Original Research Article

Impact of Cluster Front Line Demonstration on Productivity and Yield Gap of Lentil in Kokrajhar District of Assam

ABSTRACT:

The Cluster Frontline Demonstration (CFLD) on lentil var.WBL-77 was conducted by Krishi Vigyan Kendra, Kokrajhar to find out the grain yield, technological gap, extension gap, and economics during 2020-21 and 2021-22. In both the year, lentil variety WBL-77 was used in the demonstration plot and considering local variety as check in the farmer's plot. The result of the study revealed that the yield of lentil was found to be 10.0 q/ha and 9.50 q/ha, respectively under the demonstration plot as compared to 7.0 q/ha and 6.50 q/ha, respectively under the farmer's plot and the yield increased by 42.85 and 46.15 percent, respectively during the year, 2020-21 & 2021-22. The technology gap, extension gap and technology index were found to be 2.0 q/ha & 2.5 q/ha, 3.0 q/ha & 3.0 q/ha, 16.6 % & 20.83%, respectively during 2020-21 & 2021-22. The net return (Rs. 31314.00 /ha & Rs.34074.00 /ha, respectively during 2020-21 & 2021-22) and BC ratio (2.59 & 2.87, respectively during 2020-21 & 2021-22) were found to be highest under demonstration plot in both the years. The results depict that the seed yield of lentil in the Kokrajhar district could be enhanced by using lentil var. WBL-77 over local variety and CFLD could be an effective tool to minimize yield gaps.

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Key words: Lentil, Cluster Frontline Demonstration, Yield, B-C ratio

INTRODUCTION:

Pulses are good sources of proteins, vitamins & minerals, a second important constituent of the Indian diet therefore; it plays an important role in the nutritional security of India. Besides, being legumes they can fix atmospheric nitrogen, maintains soil sustainability, nutritious animal fodder, act as mulch and check soil erosion. In Assam, pulses are grown in an area of 146.4 thousand hectares with a production of 107.5 thousand tons and productivity of 735.0 kg/ha (Barman, 2020). Lentil is an important pulse crop. In Assam, production of most of the pulse crops is less than the requirement except for blackgram and pea & also the present production can meet only 20% of the present requirement therefore, it is very important to grow *rabi* pulse like lentil after harvesting of paddy to reduce the gap between demand and supply. There could be various reasons for the low productivity of lentil in the state like the use of local varieties, imbalanced use of fertilizer, delayed sowing, no proper crop management, etc. which can be overcome by following recommended package of practices and the use of improved technologies. CFLD could be a bridge between extension specialists and farmers to overcome the

yield gaps. Cluster Frontl ~~l~~line Dd~~d~~emonstration is conducted by KVK under the supervision of scientists to demonstrate the production potentiality of location-specific newly released technologies with proper crop management practices in farmer's fields and disseminates the technologies among farmers which could increase the yield of crops in the respective district. Hence, CFLD on lentil variety~~.~~ WBL-77 was conducted in Kokrajhar district to increase the productivity of lentil and reduce the extension and technology gap.

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MATERIALS AND METHODS~~:~~

The Cluster F~~f~~ront~~–~~line Dd~~d~~emonstration ~~(CFLD)~~ on lentil (var. WBL-77) was conducted by Krishi Vigyan Kendra, Kokrajhar during *rabi* seasons of two consecutive years, *i.e*. 2020-21 and 2021-22. In this programme 22 demonstrations in 10 ha and 23 demonstrations in 10 ha were carried out during 2020-21 and 2021-22, respectively where, the number of demonstrations was equal to the number of farmers. In CFLD, the recommended package of practices is adopted and inputs are provided by the KVK and the adjoining farmer's field is treated as a check or farmer's practice. The brief about the technologies adopted in the farmer's field is given in Table 1. After harvesting the crop the data were collected from both the demonstration and farmer's plot, analyzed and the cost of cultivation, net income, and benefit-cost ratio were calculated. The extension gap, technology gap, and technology index were calculated by using the formulas given by Kadian et al. (1997) and Samui et al. (2000).

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1. Technology g~~G~~ap = Potential yield – Average d~~D~~emo y~~Y~~ield
2. Extension g~~G~~ap = Average d~~D~~emo y~~Y~~ield – Average f~~F~~armer's p~~P~~ractice y~~Y~~ield
3. Technology i~~I~~ndex = {(Potential yield – Average d~~D~~emo y~~Y~~ield) X 100}/ Potential yield

Table 1: Package of practices followed in demonstration and farmers plot under CFLD on lentil ~~in Kokrajhar district of Assam~~

Particulars	Demonstration plot	Farmer's plot
Variety	WBL-77	Local
Seed rate	30 kg/ha	38-40 kg/ha
Seed treatment	Seed treatment with *Rhizobium* culture @ 50 g/kg of seeds & PSB @ 50 g/kg of seeds	No seed treatment
Fertilizer dose	Balanced fertilizer dose N:P2O5:K2O @ 10:35:15 Kg/ha	Imbalance use of fertilizer
Method of sowing	Line sowing	Broadcasting
Spacing	25 cm x 5-7 cm	-
Plant protection	Need based application	Nil

RESULTS AND DISCUSSION:

Table 2. Productivity, Technology gap, Extension gap and Technology index of CFLD on Lentil

Year	Area (ha)	No. of farmers	Seed yield (q/ha)			% increase over control/farmers practice	Technology gap (q/ha)	Extension gap (q/ha)	Technology index (%)
			Potential	Demonstration	Control				
2020-21	10	22	12	10.00	7.00	42.85	2.0	3.0	16.60
2021-22	10	23	12	9.50	6.50	46.15	2.5	3.0	20.83

Yield:

The data (Table 2) depicted that the average seed yield of lentil was found to be 10.0 q/ha and 9.5 q/ha during 2020-21 & 2021-22, respectively under demonstrated plot whereas, under the farmer's plot the seed yield was 7.0 q/ha and 6.5 q/ha during respective years. This resulted in 42.85 and 46.15 percentage increases in seed yield during 2020-21 & 2021-22, respectively as compared to the farmer's plot. The increase in yield could be due to integrated crop management approaches like optimum seed rate and spacing which maintains optimum plant population and reduces the competition for space, sunlight, nutrition and moisture. Secondly, seed treatment with Rhizobium/ PSB increases root nodulation to fix atmospheric nitrogen & PSB improves the phosphorus uptake from soil. Thirdly, need-based plant protection protects against disease and pests and finally increases the yield attributing characters. This indicated that the productivity of lentil in the Kokrajhar district could be enhanced by creating awareness among farmers and adopting the improved technologies. The findings conform with the findings of Singa et al. (2020) and Reja et al. (2017).

Technology gap, extension gap and technology index:

The technology gap (Table 2) was found to be 2.0 q/ha & 2.5 q/ha during 2020-21 and 2021-22, respectively. This could be due to variation in soil fertility, weather conditions etc. The data depicted that the extension gap of 3.0 q/ha was observed in both years. This emphasizes the need to get farmers to be aware ~~farmers~~ of the improved agricultural techniques to enhance production and mitigate the extension gap. The technology index was found to be 16.60 and 20.83 percent during the years, respectively. The technology index indicates the viability or feasibility of the improved technology in the farmer's field. The lower the value of the technology index indicates

greater technology feasibility. It shows the efficacy of good performance of technologies demonstrated in the farmer's field. The results are similar to the findings of CFLD on pulses by Singha et al. (2020) and FLD on lentil (var. WBL-77) by Mandal et al. (2017).

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Economics~~:~~

Table 3: Total cost and return of lentil production

Year	Gross cost (Rs./ha)		Gross return (Rs./ha)		Net return (Rs./ha)		B:C	
	Demonstration	Farmer's Practice	Demonstration	Farmer's Practice	Demonstration	Farmer's Practice	Demonstration	Farmer's Practice
2020-21	19686	19466	51000	35700	31314	16234	2.59	1.83
2021-22	18176	16000	52250	35750	34074	19750	2.87	2.23

The data of economic analysis of lentil production revealed that the net return (Rs. 31314.0/ha in 2020-21 and Rs. 34074.0/ha in 2021-22) and benefit-cost ratio (2.59 in 2020-21 and 2.87 in 2021-22) were found higher under demonstration plot as compared to farmers plot. This could be due to higher yield obtained under demonstration plot as compared to farmer's practice. In this study, a higher benefit-cost ratio under the demonstration plot indicates that the farm income can be enhanced by cultivating lentil variety WBL-77 with improved technologies; which uplift the livelihood of the farming community. The results were conformed with the findings of FLD on lentil (var. WBL-77) by Mandal *et al*. (2017).

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CONCLUSION AND RECOMMENDATION~~:~~

The CFLD conducted on lentil revealed that the lentil variety WBL-77 gave a higher yield and net return under the recommended package of practices in the demonstration plot as compared to the local variety in the farmer's plot (check) which implies that the productivity of lentil could be enhanced by adopting improved technologies and proper crop management practices. Moreover, scientists or extension specialists should play a vital role in getting farmers to be aware ~~the farmers~~ of the innovations by showing the technologies at the forefront under the umbrella of CFLD. Hence, CFLD could be an effective way to mitigate the yield gap and makes the country self-sufficient.

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