

**Economic Analysis of Performance of Cluster Front Line Demonstrations  
on Lentil in Golaghat District of Assam**

**Horindra Gogoi<sup>\*</sup>, Arunima Bharali<sup>\*\*</sup>, Rekhashree Kalita<sup>#</sup>, Sangita Mahanta<sup>##</sup>, Sukriti Hazarika<sup>\*\*</sup>, R.C.Neog<sup>\*\*\*</sup>, F.U.A. Ahmed<sup>\*\*\*\*</sup>, Bhairab Gogoi<sup>\*\*</sup> and T.Saikia<sup>###</sup>**

---

**ABSTRACT**

The study on performance of cluster front line demonstrations on lentil was conducted under the National Food Security Mission (NFSM) in Golaghat District, Assam, where the traditional varieties of lentil with low productivity were cultivated by the farmers. A total of 275 nos. of demonstrations in 110 ha of land area were conducted in cluster basis during the period of 2015-16 to 2017-18 by using improved varieties viz., L-9, Moitree and KLS-218. The analysis revealed that average yield of the improved varieties (8.37 q/ha) was found to be higher as compared to the farmers local variety (6.25q/ha) with an incremental increase of 33.96 per cent. The demonstration of improved varieties resulted in higher average net return by 84.25 per cent as against the check variety. The overall B: C ratio was also observed to be higher in demonstrations (2.29) than the farmers' practice/check variety (1.78). Technology gap, extension gap, technology index and yield gap-II(%) were reported highest in the variety KLS-218 and lowest in the variety L-9.

*\*Assistant Professor, Department of Agricultural Economics & Farm Management, Assam Agricultural University, Jorhat-13*

*\*\* Subject Matter Specialist, Krishi Vigyan Kendra, Golaghat (Assam)*

*\*\*\* Farm Manager, Krishi Vigyan Kendra, Golaghat (Assam)*

*\*\*\*\* Senior Scientist and Head, Krishi Vigyan Kendra, Golaghat (Assam)*

*# Assistant Professor, Department of Agronomy, Biswanath College of Agriculture, Biswanath Chariali (Assam)*

*## Assistant Professor, Department of Horticulture, Assam Agricultural University, Jorhat-13*

*### Subject Matter Specialist, Krishi Vigyan Kendra, Sivasagar (Assam)*

## Introduction

Pulses are important elements of cropping systems in India for their importance as a source of protein and ability to improve soil fertility by fixing the atmospheric nitrogen (N) (Joshi, 1998). Pulses are an effective source of reversing the process and can contribute significantly to achieving the twin objectives of increasing productivity and improving the sustainability of the rice and wheat- based cropping system in the IGP (Ahlawat *et al.*, 1983; Lauren *et al.*, 1984; Yadav *et al.*, 1985). In water-deficit and resource-poor conditions, there is a scope of increasing area under lentil during the *Rabi* season, as its cost per hectare is less with higher net returns than the competing crops like wheat, gram and mustard .It is reported that lentil-based cropping systems are profitable and also have high water productivity, and are suitable for mostly un-exploited rice-fallows under water-deficit conditions (Reddy and Reddy, 2010).

Front line demonstration (FLD) is one of the most powerful tools of extension as the objective of Front-Line Demonstrations is to demonstrate newly released crop production and crop protection technologies and its management practices in the farmers' field under different agro-climatic regions and farming situations (Sharma *et. al.* 2011).

Krishi Vigyan Kendra, Golaghat (KVK, Golaghat) under the umbrella of Assam Agricultural University, Jorhat has been demonstrating various technologies for the transfer of technologies among farming community since its inception in 1995. During 2015-16 to 2017-18, KVK, Golaghat has under taken demonstration of different pulses crop as a part of National Food Security Mission (NFSM) in selected pockets where local varieties had been grown with traditional practices . Though the soil and climatic condition of Golaghat district is suitable for cultivation of lentil, the crop was not so popular among the farmers in the district. Only small section of resource poor farmers of the district cultivated lentil with traditional practices till the intervention by the KVK, Golaghat. KVK, Golaghat intervened for bringing a shift in improvement in productivity of lentil as well as other pulses through Front line Demonstration (FLD) and Cluster Front line Demonstration (CFLD) with recent technologies viz., promising varieties like Moitree, KLS -218, L-9; Nutrient Management (Vermicompost) @ 1 t/ha, and seed inoculation of *Rhizobium* @ 50 gm/kg of seed and recommended doses of fertilizers: Urea and SSP @ 22kg/ha and 220 kg/ha ( Farmers' Share) respectively. The in-depth study on the performance of cluster frontline demonstrations in

terms of yield and economic parameters was needed for further implementation of the programme for effective results. In this context, the present study was undertaken with the following specific objectives:

1. To assess the yield performance of cluster frontline demonstrations and adoption of technology (varieties).
2. To examine the economic performance and impact of cluster frontline demonstrations.
3. To estimate the technology gap ,extension gap and technology index of cluster front line demonstrations

### **Research Methods**

Krishi Vigyan Kendra, Golaghat, Assam (INDIA) conducted 275 nos. of Cluster Front Line Demonstrations (CFLD) on lentil at farmers' field in different blocks of Golaghat district during 2015-16, 2016- 17 and 2017-18. Farmers were identified and selected by conducting survey as well as the discussion with the District Agriculture Department ,Golaghat .The required critical inputs viz. seeds , bio-fertilizer and vermicompost were provided to selected farmers by the KVK to beneficiary farmers. Various trainings were conducted by the KVK, Golaghat among the beneficiary farmers for improvement of their knowledge and skills on scientific cultivation practices, integrated nutrient management and integrated pest and disease management of lentil. Guidance was also provided to the beneficiary farmers through regular visits and monitoring by the KVK Scientists. Field days and group meetings were also organized to provide the opportunities for other farmers to witness the benefits of demonstrated technologies. The data relating to different parameters were collected from both CFLD farmers as well as control plots (farmers practice).Cost of cultivation, gross income, net income, and benefit cost ratios of both cluster demonstrations and farmers practice were worked out for comparing the performance. The technology gap, extension gap and technological index were calculated by using the formula (Samui *et. al.*, 2000) as given below.

(i)Technology gap = Potential yield - Demonstrated yield

(ii)Extension gap = Demonstrated yield - Yield under existing practice

(iii)Technology index (Yield Gap- I) = 
$$\frac{\text{Potential yield} - \text{Demonstrated yield}}{\text{Potential yield}} \times 100$$

Demonstrated yield - Check yield

$$(iv) \text{Yield Gap- II (\%)} = \frac{\text{-----}}{\text{Demonstrated yield}} \times 100$$

## **Results and Analysis**

The findings of the study are presented under the following heads.

### **Comparative yield performance of the cluster frontline demonstrations and adoption of varieties:**

Krishi Vigyan Kendra, Golaghat conducted 275 nos. of Cluster Front Line Demonstrations (CFLD) on Lentil at farmer's field in different blocks of Golaghat district during 2015-16, 2016- 17 and 2017-18 covering a total area of 110 ha under the central government sponsored flagship programme NFSM (Pulse). **Table 1** represents the comparative performance of the cluster frontline demonstrations and adoption of the varieties. The result of the study reveals that the average yield of demonstrations (8.37 q/ha) of all the varieties were found higher compared to the farmers local variety (6.25q/ha). However the demonstration yield was still found to be lower than the potential yield of the respective varieties.

The average yield of different varieties under demonstration over local check was observed to be 9.09 per cent 32.15 per cent and 40.33 per cent higher for the varieties L-9, Moitree and KLS-218 respectively with an overall increase of 33.96 percent. The relatively higher yield of in the demonstrations was due to adoption of scientific cultivation practices by the beneficiary farmers promoted through Cluster Frontline Demonstrations by the KVK scientists. Similar yield enhancement in different crops in front line demonstration was reported by Mishra *et.al* (2009) and Dhaka *et.al* ( 2010). Moreover, due to these demonstrations, the lentil crop particularly the demonstrated varieties were adopted in additional 74 ha of land area in addition to normal cultivated area of lentil during 2015-16 to 2017-18.

**Table 1: Comparative Yield Performance of Cluster Frontline Demonstration and Adoption of Varieties**

Year	Variety	Nos. of Demonstration	Area (ha)	Average Yield (Q/ha)			% increase in Average yield over Check	Additional Horizontal Expansion of area(in ha)
				Potential	Demo	Check (local variety)		
2015-16	L-9	25	10	10.18	6.00	5.5	9.09	-
2016-17	Moitree	125	50	11.35	8.59	6.5	32.15	15.00
2017-18	KLS-218	125	50	14.00	8.63	6.15	40.33	59.00
Total	-	275	110	-	8.37	6.25	33.96	74.00

**Economic performance and impact of cluster front line demonstrations (CFLD):**

The economic performance and impact of the Cluster Frontline Demonstrations is presented in the **Table 2 and Table 3**. It is observed from the **Table 2** that there has been a positive sign of economic profitability of varieties under demonstrations over the local check. The average gross return was observed to be Rs.54,168.33 /ha and Rs. 37,877.67 /ha for demonstration and local check respectively. Similarly average gross cost was found to be higher in demonstration (Rs. 23,611.00/ha) than the check variety / farmers practice (Rs. 21292.67/ha). The average net return in demonstration is higher by 84.25 per cent as compared to check variety. The reason for higher gross cost in demonstration might be due to adoption of scientific package and practices by the beneficiary farmers. The overall B: C ratio was relatively higher in demonstrations (2.29) as compared to farmers' practice/check variety (1.78) accounting about 28.65 per cent higher than the farmers practice.

**Table 2: Economic Performance and Impact of the Cluster Front Line Demonstration (Variety wise)**

Year	Farmer's practice(Check variety)				Demonstration			
	Gross Cost (Rs/ha)	Gross Return (Rs. /ha.)	Net Return (Rs. /ha.)	B:C Ratio	Gross Cost (Rs/ha)	Gross Return (Rs./ha.)	Net Return (Rs. /ha.)	B:C Ratio
2015-16	14297.00	25109.00	10812.00	1.76	18500.00	42000.00	23500.00	2.27
2016-17	25256.00	45474.00	20218.00	1.80	26015.00	60095.00	34080.00	2.31
2017-18	24325.00	43050.00	18725.00	1.77	26318.00	60410.00	34092.00	2.30
Average	21292.67	37877.67	16585.00	1.78	23611.00	54168.33	30557.33	2.29

Year wise and variety wise results (Table – 2) also depicts that demonstration of improved variety fetched higher B:C ratio of 2.27 (L-9), 2.31(Moitree) and 2.30 (KLS-218) in comparison to 1.76, 1.80 and 1.77 for the local check during 2015-16,2016-17 and 2017-18 respectively. It implies that CFLD on improved variety of Lentil not only increased the yield but also fetched higher benefit cost ratio to tune of 28.98 per cent, 28.33 per cent and 29.94 per cent during 2015-16, 2016-17 and 2017-18 respectively. The cross examination of costs and returns reveals that gross costs were relatively higher in improved or demonstrated varieties as compared to farmers' practice in all the year. Similarly, a higher gross return in demonstrated varieties as compared to farmers' practice was observed in all the year showing a greater net return of the demonstrated varieties over the farmers' variety.

Table 3 reveals that additional cost per hectare for cultivation of improved varieties resulted in incremental returns of Rs.16,891.00 (L-9), Rs.14,621.00 (Moitree) and Rs.17,360.00 (KLS-218) respectively during the year 2015-16, 2016-17 and 2017-18 respectively. Thus, the additional net returns of Rs. 12,688.00 / ha for the variety L-9 , Rs. 13,862.00 / ha for the variety Moitree and Rs. 15,367.00 / ha for the variety KLS-218 during the year 2015-16, 2016-17 and 2017-18 were obtained due to higher yield of the improved varieties. It can be concluded from the results that the cluster front line demonstrations proved its economic viability and higher net profitability. This might be due to suitability of those varieties to the micro-climatic situation and soil condition of the district.

**Table 3: Economic Impact of Cluster Demonstration of Lentil Crop**

Year	Variety	Additional cost over local check (Rs/ha)	Additional returns over local check (Rs/ha)	Additional net returns over local check (Rs/ha)
2015-16	L-9	4,203.00	16,891.00	12,688.00
2016-17	Moitree	759.00	14,621.00	13,862.00
2017-18	KLS-218	1,993.00	17,360.00	15,367.00

The technology gap, extension gap and technological index of the cluster front line demonstrations are revealed by the Table 4. It is observed from the Table that technology gap was highest (5.37) in the variety KLS-218. The highest technology gap may be attributed to dissimilarities in soil fertility, erratic rainfall and other vagaries of weather conditions in the area. The highest extension gap (2.48) was observed in the variety KLS-218 followed by

Moitree (2.09) and L-9(0.5) which implies the need for educating the farmers on improved agro techniques and improved high yielding varieties by various means of extension. Lower value of technology index indicates the higher feasibility of the technology (Rathore *et.al*, 2013).The technology index was estimated to be highest (38.36 percent) for the variety KLS-218 and little lower for the variety Moitree (24.32 percent). Yield gap-II was found to be highest for the variety KLS-218 and lowest in the variety L-9(8.33 per cent). Similar types of findings were also reported by Sawardekar *et.al*. (2003) and Hiremath and Nagaraju (2009).

**Table 4: Variety wise Technology gap, Extension gap, Technology index and Yield gap (II)**

Year	Variety	Technology gap	Extension gap	Technology index Or Yield Gap-I(%)	Yield gap –II (%)
2015-16	L-9	-	0.5	-	8.33
2016-17	Moitree	2.76	2.09	24.32	24.33
2017-18	KLS-218	5.37	2.48	38.36	28.74

### Conclusion:

It can be concluded from the present study that cluster frontline demonstration on improved lentil varieties and technology had profound impact in terms of increasing yield, income and profitability from lentil cultivation. So, more number of cluster front line demonstrations on newly developed technologies should be organised among the farmers for greater benefit of the farming community.

### References:

1. Ahlawat, I.P.S., Ali, M., Yadav, R.L., Kumar Rao, and Rego, T.J. 1998. Biological nitrogen fixation and residual effects of summer and rainy season grain pulses in rice and wheat cropping systems of the Indo-Gangetic Plain. In J.V.D.K. Kumar Rao, C. Johansen (eds.) Residual Effects of Pulses in Rice and Wheat Cropping Systems of the Indo-Gangetic Plain. International Crop Research Institutes for Semi-Arid Tropics (ICRISTAT), Oxford and IBH Publishing Co. Pvt. Ltd, New Delhi, 1998. ISBN 81-204-1297-4: 31-54



2. Dhaka, B.L., Meena, B.S. and Suwalka, R.L. (2010). Popularization of improved maize production technology through front line demonstrations in South- Eastern Rajasthan, *J.Agric.Sci.*, 1(1):39-42
3. Hiremath, S.M. and Nagaraju, M.V. (2009). Evaluation of front line demonstration trials of onion in Haveri district of Karnataka, *Karnataka J. Agric. Sci.*, 22(5):1092-1093
4. Joshi, P.K. 1998. Performance of Grain Pulses in the Indo-Gangetic Plain. In J.V.D.K. Kumar Rao, C. Johansen (ed.) Residual Effects of Pulses in Rice and Wheat Cropping Systems of the Indo-Gangetic Plain. International Crop Research Institutes for Semi-Arid Tropics (ICRISTAT). Oxford and IBH Publishing Co. Pvt. Ltd, New Delhi, 1998. ISBN 81-204-1297-4. : 3-12
5. Reddy, A. A. and Reddy, G.P. 2010. Supply Side Constrains in Production of Pulses in India: A Case Study of Lentil. *Agricultural Economics Research Review*, 23(January-June): 129-136
6. Lauren, J.G., Duxbury, J.M., Beri, V.S., Razzaque II, M.A., Sattar, M.A., Pande, S.P., Bhattarai, S. Mann, R.A., and Ladha, J.K. 1998. Direct and residual effects from forage and green manure pulses in rice-based cropping systems. In: J.V.D.K. Kumar Rao, C. Johansen (ed.) Residual Effects of Pulses in Rice and Wheat Cropping Systems of the Indo-Gangetic Plain. International Crop Research Institutes for Semi-Arid Tropics (ICRISTAT). Oxford and IBH Publishing Co. Pvt. Ltd, New Delhi, 1998. ISBN 81-204-1297-4.: 55-82.
7. Mishra, D.K., Paliwal, D.K., Tailor, R.S. and Deshwal, A.K. (2009). Impact of front line demonstrations on yield enhancement of potato, *Indian Res. J. Extn. Edu.*, 9(3):26-28
8. Raghava, N.V. and Rao, P.P. (2013). Impact of frontline demonstrations on groundnut production technology in Guntur district of A.P., *Agriculture Update*, 8(1&2):283-290
9. Rathore, R.S., Jani, P.P. and Jaitawat, G.S. (2013). Performance of frontline demonstrations on maize in Udaipur district, *Agriculture Update*, 8(1&2):234-236
10. Samui, S.K., Maitra, S., Roy, D.K., Mondal A.K. and Saha, D. (2000). Evaluation on front line demonstration on groundnut (*Arachis hypogea* L.), *J. Indian Soc. Coastal Agric. Res.* 18 (2):180-183
11. Sawardekar, S.V., Dhane, S.S. and Jadhav, B.B. (2003). Front line demonstration performance of salt tolerant rice varieties in coastal saline soils, *IRRN*, 28(1):73-74
12. Sharma, A.K., Kumar, V., Jha, S.K. and Sachan R.C. (2011). Frontline Demonstrations on Indian mustard: An Impact Assessment, *Indian Res. J. Ext. Edu.* 11 (3):25
13. Yadav, R. I., Dwivedi, B. S., Gangwar, K. S., and Prasad, K. 1998. Over view and prospects for enhancing residual benefits of pulses in rice and wheat cropping systems in India. In: J.V.D.K. Kumar Rao, C. Johansen (ed.) Residual Effects of Pulses in



Rice and Wheat Cropping Systems of the Indo-Gangetic Plain. International Crop Research Institutes for Semi-Arid Tropics (ICRISTAT). Oxford and IBH Publishing Co. Pvt. Ltd, New Delhi, 1998. ISBN 81-204-1297- 4:207-226