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Research Article

Impact Assessment of Cluster Front Line Demonstration on Lentil Crop in Sultanpur District of U.P.

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ABSTRACT

Krishi Vigyan Kendra, Sultanpur conducted 156 demonstrations on Lentil variety PL-406 during two consecutive years from 2016–17 to 2017–18. The critical inputs were identified in existing production technology through meetings and discussions with farmers & on the basis of soil sampling. Delayed sowing & use of higher seed rate resulting into dense plant population, uneven plant population, uncontrolled weeds, ignorance about fertilizers and lack of plant protection measures were the predominant identified causes of low productivity of Pulses in district Sultanpur. In the same sequence the other parameters like technological impact, economical impact and extension gap were analyzed for Impact assessment of front line demonstration on lentil crop and feasibility of demonstrated technologies at grass root levels. The results of two consecutive years study revealed that the yield under demonstration plots was 16.9 q /ha as compared to 12.46 q /ha in traditional farmer practices plots. This additional yield of 4.44 q /ha and the increase in average lentil productivity by 35.64 per cent may contribute to present lentil requirement on national basis. The average of technology gap, extension gap and technology index were found to 4.42, 2.1 and 11.5 per cent respectively. The results clearly indicate the positive effects of FLDs over the existing practices. Benefit cost ratio was recorded to be higher under demonstrations against control treatments during the years of experimentation.

Key words: *Impact, Lentil crops, Cluster front line demonstration, Technology gap.*

INTRODUCTION

Lentil (Lens culinaris Medikus) is one of the important pulse crops in India which is cultivated in 1.48 million hectares with a total production of 1.03 million tonnes[3]. It is used as rich source of protein in vegetarian diet. In recent years, the area under lentil has expanded considerably because of its popularity in different cropping systems. The crop is well adapted to very poor and marginal uplands, where other Rabi crops cannot be grown successfully. India is called as 'house of pulses' mainly due to the availability of variable forms of pulses and their antiquity in this region.

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It is the world's largest homeland of vegetarian population and world's leader in pulse production and import to provide protein supplements[1]. Lentil (Lens culinaris M.) is one of the important rabi pulse crop in India. It is mainly cultivated as sole crop after the harvesting of paddy on residual soil moisture[2]. Farmers usually grow lentil on marginal land and without any proper management and thus get low yield.

Lentil plays a significant role in human and animal nutrition and in maintenance and improvement of soil fertility. Its cultivation enriches soil nutrient status by adding nitrogen, carbon and organic matter which promotes sustainable cereal-based systems of crop production. It is a nutritious food legume. It is cultivated for its seed and mostly eaten as split. The primary product of lentil is its seed which has relatively higher contents of protein, carbohydrate and calories compared to other legumes. It is the most desired crop because of its high average protein content and fast cooking characteristic in many lentil producing regions. It can be used as a main dish, side dish, or in salads. Seeds can be fried and seasoned for consumption but sometimes difficult to cook because of the hard seed coat those results from excessive drying. Its flour is used to make soups, stews, purees, and mixed with cereals to make bread and cakes; and as a food for infants.

In Sultanpur district, lentil was raised on 4,994 ha with total production of 2,427 q and productivity of 4.86 q /ha during 2016-17. Still the area and productivity of lentil in Sultanpur is far lower than the several districts of other states because the farmers are reluctant towards proper scientific management of the crop. However, lentil crops have given the importance by the government because vast yield gap exists between potential yield and yield under real farming situation. KVK Sultanpur had done intensive efforts on training about scientific cultivation, demonstration on new variety and other interventions. The present study was conducted to impact assessment of front line demonstration on Lentil crop in the operational area of the KVK.

MATERIALS AND METHODS

Krishi Vigyan Kendra (KVK) conducted 156 Front Line Demonstrations on Lentil crop on farmer's field in different blocks of Sultanpur district during 2016-17 and 2017-18. For conducting FLDs, farmers were identified/ selected following the survey suggested by Choudhary[6]. The required inputs were supplied and regular visits to the demonstration fields by the KVK scientists ensured proper guidance to the farmers. Field days and group meetings were also organized to provide the opportunities for other farmers to witness the benefits of demonstrated technologies. However, the practices followed by farmers in general use local cultivar (K-75), seed rate @ 40 kg/ha, no seed treatment, sowing from November, in broadcasting manner, no use of fertilizer pattern to under dose application that's to use of Urea and DAP, no weed, water and plant protection measures followed. The data output were collected from both CFLD plots as well as control plots and finally the extension gap, technology gap, technology index along with the benefits cost ratio were work out[9] as given below:

Technology gap = Potential yield - Demonstration yield

Extension gap = Demonstrated yield - Yield under existing practice

$$\text{Technology index} = \frac{\text{Potential yield - Demonstrated yield}}{\text{Potential yield}} \times 100$$

RESULTS AND DISCUSSION

The analysis depicted in Table 2 showed the average yield of Lentils varieties (PL-406) were 17.8, 16.3 & 16.6 q/ha during 2016-17 and 2017-2018, respectively under demonstrated technology however, under farmer's practices the average yield were 14.6, 11.8 &11.02 q/ha during respective years.

However, the per cent increases against local yield were 21.91 & 38, 47 during 2016-17 and 2017-2018, respectively. The result is in conformity with the finding of Tiwari and Saxena and Tiwari *et al*.[11]. The results clearly indicated the positive effect of FLDs over the existing practices toward enhancing the yield of lentils in the study area due to use of high yielding variety, timely sowing, balance does of fertilizers along with sulphur, proper irrigation, need based plant protection etc. Yield of the front line demonstration and potential yield of the crop was compared to estimate the yield gaps which were further categorized into technology and extension gap. The technology gap observed may be attributing to the dissimilarity in soil fertility status, timely sowing and weather conditions. Similar finding were recorded by Mitra and Samajdar[8]. Further, the higher extension gap was observed. The extension gap ranged from 3.2 to 5.58 q /ha during the period of study that emphasizes the need to educate the farmers through various means for adoption of improved production technologies to mitigate the extension gap.

Table 1: Package of practices followed by farmers under FLD and in general

Particulars	**Technology Interventions**	**Farmer's practices**
Variety	PL-406	Local cultivar (K-75)
Seed rate	40 kg/ha	50 kg/ha
Seed treatment	PSB + Rhizobium 200gm/10 Kg seed & Trichoderma 5gm/Kg seed	No use
Time of sowing	First week of October	Last week of October to last week of November
Method of sowing	Line sowing	Broadcasting
Fertilizer management	N:P:K (18:18:18) 8 kg/ha	No use
Weed management	Pre-emergence application of Pendimethalin 30 EC 3.3 l/ha	No use
Water management	Light irrigation before flowering (If no rainfall)	No use
Plant protectio	Need based application of Imidachlorprid @ 0.5 ml/l lt. of water for the management of Pod Borer	No use

Table 2: Technical Impact of Lentil crop demonstrations during 2016- 2018

No	**Crop**	**Variety**	**Technology Demonstrated**	**Area (ha.)**	**No. of Demonstration**	**Potential yield (q/ha)**	**Yield of the crop (q/ha) under Demonstration**			**Variety and Yield of local Check (q./ha) (K-75)**	**Increase in yield (%)**
							Highest	**Lowest**	**Average**		
Year (2016-2017)											
1	Lentil	PL-406	HYV seed, weed management, Liquid fertilizer NPK (18:18:18) & P.P	30	86	19	19.3	16.4	17.8	14.6	21.91
Year (2017-2018)											
2	Lentil	PL-406	HYV seed, weed management, Liquid fertilizer NPK (18:18:18) & P.P	2	8	19	17.6	15.0	16.3	11.8	38
3	Lentil	PL-406	HYV seed, weed management, Liquid fertilizer NPK (18:18:18) & P.P	20	62	19	17.4	15.3	16.6	11.02	47

Table 3: Economic Impact of Lentil crop

Variety	Average Cost of Cultivation (Rs./ha)		Average Gross Return (Rs./ha)		Average Net Return (Profit) (Rs./ha)		Benefit - Cost Ratio
	Demonstration plot	Local Check plot	Demonstration plot	Local Check plot	Demonstration plot	Local Check plot	
PL-406	21,960	20,960	98,175	80,300	76,215	59,340	4.47
PL -406	21,160	20,980	69,275	50,150	48,165	29,170	3.27
PL -406	21,110	20,980	70,550	46,835	49,440	25,855	3.34

The data of Table 3 reveals that as far as economics of Lentil is concerned; gross cost, net income and benefit cost ratio were Rs. 21,960/ha, Rs. 76,215/ha and 4.47, respectively during 2016-17 and Rs. 21,160/ha & 21,110/ha, Rs. 48,165/ha &49,440/ha and 3.27 &3.34, respectively during 2017-18 under demonstration plot. However, Rs. 21,960/ha gross cost, Rs. 76,215/ha net return with 4.47 benefit cost ratio during 2016-17 and Rs. 21,160/ha gross cost, Rs. 29,160/ha net return with 3.27 in FLD & Rs. 21,110/ha gross cost, Rs. 49,440/ha net return with 3.34 benefit cost ratio observed during 2017-18 under farmer's practices. The superiority of recommended package of practices under frontline demonstration over farmers' practice was also reported by Mitra and Samajdar[8] and Balai *et al*.[4]. The results indicated that the percent contribution of nutrients from fertilizer sources was more than that from the soil source. These findings are closely accorded with those reported by Gayathri *et al*.[7] and Chatterjee *et al*.[5] for potato.

Extension gap

On an average extension gap under two year Demonstration programme was 1.2, 2.7 & 2.4 q/ha. This emphasized the need to educate the farmers through various techniques for the adoption of improved agricultural production technologies to reverse this trend of wide extension gap.

Technology gap

The technology gap, the differences between potential yield and yield of demonstration plots was 3.2, 4.5 & 5.58 q /ha. This may be due to the soil fertility, managerial skills of individual farmer's and climatic condition of the area. Hence, location specific recommendations are necessary to bridge this gap.

Technology Index

The technology index shows the feasibility of the demonstrated technology at the farmer's field. The technology index was 6.31, 14.21 & 12.63 which shows the effectiveness of technical interventions. This accelerates the adoption of demonstrated technical interventions to increase the yield performance of Lentil.

CONCLUSION

From the findings of present study, it can be concluded that use of latest technologies of Lentil cultivation can reduce the technology gap to a considerable extent resulting in to increased productivity of Lentil in the district. It requires collaborative extension efforts to enhance adoption level of location and crop specific technologies among of the farmers for bridging these gaps. Therefore, extension agencies in the district need to provide proper technical support to the farmers through various educational and extension methods for better Lentil production in the district.

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