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Yield Gap Analysis of Rapeseed (*Brassica campestris var. Toria*) in Kokrajhar District of Assam, India

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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

The present study was carried out at five different villages of Kokrajhar district of Assam where cluster front line demonstration (CFLD) of High Yielding Variety (HYV) of rape seed (TS 46) was conducted by Krishi Vigyan Kendra, Kokrajhar. A total of 652 nos. of front line demonstration (FLD)s were evaluated to find out the yield gaps between HYV toria variety TS 46 and variety grown by farmers. Yield data of both demonstration and farmers practice were recorded and their yield gap, technology gap, extension gap and technology index were analyzed. The yield of rape seed variety TS 46 was registered 22.38 to 50.00 per cent higher over farmer's variety. On an average technology gap, extension gap and technology index were recorded as 2.28qha^{-1}, 2.08 qha^{-1} and 20.73 per cent respectively.

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Keywords: Cluster frontline demonstration; extension gap; technology gap; technology index yield gap.

1. INTRODUCTION

India is the fourth largest oilseed economy in the world. Rapeseed and mustard is the second most important edible oilseed after ground nut sharing 27.8 per cent in India's oil seed economy. In terms of acreage, oilseeds occupy 14.1 per cent and rape seed- mustard alone occupies 3 per cent of the total cropped area in the country (Shekhawat et. al., 2013). Rapeseed is one of the important rabi oilseed crops throughout India. In Assam, rapeseed- mustard cultivated on an area of 3.12 lakh hectares with annual production and productivity of 2.09 lakh tones and 670 kgha^{-1}respectively (NFSM, Govt. of Assam 2017-18) which is very low as compared to national average productivity due to non adoption of improved production technology and improved HYV of rapeseed.

Kokrajhar district of Assam has a sizeable area under rapeseed-mustard cultivation occupying area and production 0.26 lakh ha and 0.18 lakh tones, respectively [1].

However, with the available improved technologies, it is possible to bridge the yield gap and increase the productivity up to the potential level (12.0 qha^{-1}).The reasons for low productivity are poor knowledge about newly released varieties crop production and protection technologies and their management. To meet the oilseeds demand, the Ministry of Agriculture and Farmers' Welfare, Govt. of India had initiated a nationwide cluster frontline demonstration (CFLD) programme on oilseed under National Mission on Oilseed and Oil palm (NMOOP). The main aim of the mission is to increase the area and production of oilseed crops and also to improve the availability of quality and efficient planting materials of oilseed crops. In this context, KVK (KVK), Kokrajhar, Assam has conducted CFLD programme on rapeseed using HYV TS-46 developed by Assam Agricultural University. The improved variety of rapeseed having crop duration of 90 days with a oil content of 44%. Keeping the above points in view, the present study was undertaken to find out the effects of FLDs on bridging the yield gap in terms of technology gap, extension gap and technology index.

2. METHODOLOGY

The study was undertaken by Krishi Vigyan Kendra (KVK), Kokrajhar during *rabi* seasons from 2015-16 to 2019-20 in different villages of Kokrajhar district using rapeseed variety TS-46. A total area of 290 ha was covered involving 727 farmers during these five years of study. Farmers were trained by KVK faculty to adopt the improved package and practices for the cultivation of rapeseed. Use of improved rapeseed variety TS-46, timely sowing, weeding, irrigation, application of recommended doses of fertilizers in all the demonstration plots were performed. A comparison between CFLD practices and farmer's practice has been done (Table 1). Before conducting the demonstrations, the list of farmers was prepared from group meeting and specific skill training was conducted for those selected farmers. The data was collected from both CFLD plots as well as farmers practice plots and their technology gap, extension gap and technology index were calculated by using the formula [2] as stated below:

1. Technology gap= Potential yield - Demonstration yield
2. Extension gap= Demonstration yield – Farmer's yield

3. Technology index= $\frac{\text{Potential yield} - \text{Demonstration yield}}{\text{Potential yield}}$

3. RESULTS AND DISCUSSION

Results of CFLDs conducted during 2015-16 to 2019-20 in different villages of Kokrajhar district indicated that the improved cultivation practices under CFLD (Table-1) *i.e.* improved rapeseed variety TS-46, timely sowing, weeding, irrigation, application of recommended doses of fertilizers record higher grain yield as compared to farmers practice during the five years of cultivation (Table-3). The highest yield of rapeseed (9.0 qha^{-1}) in demonstration plot was recorded in the year 2017-18 & 2018-19 and lowest yield (8.2 qha^{-1}) was recorded in 2015-16 (Table 3). The yield of rapeseed in the CFLD plots during five years varies from 8.2 to 9.0 qha^{-1} which was 22.39 to 50.00 per cent higher over the farmers practice. The higher yield in demonstration plot might be due to use of the improved variety and application of recommended doses of fertilizers. Application of recommended doses of fertilizers increased the availability of nutrients specially nitrogen, phosphorus and potassium resulting

Table 1. Comparison between demonstration practices and farmer's practices

Particulars	Demonstration practices	Farmer's practices
Farming situation	Rainfed medium land	Rainfed medium land
Variety	TS-46	Local
Time of sowing	Mid Oct to Mid Nov	Last week of Nov to 1st week of Dec
Method of sowing	Line sowing	Broadcasting
Seed rate	10 $kgha^{-1}$	12 $kgha^{-1}$
Fertilizer's dose (NPK)	60:40:40 NPK $kgha^{-1}$	FYM and lower rate of NPK
Borax	10 $kgha^{-1}$	Nil
Plant protection	Need based application	Nil
Interculture operation	Weeding at 15-20 DAS	Nil

Table 2. Average yield parameters under CFLDs and existing farmer's package of practices

Yield parameters	CFLD	FP
Plant height (cm)	118.5	104.5
No. of branches per plant	9	7
No. of silique per plant	109	94.64
No. of seeds per siliqua	14	12
Test weight (g)	2.13	2.00

Table 3. Productivity, technology gap, extension gap, technology index and benefit-cost ratio of Rapeseed grown under CFLDs and existing farmer's package of practices

Year	Area (ha)	No. of farmers	No. of demo.	Seed Yield (qha^{-1})			% increase over control	Tech gap (qha^{-1})	Ext. gap (qha^{-1})	Tech. index (%)	B:C ratio	
				P	D	FP					D	FP
2015-16	30	75	75	11	8.2	6.7	22.39	2.8	1.5	25.45	**2.67**	**1.45**
2016-17	30	75	75	11	8.5	6.8	25.00	2.5	1.7	22.73	3.25	1.34
2017-18	50	125	125	11	9.0	7.2	25.00	2.0	1.8	18.18	1.79	1.50
2018-19	30	77	77	11	9.0	6	50.00	2.0	3.0	18.18	2.36	1.75
2019-20	150	375	375	11	8.9	6.5	36.92	2.1	2.4	19.09	1.69	1.24
Total	290	727	727		--	-	-	-	-	-	-	-
Mean				**11**	**8.7**	**6.6**	**31.82**	**2.3**	**2.1**	**20.91**	**2.35**	**1.46**

**FP: farmer's Practice, *D: Demonstration, *P: Potential*

better uptake of nutrients from the soil leading to proper growth of the rapeseed crops. Similar results were also reported by Deka et al. [3] and Kumar and Singh [4]. Low yield found in farmers practice plot might be due to lower level of management practices along with non availability of resources at proper time [5].

The results clearly indicate the positive effects of CFLDs over the farmer's practices towards increasing the yield of rapeseed (Table-3) along with the higher yield attributes (Table 2). The average technology gap was recorded 2.3 qha^{-1} during the five years of study. The extension gap ranging between 1.5 to 3.0 qha^{-1}during the cultivation period which emphasizes the need to educate the farmers to adopt the improve variety and cultivation practices to reduce the extension gap. The technology index (ranges from 18.18 to 25.45 qha^{-1}) reflects the farmers' co-operation in carrying out such production technology with encouraging results in subsequent years. Similar results were also observed by Katare et al. [6] and Sharma and Sharma [7]. The technology index showed feasibility of evolved production technology of rapeseed at farmer's fields. Lower the technology index higher the feasibility of technology to the field. The benefit cost ratio was also found highest under CFLD plots than the farmer's practice plot (Table-3). Hence, higher benefit cost ratios proved the economic viability of the cultivation practices and convinced the farmers to adopt the cultivation practices of new variety of rapeseed.

4. CONCLUSION

From the present study, it is concluded that the technology gap can be reduced to a considerable extent by adoption of improved production technology of rapeseed cultivation thus leading to increase productivity of rapeseed in Kokrajhar

district of Assam. Krishi Vigyan Kendra, Kokrajhar also provide proper technical support through different extension and educational method to reduce the extension gap between the demonstration and farmer's practice for higher production of rapeseed in Kokrajhar district. Horizontal expansion of improved production technologies of rapeseed may also be achieved by implementation of various extension activities like training programme, field day, method demonstration *etc.* organized under CFLD programmes in the farmer's fields. Moreover, Krishi Vigyan Kendra should motivate the local people to adopt the improved production technology along with improved varieties to reduce the extension gap.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Anonymous. Statistical handbook Assam, Directorate of Economics and Statistics, Government of Assam. 2018;71.
2. Samui SK, Maitra S, Roy DK, Mandal AK, Saha D. Evaluation of front line demonstration on groundnut. J Indian Soc. Coastal Agri. Res. 2000;18(2):180-183.
3. Deka P, Pathak K, Sarma A, Medhi BK, Dutta PK, Saikia M. Productivity and economics of late sown rapeseed (*Brassica campestris var.* Toria) after winter rice under varying irrigation and nutrient levels. J. Oilseed Brassica. 2018;9(1):195-200.
4. Kumar A, Singh BP. Effect of row ratio and phosphorus levels on performance of chickpea (*Cicer arietinum*) – Indian mustard (*B. juncea*) intercropping. Indian J Agron. 2006;51:100-102.
5. Ahmed P, Nath RK, Sarmah AC, Deka PC. Yield gap analysis of Toria (*Brassica campestris*) in Tinsukia district of Assam. Indian Res. J. Ext. Edu. 2017;17(3):44-46.
6. Katare S, Pandey SK, Mustaafa M. Yield gap analysis of Rapeseed-mustard through front line demonstrations. Agric. Update. 2011;6:5-7.
7. Sharma RN, Sharma KC. Evaluation of Front Line Demonstration trials on oilseeds in Baran district of Rajasthan. Madhya J Exten. Edu. 2004;7:72-75.

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