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Evaluation of front line demonstration of Lentil var HUL 57 in Bishnupur district, Manipur, India

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Abstract
Front Line Demonstrations (FLD) on Lentil using improved variety, Lentil var. HUL 57 were conducted by the Krishi Vigyan Kendra, Bishnupur district during the *Rabi* season of the year 2017-2018 in the adopted farmer's field in Bishnupur district of Manipur to show the higher production potentiality of the technique using improved variety. The demonstration packages on high, low and average yield of Lentil were recorded 12.85 Qt/ha., 5.79 Qt/ha., and 12.60 Qt/ha., respectively. It was found higher than yield of local checked (9.86 Qt/ha.). The technology gap in the demonstration yield over potential yield was 2 Qt/ha. The highest extension gap of 3 Qt/ha was recorded. The technology index was 12 percent. The cultivation of Lentil var. HUL 57 under improved technologies gave higher net return of Rs 72800/ha, as compared to farmers practices Rs. 56880/ha. The benefit cost ratio of Lentil var. HUL 57 under improved technologies was 2.60:1 as compared to 2.58:1 under farmer's practices.

Keywords: Front line demonstration (FLD), Lentil var HUL 57, yield, net return, B: C ratio, extension gap, technology gap

Introduction
India being one of the major pulse producing countries in the world contributes about 33 per cent of area and 25 percent of world's pulses production. According to FAOSTAT, 2012 [3], India alone accounts for the 90% global pigeon pea, 65% of chickpea and 37% of lentil production over 93%, 68% and 32% of the global production. Pulse have great significance in the context of Indian agriculture as they are high protein foods (17 to 25%) as compared to others like cereal crop that contributes to 6 to 10% of protein (Veeramani *et al.,* 2017) [20]. It contributes to about 11% of the total proteins intake in India and frequency of consumption is much higher compare to other protein source indicating the importance of pulse in daily food habits (Reddy, 2010) [15]. In the year 2013-2014, India has produce 19.25 million tons of pulse from an area of 25.2 million hectare (Roy *et al.,* 2017) [16], indicating slight incline in pulse productivity but which is far below the global average productivity (840 kg/ha) (Raj *et al.,* 2013). In the North-eastern parts of India pulses are also grown mainly in the uplands and it had produces 209.3 thousand tonnes of pulses from an area of 252.8 thousand hectare with an average productivity of 828 Kg/ha during the year 2013 – 2014 and still the region is almost 82% deficit in pulse production against its requirements as per ICMR recommendation (Roy *et al.,* 2017) [16]. Despite the significant pulse production during the last decade, the faster growth rate has imposed a bigger challenge for researchers, extension workers and policy makers to fulfill the ever increasing demand of it in India. (Raj *et al.,* 2013) [14].

Lentil (*Lens culinaris*), a pulse crop is one of the oldest pulse crops in India and nutritionally it tops among the other Rabi pulses. Although India ranks first in the world in respect of production as well as acreage, the average productivity is significantly poor (714kg/ha) far below the world average productivity 1008 kg/ha (Afzal Ahmad *et al*., 2012) [1].

Lentil being the most actively traded pulse crop, it have also been proven to be invaluable in crop rotation, controlling of weeds, diseases and insects, as well improving soil texture and fertility.

It is the need of the hour for wider adoption of low-cost technology among all pulse crops in order to meet the increasing demand both domestically as well as globally. The study was conducted with the aim to promote and extend improved technologies using improved seed

varieties, micro-nutrients, soil amendments, integrated pest management techniques, farm machinery and implements, irrigation devices along with capacity building of farmers. This project was implemented by Krishi Vigyan Kendra, Bishnupur district with main objective to boost the production and productivity of lentils through FLDs with latest and improved technologies besides the speed spread of new technology of lentil in Bishnupur district of Manipur.

Materials and methods

The present study was carried out the Front Line Demonstration (FLD) of Participatory Seed Production of Lentil var HUL 57 by the Krishi Vigyan Kendra, Bishnupur district, Manipur (India) in *rabi* seasons at adopted farmer's field in Bishnupur district during 2017-18. The study was carried out to demonstrate the production and economic benefit of adopting improved technologies through line transplanting in each of the 20 (Twenty) adopted farmer's field covering an area of 10 ha. The improved technology included modern varieties, seed treatment and maintenance of optimum plant population etc. The fertilizers were given as per improved practices as basal dose. Pest and diseases management were done routinely. The crops were harvested at perfect maturity stage with suitable method. In demonstration plots, critical inputs in the form of quality seed and treatment, farm manure, balanced fertilizers and agro-chemicals were provided by KVK, Bishnupur. For the study, technology gap, extension gap and technology index were calculated as suggested by Samui *et al.,* (2000) [17].

Technology gap = Potential yield- Demonstration yield

Extension gap = Demonstration yield-Farmers yield

$$\text{Technology index (\%)} = \frac{\text{Technology gap}}{\text{Potential yield}} \times 100$$

Results and discussion

Yield

The demonstration packages on high, low and average yield of Lentil var HUL 57 were recorded 12.85 Qt/ha., 5.79 Qt/ha., and 12.60 Qt/ha., respectively. It was found higher than yield of local checked (9.86 Qt/ha.). The results indicated that the front line demonstrations have given a good impact over the farming community of Bishnupur district as they were motivated by the new agricultural technologies applied in the FLD plots (Table 1). This finding is in agreement with the findings of Poonia and Pithia (2010) [13].

Technology gap 1530kg-

The technology gap in the demonstration yield over potential yield was 2Qt/ha. The technological gap may be attributed to the dissimilarity in the soil fertility status and weather conditions (Mukharjee, 2003). Hence, variety wise location specific recommendation appears to be necessary to minimize the technology gap for yield level in different situations (Rachhoya *et al.,* 2018) [6].

Extension gap

The highest extension gap of 3Qt/ha was recorded. This emphasized the need to educate the farmers through various means for the adoption of improved agricultural production technologies to reverse this trend of wide extension gap. More and more use of latest production technologies with high yielding variety will subsequently change this alarming trend of galloping extension gap. The new technologies will eventually lead to the farmers to discontinue the old technology and to adopt new technology (Table 1). This finding is in corroboration with the findings of Hiremath and Nagaraju (2010) [4].

Technology index

The technology index shows the feasibility of the evolved technology at the farmer's fields and the lower the value of technology index more is the feasibility of the technology (Jeengar *et al*., 2006) [7]. The technology index was 12 percents.

Economic return

The inputs and outputs prices of commodities prevailed during the study of demonstrations were taken for calculating gross return, cost of cultivation, net return and benefit: cost ratio (Table 1). The cultivation of Lentil var. HUL 57 under improved technologies gave higher net return of Rs.72800/ha, as compared to farmers practices Rs.56880/ha. The benefit cost ratio of Lentil var. HUL 57 under improved technologies was 2.60:1 as compared to 2.58:1 under farmer's practices. This may be due to higher yields obtained under improved technologies compared to local check (farmers practice). This finding is in corroboration with the findings of Mokidue *et al.*, (2011) [10].

Table 1: Front Line Demonstration of Lentil var. HUL 57

Crop Enterprise	Technology demonstrated	Demonstration Yield (Qt/Ha)	Yield of local Check	% increase/ change in avg. yield over local	Gross Cost (Rs/ha)/ (Rs./unit)	Gross Return (Rs/ha) /(Rs./ unit)	Net Return (Rs/ha)/ (Rs./Unit)	B:C Ratio (GR/GC)		
		H	L	A	Qt/ha)	%				
Lentil var. HUL-57	Technology: Application of 9kg N+23kg P2O5+10 kg S/ha Source ICAR-Indian Institute of pulses research, Kanpur, 2016	12.85	5.79	12.60	9.86	27.78	28000	100800	72800	2.60:1
	Farmer's practices :						22000	78880	56880	2.58:1

Conclusion

The unavailability of advanced scientific tools and equipment for small holding farmers also hinders the exercise of improved technology. The frontlines demonstration of technologies gave higher yield of in an average with 27.78 % increase in average yield over farmer's local practices. Technological and extension gap extended which can be bridges by promoting the package of practices with emphasis of high yielding variety, use of proper seed rate, balance nutrient application and proper use of plant protection measures. Hence, replacement of local variety with the new released variety of lentil would be increased in the production

and net income of the farmers of Bishnupur district by more than seventy two thousand rupees.

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