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Assessment of Impact of Frontline Demonstrations in North Eastern-Hill Region of India

A. K. Parihar* . G. P. Dixit . S. Gupta

All India Coordinated Research Project (AICRP) on MULLaRP, ICAR-Indian Institute of Pulses Research, Kanpur-208024

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ABSTRACT

Pulses are important components of balanced diet and playing key role in alleviating malnutrition and micronutrient deficiencies in third world countries. Among the pulses, lentil is recognised as nutritious pulse crop and grown in different agro-ecology of India. Several high yielding varieties have been developed in the past, however, only few of them could reach to the farmers field, particularly in NEH region. Frontline demonstration is the best established strategy to popularize the newly developed technology at farmer's field. Therefore to assess the yield gap and impact of demonstration in North-eastern region present attempt has been made. The results revealed that there was more than 29 Percent increase in grain yield through demonstrations over the farmer's practices being followed. Similarly, the average technology gap was 372 kg/ha which exhibited the feasibility of improved technology at the farmer's field. The average technology index was 31% during the study period which is in accordance with technology gap. On the contrary, average extension gap was 183 kg/ha, which might be attributed to adoption of improved technology in demonstrations that resulted in higher grain yield than the traditional farmers practices. Finally it may be concluded that in eastern hill region of India, frontline demonstrations of lentil was found more productive, profitable and feasible in local conditions as compared to existing local technology and got success in increasing productivity of lentil during last fifteen years.

1. Introduction

Pulses are important components of balanced diet owing to sufficient dietary proteins (22–35%), minerals, fiber, and carbohydrates to poor and vegetarian population people and play a crucial role in alleviating malnutrition and micronutrient deficiencies in third world countries (Kumar et al. 2015). In India, among the rabi pulses, lentil is being grown on an area of 1.47 m ha with annual production of 1.03 m tones and productivity of 705 kg/ha. It is generally grown as rainfed crop during rabi season after rice, maize, pearl millet or kharif fallow. Its cultivation is mainly concentrated in UP, Bihar, MP and West Bengal which together contribute more than 80% area and production of this crop.

As far as North-eastern parts are concerned lentil is cultivated as paira crop with rice. It is a well Established fact that to popularize any technology developed by National Agricultural Research Systems (NARS), organization of frontline demonstrations at farmer's field is essential event. But since long back, frontline demonstrations were laid out at farmer's field and no impact analysis/yield gap analysis was done for such a long time frame in particular area of country. However for short time frame for small field area it was done by some workers in different crops like urd bean and chickpea (Ram et al. 2014; Dayanand et al. 2014). Therefore, to ascertain impact of frontline demonstrations in lentil which were executed during last fifteen years over productivity in north-eastern region of India, the present attempt has been made.

*Corresponding author: ashoka.parihar@rediffmail.com

2. Materials and Methods

Frontline demonstrations in lentil on package technology aspect which comprised of high yielding varieties, Rhizobium inoculation, fertilizer application and insect and pest management were conducted during 2002-03 to 2015-16 in north eastern hill region of India which included three state Assam, Tripura and Manipur (Singh et al. 2014; Anonymous 2015, 2016). Total 234 demonstrations were conducted by three centres Shillongani, Imphal and Agartala which comes under AICRP on MULLaRP. The trials were sown during mid October to last week of November under assured irrigation conditions. The farmers who had laid out demonstrations were trained properly on improved production technology of Lentil. The data for production and monetary gain was recorded from demonstrations and farmer's practices were analyzed. To ascertain extension gap, technology gap, technology index and net return, the following given formulae were used (Yadav et al. 2000).

Technology gap=Potential yield (P1)-Demonstrations yield (D)
Technology index=Potential yield (P1)-Demonstration yield (D) x 100/Potential yield (P1)
Extension gap=Demonstration yield (D)-Farmers practices yield (F1)

Demonstrations plot at Dhalai

3. Results and Discussion

To promote and develop awareness about improved/package technology among the farmers of north eastern region of India frontline demonstrations were executed Between time frame of 2000-2015. The results of 137 demonstration revealed that the package technology aspect with improved varieties *viz*. PL 406, B 77 and HUL 57 in Assam state observed an increase of 39.37% in grain yield as against the control plot where package technology was not applied (Figure 1). Similarly in Tripura at Agartala centre total 69 frontline demonstrations were laid out by Agartala centre in which they reported 839 kg/ha average grain yield as compared to 671 kg/ha in control plot *i.e.* where farmer grown old/traditional variety without adopting any package and practices. There was a increase in grain yield of more than 26% over the farmer practices. Likewise, by applying package technology in Manipur by Imphal centre, 28 demonstrations were executed and an increase of 21.42% was witnessed through package technology adoption. The results of three states witnessed that there was more than 29% increase in grain yield through demonstrations over the farmer's practices. From these results, it is witnessed that the performance of improved varieties with proper package and practices was found better than the conventional farmers practices. These finding are in accordance to the earlier reports (Ali and Gupta 2012; Ram et al. 2014). The result of frontline demonstrations yield and potential yield of lentil was compared to estimate the yield gaps which were further categorized into technology gap and technology index (Table 1). The technology gap showed the wide gap in the demonstrations yield over potential yield. The technology gap was maximum (442 kg/ha) at Manipur followed by Tripura (361 kg/ha). The average technology gap was 372 kg/ha which may be due to more feasibility of recommended technologies during study period. Technology gap exhibited the feasibility of the improved technology at the farmer's field. The higher the value of technology gap more is the feasibility. Likewise, the minimum technology index value was 26.08% noticed at Assam followed by Tripura (30.08%) whereas maximum value of technology index was 36.83% at Manipur. The average technology index was 31% during said period which is in accordance with technology gap. The higher technology index indicated the inadequate proven technology for transferring to farmers and insufficient extension services for transfer of technology. The findings of the present study were in line with the finding of Dhaka et al. (2010) and Ram et al. (2014). On the contrary, an extension gap ranged from 143-239 kg per hectare in yield was recorded between demonstrations technology and farmers practices in all three state. Average extension gap was 183 kg/ha which might be attributed to adoption of improved technology in demonstrations which resulted in higher grain yield than the traditional farmers practices. In terms of monetary advantage, highest gain was at Assam (56.15%) followed by Manipur. The results of frontline demonstrations corroborate the finding of earlier workers (Lathwal 2010; Dayanand et al. 2014).

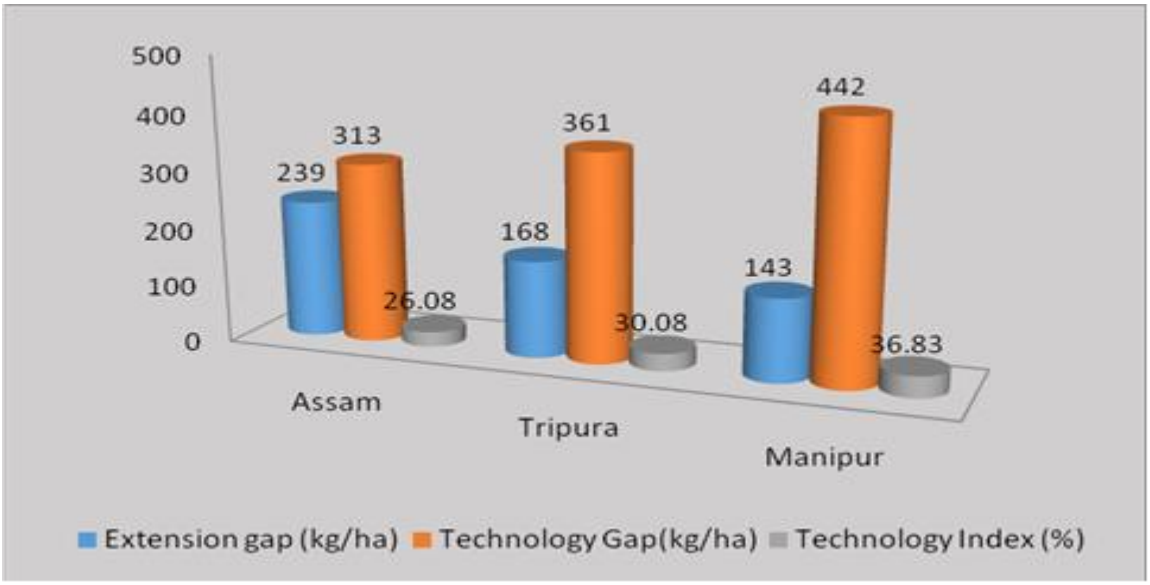

Figure 1. Overall scenario of extension gap, technology gap and technology index.

Table 1. Impact analysis of frontline demonstrations conducted in NEH during 2000-2015

State	No. of demonstrations	Yield(kg/ha)			Net return(Rs./ha)		
		Demonstration	Farmers practices	Increase over farmers practices (%)	IP	FP	Increase over farmers practices (%)
Assam	137	887	648	39.37	26315	18087	56.15
Tripura	69	839	671	26.42	---	----	---
Manipur	28	758	615	21.42	10463	7805	35.34
Total	**234**	**828**	**645**	**29.07**	**18389**	**12946**	**45.75**

Conclusion

Lentil productivity in NEH region was low as compared to other major lentil growing areas of India during 1990's. Later on, in 21st century due to popularization of newly developed technology at farmer's field and other government initiatives, it increases to a substantial level. At present the productivity of lentil in north-eastern states is around 800 kg/ha. Therefore it may be concluded that in north-eastern hill region of India frontline demonstrations of lentil was found more productive, profitable and feasible as compared to existing local technology during the last fifteen years. This also improved the relationship between framers and scientists and built confidence between them. The demonstration played as a primary source of information for farmers regarding improved practices of lentil cultivation and also acted as source of good quality seed in their locality and surrounding area. Therefore, frontline demonstrations on lentil may be continued for fast and wider dissemination of the recommended practices to the farming community. This will be helpful in achieving self-sufficiency and sustainability in pulses production.

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