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Effect on yield and profitability of Toria through cluster frontline demonstrations (CFLD) in Morigaon district

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Abstract

In Morigaon district of Assam, 431.25 demonstrations on High Yielding Variety (HYV) of toria TS-38 were conducted by Krishi Vigyan Kendra, Morigaon during 2017-18 to 2019-20. The study revealed that the yield of toria with HYV and improved production technology has been increased significantly as compared to local varieties cultivated by farmer. The demo yield was obtained in range from 9.5 to 11.5 q/ha whereas in farmers practice it was recorded from 5.5 to 8.4 q/ha. The percentage increase over farmer's practice was obtained from 53.33 to 72.73%. The average technology gap, extension gap and technology index were found to be 1.16 q/ha, 4 q/ha and 9.67% respectively. Introducing high yielding varieties with improved production technology, the yield of toria can be enhanced to a great extent with increased economic conditions of farming community.

Keywords: Toria, improved practice, extension gap, technology gap, technology index

Introduction

The major rapeseed mustard growing states in India are Rajasthan, Madhya Pradesh, Uttar Pradesh, Haryana, Punjab, West Bengal, Gujarat, Bihar and Assam occupies approximately 86.5% of total area which is 5.76 million hectare in the country and 91% of total production of 6.82 million tonnes. Among the nine oil seed crops grown in India. Rapeseed mustard contributes about one third of the oil to the country. This crops can be cultivated both rain fed as well as irrigated condition and fetches higher market value, thus add to the rural economy specially to marginal and small farmers. Toria is one of the most important rabi oilseed crop grown in Assam. Being flood affected, huge areas of Morigaon district remains fallow during the Sali season and the farmers mostly prefer toria as a short duration crop before going for cultivation of boro paddy.

The production and productivity of local variety is comparatively low due to lack of irrigation facility, but this variety is still existing due to its distinguished character of growing in rainfed condition. TS -38 is newly developed variety of toria with high yield potential and high oil content as compared to other local varieties of toria available in the district. Realizing the importance of high yielding varieties, cluster frontline demonstration was conducted in different locations of Morigaon district starting from 2015-16 with improved production technology. To enhance the production and productivity, Krishi Vigan Kendra Morigaon have conducted cluster frontline demonstration (CFLDs) under National Mission on Oilseed and Oil palm (NMOOP) funded by government of India. The front-line demonstration (FLD) is an important method of transferring the latest package of practices in totality to farmers. Total 431.25 nos of Cluster Frontline demonstrations were conducted on farmer's field to demonstrate the impact of improved variety of Rape seed for over three years during Rabi 2017-18 to 2019-20.

Further, these demonstrations are designed carefully where provisions are made for speedy dissemination of demonstrated technology among farming community through organization of other supportive extension activities, such as field days, trainings and group discussion.

Materials and Methods

Krishi Vigyan Kendra Morigaon conducted cluster frontline demonstrations of toria in different operational areas of the district, to disseminate the improved production technology and high yielding varieties of toria.

From 2017-18 to 2019-20, a total of 431.25 no of demonstrations were conducted involving 591 farmers and covering 230 ha area in rabi season. Each demonstration was conducted on an area of 0.4 ha, and an area adjacent to the demonstration plot was kept as farmers' practices. The package of improved technologies like required seed rate, nutrient management, seed treatment were used in the demonstrations. Before conducting the demonstrations, training and method demonstrations of seed treatment with PSB and Azotobacter were imparted to the selected farmers. The sowing was done from mid-October to mid-November in broadcasting manner. Data were collected from both the improved and farmers practices and analyzed for cost of

cultivation, net income, benefit cost ratio etc. the technology gap, extension gap and technology index were calculated by using the formula as given below

Technology gap = Potential yield (kg/ha) – Demonstration Yield (kg/ha)

Extension gap = Demonstration Yield (kg/ha) – Farmer's yield (kg/ha)

Technology index = {(Potential yield – Demonstration yield)/ Potential yield} x 100

Table 1: Cultivation practices followed for improved practices and farmers practices under CFLD

Particulars	Improved practices (IP)	Farmers Practice (FP)
Variety	TS-38	Local
Seed Rate	7.5 kg/ha	15-20 kg/ha
Seed treatment	PSB @ 50 gm/kg seed and Azotobacter @ 50 gm/kg seed	Nil
Land preparation	4-5 ploughings (Depending on soil type) to obtain a good tilth	2-3 ploughings
Time of sowing	Mid October to Mid-November	October to December
Fertilizer application	Organic cultivation with vermicompost	Imbalanced use of chemical fertilizers
Micronutrient	Borax @ 7.5 kg/ha	Nil
Plant protection	Need based application	Nil

Results and Discussion

Yield: The average yield of toria variety TS-38 were found 11.5, 11.5 and 9.5 q/ha during the year 2017-18 to 2019-20 respectively, however under farmer's practice the average yield was 7.5, 7.5 and 5.5 q/ha during respective years. The percentage increase in yield over control was found 53.33, 60.00 and 72.73 during the year 2017-18 to 2019-20 respectively. The result is in conformity with the findings of Tiwari *et al.* (2001) [13], Raj *et al.* (2013) [11] and Lydia *et al.* (2020) [8].

The Cluster Frontline Demonstrations (CFLD) has given a

good impact over the farming community of Morigaon district of Assam. The high yielding variety of toria TS-38 has enhanced the productivity of toria as compared to other local varieties as well as has increased the income of the farmers. In subsequent years it was observed that farmers are using their own saved seeds for the next year also, farmer to farmer seed exchange was observed within the village and outside through nearby farmers, relatives and friends. This finding was also in corroboration with the findings of Poonia *et al.* (2010) [10] and Lydia Z *et al.* (2020) [8].

Table 2: Productivity, technology gap, extension gap and technology index of toria variety TS-38 under CFLD N=30

Year	Area (ha)	Seed yield (q/ha)			% increase over control	Tech. Gap (q/ha)	Extension gap (q/ha)	Tech. Index (%)
		Potential	Demo	Control				
2017-18	30	12	11.5	7.5	53.33	0.5	4	4.1
2018-19	50	12	11.5	7.5	53.33	0.5	4	4.1
2019-20	150	12	9.5	5.5	72.73	2.5	4	20.83

Yield gap: The yield gap is the difference between the farmers potential yield and its current yield. In the present study the yield gap was categorized into technological and extension gap. From the data (Table 2) it was observed that the technology gap ranges from 0.5 to 2.5 q/ha. The above data implies that the farmers obtained yield almost at par with its potential yield and it may be attributed due to soil fertility status, timely sowing, weather condition and improved management of the crop. The result indicates the positive impact of introducing high yielding varieties in the locality.

Extension Gap: The extension gap was 4 q/ha during the period of study indicates the lack of knowledge in appropriate time of sowing, soil fertility management, and improved production technology on cultivation of toria. Similar findings were observed by Karate *et al.* (2011) in oilseeds and Saikia *et al.* (2018) [12] and Jha *et al.* (2020) [6] in black gram and Bezbaruah *et al.* (2020) [2] in green gram. Need based extension literatures, trainings, workshop and advisories from extension specialists may be required to mitigate the extension gap of the farming community.



Technology index: From the data (Table 2), the technology index ranges from 4.1 to 20.83 %. The lower value of technology index means the more feasibility of the technology (Jeengar *et al.* 2006) [5]. From the present study it was revealed that introduction of high yielding toria variety TS-38 has a great impact over the farming community in terms of enhancement in productivity and economic conditions of the farmers in the district.

Economic return: The input and output prices of commodities prevailed during the study of demonstrations were taken for calculating the gross return, cost of cultivation, net return and benefit: cost ratio (Table 2). The cost of cultivation, gross return, net return and benefit: cost ratio was calculated considering the input and output costs of the commodities in their respective years. Cultivation of toria under improved technologies gave higher returns of Rs 45800.00, 43500.00 and 36100.00 per ha during 2017-18 to 2019-20 respectively. The benefit cost ratio was 1.72, 2.09

and 1.29 from 2017-18 to 2019-20 respectively. This may be due to higher yield obtained under improved technologies compared to farmers practice. The superiority of recommended package of practices under frontline demonstration over farmers’ practice was also reported by Mitra *et al.* (2010) [9], Balai *et al.* (2012) [1], Raj *et al.* (2013) [11], Jyothi *et al.* (2016) [4] and Chaudhary *et al.* (2018) [3].

Table 3: Gross return (Rs/ha), Gross cost (Rs/ha), Net return (RS/ha) and B:C Ratio of HYV toria TS-38 under CFLD

Year	Area	No of Demo/Farmer	Results		GC	GR	NR	B:C
			Demo (q/ha)	Check (q/ha)				
2017-18	30	30	11.5	7.5	26600	45800	19200	1.72
2018-19	50	30	11.5	7.5	20750	43500	22750	2.09
2019-20	150	30	9.5	5.5	27835	36100	8265	1.29

Conclusion

This study on Effect of Cluster Frontline Demonstration on Production, Profitability, and social impact on mustard cultivation was conducted to assess the average status of rapeseed production in Morigaon district of Assam, average cost of cultivation, net return, benefit cost ratio, challenges faced by mustard farmer and to suggest agronomical and technical measures for higher oilseed production. The main issue reported by the toria growers was non recommended varieties for the area and poor quality of seed. Rapeseed is important commercial oilseed crop in flood dominated Morigaon district, therefore its cultivation needs to be enhanced. From the findings it can be concluded that introduction of high yielding variety and improved production technology can reduce the technology gap resulting in increased productivity of toria as well as higher income of the farmers in the district. Awareness and knowledge on high yielding varieties among farmers can reduce the technology and extension gap of the farmers. Therefore, there is a need to provide proper technical support and guidance from appropriate source for better production and upliftment of the farming community of the district. The frontline demonstrations on toria conducted at Morigaon district of Assam during 2017-18 to 2019-20 at the farmers' field revealed that the adoption of improved technologies significantly increased the yield of the crop and also the net returns to the farmers. There was 51.11 per cent increase in yield observed in demonstrated plot over farmers plot (Table 2). Lydia Z *et al.* (2020)^[8] also reported 42.58 cent increased yield in demonstration plot over farmer's practice. Toria variety TS -38 released by Assam Agricultural University has been recommended in all India level during the year November 2021. There is a need to further disseminate these improved technologies among the farmers with effective extension methods like training, farmers conventions, field days and demonstrations. The farmers should be encouraged to adopt the recommended package of practices for realizing higher returns.

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