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Impact Assessment of Cluster Frontline Demonstration Programme on Toria for Income Enhancement of Farmers in Baksa District of Assam

Jyotismita Borah[1], Dinku Bora[2], Manoranjan Neog[3], Utpal Jyoti Sarma[4] and Prasanna Pathak[5]
[1,2&4]Krishi Vigyan Kendra, Baksa, Assam Agricultural University, Kharua, Assam - 781 346
[3&5]Directorate of Extension Education, Assam Agricultural University, Jorhat, Assam - 785 013
e-Mail : jyotismita@aau.ac.in

Authors Contribution

Jyotismita Borah :
Carried out the experiment, data analysed and wrote manuscript;
Dinku Bora :
Editing the manuscript;
Manoranjan Neog :
Conceptualization, framing and editing of the manuscript;
Utpal jyoti Sarma & Prasanna Pathak :
Provided the facilities to conduct research

Corresponding Author :

Jyotismita Borah
Krishi Vigyan Kendra, Baksa, Assam Agricultural University, Kharua, Assam

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Abstract

Krishi Vigyan Kendra, Baksa conducted Cluster Front Line Demonstration programme on Toria during *rabi* 2016-17, 2017-18 and 2018-19 to assess its impact in terms of change in yield and income gap through scientific cultivation practices. The study was conducted in nine villages of the district covering 180 farmers to find out the extension gap, technology gap, technology index and economic indexes of the crop before and after the intervention of Cluster Front Line Demonstration. The study revealed that, average yield of 8.4 q/ha was obtained in the demonstrated plot which was 33.81 per cent higher than the farmer's practice. Similarly, the technology gap, extension gap and technology index were found to be 1.6q/ha, 2.1q/ha and 16 per cent, respectively. The average gross income in demonstrated plot was found to be Rs.40633/ha as compared to Rs.29450/ha in farmers practice. Likewise, average net income of Rs.17033/ha was found in demonstration plot while it was Rs.9533/ha in farmer's plot. The Benefit-cost ratio was found to be 1.72 in the demonstration plot which is higher as compared to 1.48 at farmer's practices. It clearly indicates that the production and economic efficiency of the demonstrated technology of Toria in the study area. There was technology gap and extension gap due to the non-adoption of high yielding varieties, proper time of sowing, seed rate, seed treatment, fertility management, and lack of awareness about the recommended package of practices. The study revealed that cluster frontline demonstration programme (CFLD) may play a significant role in disseminating the technologies to the farmers field and thereby enhancing crop yield and farmer's income.

Keywords : Toria, *Rabi*, Cluster, Impact, Technology gap, Technology index, Extension gap

Toria is one of the most important oilseed crops grown in the Baksa district of Assam. The district falls within the lower Brahmaputra valley zone of Assam. In Assam, toria is the predominant oilseed crop because of the prevailing climatic condition and early duration of the crop which enable the farmer to catch the summer season after harvesting of toria. A total of 8491 ha of the area was covered under oilseed crops in the entire district (District Irrigation Plan, Baksa; 2016-2020). The oil content varies from 37-49 per cent depending upon the crops and varieties. In India, toria is an important source of edible oil followed by groundnut (Panday *et al*., 1999). In the world, it is the third largest source of vegetable oil and in the country, 90 per cent of total edible oil is produced from toria and groundnut. In Baksa district, toria production is 10.47 thousand MT (District Irrigation Plan, Baksa; 2016-2020). Varieties like TS-36, TS-46 and TS-38 are suitable for Assam conditions which are usually sown from mid-Oct. to mid-Nov. The analysis showed that the productivity of the crop had not increased to the desired level. It is significantly lower than other toria growing advanced states of India. This lower productivity might be due

to lack of awareness or non-adoption of improved recommended technology of the crop. KVK, Baksa had taken up extensive programme on awareness and training on scientific cultivation and also cluster frontline demonstration on HYV and other improved cultivation practices. The present study was carried out to analyse the changes in crop yield and income of farmers from toria cultivation under cluster frontline demonstration after technology intervention.

Material and Methods

Krishi Vigyan Kendra, Baksa, Assam, carried out a study to perceive the impact assessment of toria crop under the Cluster Frontline Demonstration programme. The study was conducted for the last 3 years during rabi 2016-17, 2018-17 and 2018-19 at the farmer's field of the district where the demonstration programme was conducted.

Table 1

Technologies demonstrated and farmers practices under Cluster Front line Demonstration

Particulars	Demonstrated technologies	Farmers practice
Variety	Improved varieties (TS-38)	Local traditional
Time of sowing	Mid October - Mid November	Last part of November to December
Seed rate	10kg/ha	12-14 kg/ha
Method of sowing	Line sowing/Broadcasting	Broadcasting
Seed treatment	Seed treatment with metalaxy l35WS@6g/kg of seed	Not followed
Fertilizer management (INM)	40:35:15 (N:P:K) kg/ha and Borax@10kg/ha	Random use of chemical fertilizers without following the proper dose
Plant protection	Need-based application	Nil

Three clusters were selected randomly in each year. A sample of 10 participating farmers from each cluster and 10 non-participating farmers from the same locality were selected as respondents. From each cluster 20 beneficiaries were selected and a total of 60 beneficiaries were considered to study the impact assessment of the CFLD on toria in the district. The present study was mainly based on primary data. Both sample survey and PRA (participatory Rural Appraisal) methods were applied for the collection of data. The output data was collected from both CFLD as well as farmer's plots. The percentage method is used to analyze the result. CFLD programs were conducted in the farmer's field according to the recommended package of practices of AAU and finally, the yield, extension gap, technology gap and technology index with the benefit-cost ratio were calculated by following the procedure as given below (Samui *et al*, 2000).

Technology Gap : Potential yield - Demonstration yield

Extension Gap : Demonstration yield - Famers practice yield

Technology Index : Potential yield - Demonstration yield/potential yield x 100

Impact change (%) : change in no of adopters/no of adopters before demonstration X 100

Benefit cost ratio : Gross return (Rs/ha)/Gross cost (Rs/ha)

Results and Discussion

Impact of Technology Adoption in Toria

The technologies adopted for toria cultivation under the CFLD programme are shown in Table 2. The number of adopters in improved varieties like TS-38 were increased by 75 per cent. In the Table, time of sowing shows a highly positive impact (100%) after technology intervention. Similarly, seed rate and seed treatment increased from 0 to 70 per cent and 83.33 per cent, respectively. Correspondingly after technology intervention, fertilizer management, plant

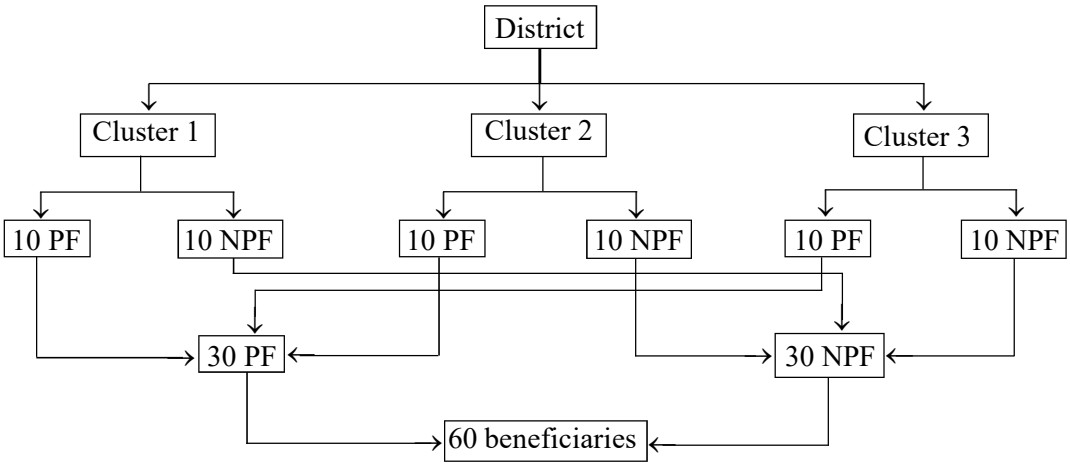

Fig 1: Sample beneficiaries for each year

TABLE 2

Extent of adoption of recommended package of practices of toria

Technology	Adoption (Before CFLD)	Adoption (After CFLD)	Change in no. of adaptors	Impact change (%)
Variety	0 (0.00)	45 (75.00)	45	45
Time of sowing	25 (41.66)	60 (100)	35	140
Seed rate	0 (0.00)	42 (70.00)	42	42
Seed treatment	0 (0.00)	50 (83.33)	50	50
Fertilizer management (INM)	22 (36.66)	45 (75.00)	45	204.54
Plant protection	28 (46.66)	38 (63.33)	10	35.72
Irrigation	30 (50.00)	40 (66.66)	10	33.33

(Figures in parenthesis indicate the percentage)

protection and irrigation also significantly increased from 36.66 to 75.00 per cent, 46.66 to 63.33 per cent and 50.00 to 66.66 per cent respectively.

Impact of Technology Interventions on Crop Yield

Table 3 indicates that the performance of average yield and percentage increase of toria under cluster frontline demonstration programme of KVK, Baksa during rabi 2016-17 to 2018-19. The yield of toria in the demonstrated plot was found to be 8.2q/ha, 8.5q/ha and 8.5q/ha whereas 5.8q/ha, 6.6q/ha and 6.5q/ha were obtained in the farmer's plot during the year 2016-17, 2017-18 and 2018-19, respectively which was 41.84, 28.8 and 30.8 per cent higher than the farmer's practices. On an average 8.4q/ha yields were recorded in the demonstrated plot compared

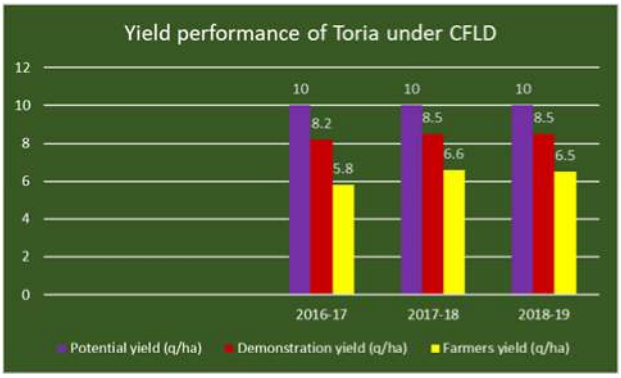

Fig. 1 : Yield performance of Toria under CFLD

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TABLE 3

Impact of technological intervention on crop yield

Year	Variety	Area (ha)	No of farmer	Yield (q/ha)		Potential yield (q/ha)	% Increase in yield
				Demonstration field	Farmers field		
2016-17	TS-38	20	60	8.2	5.8	10	41.84
2017-18	TS-36	20	60	8.5	6.6	10	28.80
2018-19	TS-46	20	60	8.5	6.5	10	30.80
Average		20	60	8.4	6.3	10	33.81

to 6.3q/ha in farmer's practices. Similar results were also reported by Sarma *et al.* (2020); Ahmed *et al* (2017); Dutta (2014) and Sharma *et al* (2014). Lower productivity/yield in the farmer's field might be due to lack of non-adoption of improved technology and the unavailability of high-yielding varieties. The Cluster Front Line Demonstration program in the Baksa district provides a positive significant role for enhancing the production and productivity of toria by using high-yielding varieties, proper time and method of sowing, following the appropriate seed rate and nutrient management practices with need-based plant protection measures.

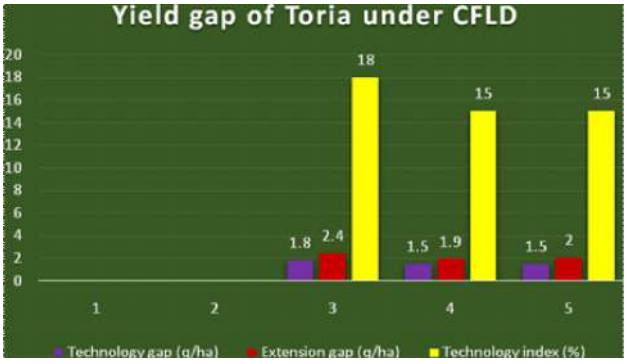

Fig. 2 : Yield gap of Toria under CFLD

Technology Gap : The technology gap is presented in Table 4 which indicates the gap between the potential yield and yield of the demonstrated plot. The average technology gap in toria was recorded as 1.6 q/ha. The results indicated that there was still a gap in technology demonstration in the study area due to which the farmers did not get the potential yield of toria. The differences in the technology gap may be due to different weather conditions, sowing time and different soil nutrient status of the district. The results conform with the findings of Lydia *et al*. (2020) and Deka *et al*. (2021).

Extension Gap : The extension gap indicates the difference between the demonstration yield and farmer's yield which was represented in Table 4. The average extension gap was found to be 2.1q/ha. The study clearly indicates that there is a gap between the demonstration and farmer's yield. These gaps may be due to a lack of awareness about improved technology of the crop, proper cultivation practices and management of the crop. The same results were also reported by Dhaliwal *et al.* (2018); Sandhu and Dhaliwal (2019). These gaps can be minimized by

TABLE 4

Yield gap of Toria under Cluster Front Line Demonstration

Year	Potential yield (q/ha)	Demonstration Yield (q/ha)	Farmers field yield (q/ha)	Technology gap (q/ha)	Extension gap (q/ha)	Technology index (%)
2016-17	10	8.2	5.8	1.8	2.4	18
2017-18	10	8.5	6.6	1.5	1.9	15
2018-19	10	8.5	6.5	1.5	2.0	15
Average	10	8.4	6.3	1.6	2.1	16

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using various awareness programs about technology and also use of the latest technology can minimize this extension gap and increase the productivity of the toria crop in the Baksa district of Assam.

Technology Index : In the present study, technology index data are given in Table 4 which defines the ratio between the technology gap and potential yield in terms of percentage. In the years 2016-17, 2017-18 and 2018-19 technology indexes were found 18, 15 and 15 per cent respectively with an average technology index of 16 per cent higher the technology index shows a lack of transfer of technology in the farming community/farmers field and lower the value of technology index was more the feasibility of the technology intervention (Jeengar *et al.*, 2006).

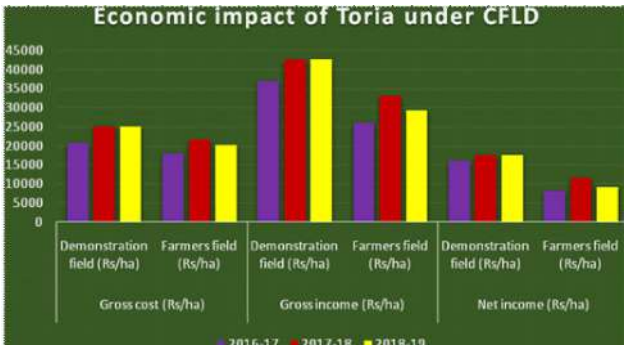

Fig 3. Economic impact of Toria under CFLD

Economic impact of Toria

The economics of the Cluster Frontline Demonstration Programme were calculated and the results are presented in Table 5. The results showed that the average cost of cultivation of toria during the study period from 2016-17 to 2018-19 in the demonstrated plot was found to be Rs.23,600/- as compared to Rs.19,917/ha in farmers plot. During the study period, the average gross income and net income were found to be increased in the demonstration plot recording Rs.40,633/ha and Rs.17,033/ha while it was recorded as Rs.29,450/ha and Rs.9,533/ha in the farmer's plot, respectively. While calculating the cost of cultivation and gross income, the input and output prices were taken into consideration. The average benefit-cost ratio was found to be 1:72 in the demonstrated field which was higher than the farmer's field (1:48). Similar findings were also reported by Mitra and Samajdar 2010; Balai *et al.* (2012); Raj *et al*. (2013); Jyothi *et al.* (2016); Chaudhary *et al.* (2018); Mokidue *et al.* (2011) and Anuratha *et al.* (2019). The present study reveals that the adoption of improved technology of CFLD was profitable and superior as compared to farmer's practices.

CFLD is an effective extension programme to attract the farmers towards scientific cultivation of toria in the Baksa. Use of a proper recommended package of practices of the crop may minimize the technology gap and extension gap which results in increased production and productivity of the toria crop in the district. The farmer's attitude towards the demonstrated technology was found to be positive. However, there exists a technological gap between demonstrated technology and farmer's practice which affect the crop yield. Lack of aware ness among the farmers and their socio-economic conditions might be the factors for such gaps. It needs various training and awareness programs by extension personnel to enhance the adoption of improved

TABLE 5

Economic impact of Toria crop

Year	Cost of cultivation (Rs/ha)		Gross income (Rs/ha)		Net income (Rs/ha)		B:C	
	Demonstration Field Rs/ha	Farmers field Rs/ha	Demonstration Field (Rs/ha)	Farmers field Rs/ha	Demonstration Field Rs/ha	Farmers field Rs/ha	Demonstration Field (Rs/ha)	Farmers field Rs/ha
2016-17	20800	18000	36900	26100	16100	8100	1.77	1.45
2017-18	25000	21500	42500	33000	17500	11500	1.70	1.56
2018-19	25000	20250	42500	29250	17500	9000	1.70	1.44
Average	23600	19917	40633	29450	17033	9533	1.72	1.48

technology among the farmers to reduce these gaps for better oilseed production in the district. Thus, Cluster Front Line Demonstration program plays a significant role in disseminating the technologies to the farming community which may help in increasing the production and productivity of toria and thereby enhancing farmer's income in the district.

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