop varieties with recommended package of crop production practices then the yield of the crop can easily be increased than the present level. (Singh et al., 2019). Therefore, CFLD programme on toria variety TS 38 with recommended package of practices was conducted in farmers' field in a participatory mode to enhance the production and productivity of oilseed crop.

## 2. METHODOLOGY

Krishi Vigyan Kendra, Dibrugarh conducted Cluster Front Line Demonstration (CFLD)

programme on toria variety TS 38 with recommended package of practices in 80 ha area of thirteen different villages in Dibrugarh district covering 200 numbers of farmers during *rabi* season of 2022-23 and 2023-24 under *rainfed* condition. The traditional practices along with existing farmers' variety M 27 were followed in case of farmers practice (Table 1). After harvest of *kharif* rice, toria was sown as second crop in residual soil moisture during second fortnight of November, 2022 and 2023. The soils of farmers' field were sandy loam in texture with pH 5.3 and medium range of available nitrogen (403 kg/ha), available phosphorous (25.1 kg/ha), available potassium (176 kg/ha) and organic carbon (0.63%). The data were collected from both the years 2022-23 and 2023-24 from demonstration plots as well as control plots (farmers practices) and after that technology gap, extension gap, technology index and economics of production were worked out (Samui et al., 2000) as mentioned below:

$$\text{Technology gap} = \text{Potential yield} - \text{Demonstration yield}$$

$$\text{Extension gap} = \text{Demonstration yield} - \text{Farmers yield}$$

$$\text{Technology Index} = (\text{Potential yield} - \text{Demonstration yield} / \text{Potential yield}) \times 100$$

$$\text{B: C ratio} = \text{Gross return} / \text{Cost of cultivation}$$

## 3. RESULTS AND DISCUSSION

The results from both the years revealed that the mean yield of different demonstration plots were 10.65 q/ha and 9.8 q/ha for the toria variety TS 38 with recommended package of practices which were substantially higher than the mean yield of 6.80 q/ha and 7.30 q/ha from different farmers plots with the use of existing farmers variety M 27 with traditional practices. Similar result was also observed with the findings of Kumar et al., 2020. The average technology gap

**Table 1. Practices followed in demonstration plots and farmers' plots under Cluster Front Line Demonstration (CFLD) on toria**

Practices	Demonstration plots	Farmers plots
Variety	TS 38	M 27
Seed rate (kg/ha)	8	10
Method of sowing	Broadcasting	Broadcasting
Seed treatment	PSB and azotobacter @ 50 g/kg of seed	No seed treatment
Sowing time	Second fortnight of November	Second fortnight of November
Fertilizer Doses	Compost @ 2t/ha, urea: SSP: MOP: 87:220:25 kg/ha as basal and micronutrient liquid fertilizer sulphur as foliar spray @ 2.5 ml/lit of water at 20 and 40 DAS	Imbalance use of fertilizer
Plant protection	Neem oil	Nil
Weeding	one hand weeding at 30 DAS	No weeding

**Table 2. Grain yield and yield gap analysis of Cluster Front Line Demonstration (CFLD) on toria in 2022-23 and 2023-24**

Year	Nos. of demo	Area (ha)	Potential yield (q/ha)	Demo yield (q/ha)	Farmers yield (q/ha)	Increase yield (%)	Technology gap (q/ha)	Extension gap (q/ha)	Technology Index (%)
2022-23	125	50	12.00	10.65	6.80	56.62	1.35	3.9	11.25
2023-24	75	30	12.00	9.80	7.30	34.25	2.20	2.50	18.33
<b>Average</b>	-	-	<b>12.00</b>	<b>10.23</b>	<b>7.05</b>	<b>45.44</b>	<b>1.78</b>	<b>3.20</b>	<b>14.79</b>

**Table 3. Economic Analysis of Cluster Front Line Demonstration (CFLD) on toria in 2023-24**

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
2022-23	20100/-	15300/-	42600/-	27200/-	22500/-	11900/-	2.12:1	1.70:1
2023-24	23300/-	20900/-	55370/-	41245/-	32070/-	20345/-	2.38:1	1.97:1
<b>Average</b>	<b>21700/-</b>	<b>18100/-</b>	<b>48985/-</b>	<b>34223/-</b>	<b>27285/-</b>	<b>16123/-</b>	<b>2.25:1</b>	<b>1.84:1</b>

and extension gap were recorded as 1.78 q/ha and 3.20 q/ha respectively (Table 2). To bridge the extension gap, farmers need to educate about adoption of high yielding crop varieties along with recommended package of practices through various extension activities. The average technology index was estimated as 14.79 per cent and therefore showed the possibilities of further increase in yield performance through technological intervention. The average gross return and net return from both the years of toria production under CFLD programme were estimated as Rs. 48,985.00 and Rs. 27,285.00 per hectare for demonstrated practices and Rs. 34,223.00 and Rs.16,123.00 per hectare for farmers practice respectively (Table 3). The average B:C ratios of demonstrated plots and farmers plots were 2.25 and 1.84 respectively due to utilization of high yielding toria variety TS 38 with recommended package of practices against the farmers' variety M 27 with traditional practices.

#### 4. CONCLUSIONS

By conducting Cluster Front Line Demonstration (CFLD) programme with the use of high yielding toria variety TS 38 alongwith recommended package of practices the average yield of toria increased by 45.44 per cent over the farmers practice ie. the average yield of different demonstration plots was 10.23 q/ha for the toria variety TS 38 with recommended package of practices and 7.05 q/ha for the existing farmers variety M 27 with traditional practices. Also the average net return and B:C ratios were Rs. 27285.00 per hectare and 2.25:1 from the demonstrated plots were much higher than the average net return and B: C ratio Rs. 16123.00 and 1.84:1 from the farmers' plots.

#### DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) 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.

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#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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