IJPS INTERNATIONAL JOURNAL OF PLANT SCIENCES
e ISSN-0976-593X Volume **12** | Issue 2 | July, 2017 | 169-172

DOI: 10.15740/HAS/IJPS/12.2/169-172
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RESEARCH ARTICLE

Impact of front line demonstrations (FLDs) on yield of pulses in NICRA villages of Bundelkhand region of U.P.

■ **D.K. MISHRA , K.K. SINGH, NISHI ROY AND VIKAS KUMAR**

SUMMARY

The study was carried out during *Kharif, Rabi* seasons in NICRA villages of Hamirpur and Jhansi district of Bundelkhand region of Uttar Pradesh during 2014-15. All 255 demonstrations on pigeonpea, black gram, green gram, chick pea, fieldpea and lentil were carried out in area of 53.4 ha by the active participation of farmers with the objective to demonstrate the improved technologies of pulses production potential. The improved technologies consisting use of high yielding variety, seed inoculation with *Rhizobium* and PSB culture, integrated nutrient and pest management. FLD recorded higher yield as compared to farmer's local practice. The demonstrated technology recorded higher yield of 1160 kg/ha, 950 kg/ha, 820 kg/ha, 790 kg/ha,700 kg/ha and 350 kg/ha in chick pea, field pea, lentil, black gram, pigeonpea and green gram, respectively than 620, 530, 460, 450 , 420 and 230 kg/ha. Despite of yield increase the technological gap, extension gap and technology index were observed. The results indicated that improved technology gave higher gross return, net return with higher benefit cost ratio as compared to farmer's practices.

Key Words : Pulses, Yield, Technology gap, Extension gap, Technology index

How to cite this article : Mishra, D.K., Singh, K.K., Roy, Nishi and Kumar, Vikas (2017). Impact of front line demonstrations (FLDs) on yield of pulses in NICRA villages of Bundelkhand region of U.P. *Internat. J. Plant Sci.*, **12** (2): 169-172, **DOI: 10.15740/HAS/IJPS/12.2/169-172**.

Article chronicle : Received : 05.04.2017; **Revised :** 09.05.2017; **Accepted :** 27.05.2017

The pulses are the main dietary source of protein and account for 11 per cent of the total intake of proteins in India (Reddy, 2010). Pulses are the most important crops grown in varied conditions in Hamirpur and Jhansi districts of Bundelkhand zone in Uttar Pradesh. However, the productivity of these crops is much lesser than the state average. The major constraints for less production are non-availability of improved varieties seed, imbalanced use of fertilizers and lack of adoption improved cultivation techniques by majority of farmers. Most of the farmers in the districts are not aware about improved techniques of crops cultivation. If the productivity increase with sizeable area under these crops, the districts Hamirpur and Jhansi has tremendous potential in the production of pulses. Keeping

MEMBERS OF THE RESEARCH FORUM

Author to be contacted :
D.K. MISHRA, Krishi Vigyan Kendra, Tatyora, HARDOI (U.P.)INDIA
Email : mishradk3@gmail.com

Address of the Co-authors:
K.K. SINGH, Krishi Vigyan Kendra, Dariyapur, RAEBARELI (U.P.) INDIA
Email : kvkraebareli.1984@gmail.com

NISHI ROY AND VIKAS KUMAR, Krishi Vigyan Kendra, Bharari, JHANSI (U.P.) INDIA

these factors in view, the technologies were demonstrated under different situations on farmer's fields in district Hamirpur and Jhansi to enhance the productivity and profitability per unit area.

MATERIAL AND METHODS

The present study was carried out by the Krishi Vigyan Kendra, Hamirpur and Jhansi of C.S. Azad University of Agricultural and Technology, Kanpur in *Kharif* and *Rabi* seasons in the farmer's fields of NICRA villages (Mankikhurd and GandhiNagar) of Hamirpur and Jhansi districts during 2014-15. There were 255 front line demonstrations in 53.4 ha area were conducted in these villages. Materials for the present study with respect to FLD were on following:

– Improved variety (Pigeonpea-UPAS 120, Black gram-AU-2, Green gram-PDM 139, Chickpea-KPG 59, KGD 1168, Fieldpea-KPMR 522 and Lentil- KL 320)

– Seed treatment with *Trichoderma* 10g/kg seed, *Rhizobium* and PSB culture with 200g /kg seed

– Farm manure @ 10 ton/ha

– Adoption of INM and IPM practices.

The improved technology included high yielding varieties, seed treatment and maintenance of optimum plant population etc. The sowing was done during June-July of pigeonpea, black gram and mungbean and Oct.-Nov. chickpea, fieldpea and lentil. The spacing was 90 x 20 cm pigeonpea and 45 x 10 cm in, mungbean, urdbean, fieldpea, chick pea and lentil, respectively. The seed rate of pigeonpea, black gram and green gram were 15 kg/ha. The seed rate of chickpea, fieldpea and lentil were 80 kg/ha, 100 kg/ha and 50 kg/ha, respectively. The fertilizers were given as per improved practices as basal dose. Hand weeding within lines was done at 25-30 and 50-55 DAS. The crops were harvested at perfect maturity stage in all pulses with suitable method.

In general, soils of the area under study were medium black with medium to low fertility status. The average rainfall of this area was 952 mm with 50 rainy days. In demonstration plots, critical inputs in the form of quality seed and treatment, farm manure, balanced fertilizers and agro-chemicals were provided by KVK. For the study, technology gap, extension gap, technology index were calculated as suggested by Samui *et al*. (2000).

Technology gap = Potential yield- Demonstration yield

Extension gap = Demonstration yield-Farmers yield

technology gap

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

RESULTS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

Yield :

The average yield of pulses [chickpea (1160 kg/ha), fieldpea (950 kg/ha), lentil (820 kg/ha), urdbean (790 kg/ha) pigeonpea (700 kg/ha) and moongbean (350 kg/ha)] were much higher than as compared to average yield of farmers practices [chickpea (620 kg/ha), fieldpea (530 kg/ha), lentil (460 kg/ha), urdbean (450 kg/ha) pigeonpea (420 kg/ha) mungbean (230 kg/ha)]. The average percentage increased in the yield over farmer's practices was 43.5, 39.6, 39.1, 37.8, 33.3 and 26.1 for chickpea, fieldpea, lentil, urdbean, pigeonpea and moongbean, respectively. The results indicated that the front line demonstrations have given a good results over the farming community of Jhansi and Hamirpur district as they were motivated by the new agricultural technologies applied in the FLD plots (Table 1). This finding is in corroboration with the findings of Poonia and Pithia (2011).

Technology gap :

The technology gap in the demonstration yield over potential yield were 1050 kg/ha for fieldpea, 840 kg/ha for chick pea, 800 kg/ha for pigeonpea, 580 kg/ha for lentil, 450 kg/ha for green gram and 210 kg/ha for black gram The technological gap may be attributed to the dissimilarity in the soil fertility status and weather conditions (Mukharjee, 2003) (Table 1).

Extension gap :

The highest extension gap of 540 kg/ha was recorded in chickpea followed by 420 kg/ha for fieldpea and the lowest was observed in 120 kg/ha for green gram and 280 kg/ha for pigeonpea. This indicates that there is need to educate the farmers through various means for adopting improved agricultural production technologies to reverse this trend of wide extension gap. Extensive use of latest production technologies with improved high yielding variety will subsequently change this trend of extension gap. The adoption of newer technologies leads

to the farmers to discontinue the old practices (Table 1).

Technology index :

The low technology index of 21.0 per cent urd, 41.4 per cent for lentil and 42.0 per cent for chickpea shows the feasibility of the evolved technology at the farmer's fields for these crops (Table 1).

Economics :

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 2). The cultivation of pigeonpea, chickpea, urdbean, lentil, mungbean and fieldpea under improved technologies gave higher net return of Rs. 39050, 22770, 20800, 15500, 11360 and 9140/ha, respectively as compared to farmers practices. The benefit cost ratio of pigeonpea, chickpea, urdbean, lentil, mungbean and fieldpea under improved technologies were 4.92, 2.59, 2.93, 2.17, 2.18 and 1.67 as compared to 3.17, 1.72, 1.99, 1.58, 1.52 and 1.26 under farmers 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).

Conclusion :

There have been overwhelming responses of farmers to adopt the innovations highlighted in the demonstrations. The results of the frontline demonstrations of different pulses showed the yield increase from 26.1 per cent mungbean to 43.5 in chickpea by different technological interventions in Jhansi and Hamairpur district of Bundelkhand region of U.P.

The results clearly established the facts that the reasons for low yield of pulses at farmers field is non availability of quality seed in time, seed sowing by broadcast method, high seed rate and use of inadequate and imbalance dose of fertilizers especially the nitrogenous and phasphatic fertilizers by farmers does not make possible to fetch potential yield. Mechanical weed control is costly and chemical control is quite uncommon in this region.

The specific constraints are the cultivation of pulses is confined to marginal and rainfed situations in these areas leads to poor yield of potential varities. Thus, technological and extension gap extended which can be bridge by popularizing package of practices with emphasis of improved variety, use of proper seed rate, balance nutrient application and proper use of plant protection measures.

Acknowledgement :

The authors are highly thankful to the CRIDA, Hyderabad for providing financial assistance towards organizing front line demonstrations. Hence, by conducting front line demonstrations of proven technologies, yield potential of pulse crops can be

Table 1 : Productivity, technology gap, extension gap and technology index of pulses under front line demonstrations and existing practices

Name of pulses	Area (ha)	No. of farmers	Yield (q/ha)			% increase over local	Extension gap (kg/ha)	Technology gap (kg/ha)	Technology index (%)
			Potential	FLD	FP				
Urd	11.2	33	10	7.9	4.5	37.8	3.4	2.1	21
Moong	3.2	8	8	3.5	2.3	26.1	1.2	4.5	56.3
Pigeonpea	25	134	15	7	4.2	33.3	2.8	8	53.3
Fieldpea	5	20	20	9.5	5.3	39.6	4.2	10.5	52.5
Lentil	1	5	14	8.2	4.6	39.1	3.6	5.8	41.4
Chickpea	8	55	20	11.6	6.2	43.5	5.4	8.4	42

Table 2 : Economics of pulses production under front line demonstrations and existing practices

Name of pulses	Cost of cultivation (Rs./ha)		Gross returns (Rs./ha)		Net returns (Rs./ha)		B:C	
	FLD	Existing practice	FLD	Existing practice	FLD	Existing practice	FLD	Existing practice
Urd	10800	9050	31600	18000	20800	8950	2.93	1.99
Moong	9640	9050	21000	13800	11360	4750	2.18	1.52
Pigeonpea	9950	9270	49000	29400	39050	20130	4.92	3.17
Fieldpea	13660	10130	22800	12720	9140	2590	1.67	1.26
Lentil	13200	10200	28700	16100	15500	5900	2.17	1.58
Chickpea	14350	11520	37120	19840	22770	8320	2.59	1.72

increased to the extent. This will subsequently increase the income as well as the livelihood of the farming community.

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