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Impact of Front Line Demonstrations on Yield, Knowledge Adoption and Horizontal Spread of Clusterbean Crop in Hot Arid Zone: An Assessment

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Abstract: The study was conducted in Bheenjwdia village of Jodhpur district of Rajasthan during 2010 to 2014 to assess the impact of Front Line Demonstrations (FLDs) of clusterbean crop in hot arid zone on the parameters like enhancement in yield, increase in knowledge, adoption of technology and extent of horizontal spread of clusterbean production through FLDs. The data were collected from 96 farmers and analyzed. The results of the study revealed that the yield of clusterbean crop under demonstration was 32.71% higher as compared to farmer's practices. The overall knowledge and adoption level of production technology of clusterbean was increased by 44.82 and 224.45%, respectively due to front line demonstrations. The local variety of clusterbean was replaced by RMG-112, RGC-936, RGC-1003, HGS-365 in demonstration areas. This significantly increased horizontal spread by 486.04%.

Key words: Front line demonstration, adoption, horizontal spread.

Clusterbean is an important kharif crop of Rajasthan. It occupies about 47.86 lakh hectare areas with total production of 22.23 lakh tons in Rajasthan state. Mostly, it is grown under rainfed condition in the state. The average productivity of clusterbean was 465 kg ha^{-1} (Rajasthan Agricultural Statistics at a glance 2015-16) in the state, which is very low as compared to its potential. Government of India and ICAR are operating various schemes for quick and effective transfer of technology to farmer's field. Among these schemes, front line demonstrations (FLDs) is one, which emphasizes to increase production by supplying critical inputs along with improved packages of practices recommended by scientists of ICAR Institutes and State Agricultural Universities (SAUs). Use of improved packages of practices like quality seed, seed rate, seed treatment, sowing time, recommended dose of fertilizer, weed control and plant protection measures lead to higher yield of clusterbean in comparison to farmer's practices. Extending cultivation of improved varieties, getting feedback from farmers about constraints in adoption of recommended improved technologies for further research and to maximize the process of technological dissemination among the farmers are some of the other important features of this program (Nagrajan *et al*., 2001). Keeping these facts in mind, the present study was conducted with the objective to assess the impact of FLDs of clusterbean crop in hot arid zone with respect to enhancement in yield, increase in knowledge, adoption of technology and extent of horizontal spread.

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Materials and Methods

The front line demonstrations were conducted in Bheenjwadia village of Jodhpur district of Rajasthan during 2010-11 to 2014-15. A total of 96 farmers were selected and all demonstrations were conducted under the supervision of scientists of ICAR-CAZRI, Jodhpur. In demonstration plots, use of quality seeds of improved varieties (RMG-112, RGC-936, RGC-1003, HGS-365), line sowing, seed treatment and timely weed control as well as recommended dose of fertilizer (20 kg nitrogen + 40 kg phosphorus) were followed under improved practices (IP). In case of farmer's practices (FP), existing practices used by farmers were carried out. Before conducting the demonstration, training was imparted to the selected framers of the village with respect to envisaged technology interventions, site selection, lay out of demonstration and farmer's participation, etc. as suggested by Choudhary (1999). Visits of farmers and the extension functionaries were organized at demonstration plots to effectively disseminate the message at large. The demonstrations were laid out on farmer's field according to recommended package of practices of ICAR-CAZRI, Jodhpur. The data of FLD were collected by scientists of

the CAZRI and analyzed to assess the impact of yield. However, data about knowledge, adoption and horizontal spread of technologies were collected from farmers with help of interview schedule. Data were subjected to a suitable statistical analysis. The following formula was used to assess the impact on different parameters of clusterbean crop.

Impact on yield (% change)

$$= \frac{\text{Yield of demo. plot - Yield of control plot}}{\text{No. of adopter before demonstration}} \times 100$$

Impact on adoption (% change)

$$= \frac{\text{No. of adopter after demonstration - No. of adopter before}}{\text{No. of adopter before demonstration}} \times 100$$

Impact on spread (% change)

$$= \frac{\text{After area (ha) - Before area (ha)}}{\text{Before area (ha)}} \times 100$$

Results and Discussion

Impact of front line demonstration on yield

The yield performance of demonstrations conducted in Bheenjwadia village during 2010-2014 (Table 1). The data indicated that under the demonstration plots the crop productivity was recorded higher than that under the farmer's practices. Highest grain yield was recorded (695 kg ha^{-1}) during 2014 and lowest (353 kg ha^{-1}) during 2011 (Table 1). Average grain yield of clusterbean over the years under demonstration plot was 507.8 kg ha^{-1} which is 32.71% more than control (382.6 kg ha^{-1}).The increased grain yield in term of per cent ranged from 18.80 to 64.19 higher over the control during the five year study. The yield level of control plot under farmer's practice (FP) was reduced due to low yielding local variety, improper fertilizers and improper plant population. However in case of demonstration plot, the factors that led to enhance the yield of crop were timely sowing, use of recommended variety and balanced nutrient management. The results clearly showed the positive effects of FLD over the existing practices towards enhancing the yield of clusterbean (Table 1). Similar yield enhancement in different crops in front line demonstration has amply been documented by Jeenangar *et al*. (2006); Hiremath *et al.* (2007); Dhaka *et al.* (2010); Patel *et al.* (2013); Tiwari *et al.* (2003); Tomar *et al.* (2003); Kumar *et al.* (2013); Naberia *et al.* (2015); Meena *et al.* (2012); Ghintala (2016) and Mahle *et al.* (2016).

Table 1. Impact of front line demonstration (FLDs) on yield

Year	No. of demo.	Area (ha)	Grain yield (kg ha^{-1})		Impact (% change)
			IP	FP	
2010	12	4.8	515	414	24.40
2011	14	5.6	353	215	64.19
2012	16	6.6	430	314	36.94
2013	27	11.0	546	385	41.82
2014	27	12.0	695	585	18.80

Impact of front line demonstrations on knowledge of clusterbean production technology

Knowledge level of farmers on various aspect of scientific clusterbean production technology before conducting front line demonstrations and after implementation was measured and compared by applying dependents't' test. Before conducting front line demonstrations farmers mean knowledge score was 48.33% which increased to 70.83% after implementation of FLDs (Table 2). The knowledge score increased by 44.82% after implementation of FLDs. The increase mean knowledge score of farmers was observed significantly higher to the computed value of 't' (19.63) and was statistically significant at 1% probably level. The results were similar to those of Narayanaswamy and Eshwarappa (1998), Khajuria *et al*. (2016). This showed positive impact of front line demonstration's on knowledge of the farmers that have resulted in higher adoption of improved practices. The results so arrived might also be due to the concerted educational efforts made by the scientists.

Table 2. Comparison between knowledge level of the respondents about scientific farming practices of clusterbean

	Mean score		Mean difference	Calculated 't' value
	Before FLD implementation	After FLD implementation		
Knowledge	5.80 (48.33%)	8.40 (70.00%)	2.6 (21.67%)	19.6277**

** Significant at .01% level.

Table 3. Impact of FLDs on adoption of clusterbean production technology

Technology	Number of adopters (N-96)		Change in no. of adopters	Impact (% change)
	Before demonstration	After demonstration		
Land preparation and application of FYM	56	90	34	60.71
Improved variety RGM-112, RGC-936, RGC-1003, HGS-365)	8	84	76	950.00
Seed rate (12-15 kg ha^{-1})	51	88	37	72.55
Seed treatment with trichodrma @ 4 gm kg^{-1} seed	8	32	24	300.00
Time of sowing	30	72	42	140.00
Method of sowing or spacing	52	89	37	71.15
Fertilizing management	22	44	22	100.00
Weed management	39	62	23	58.97
Plant protection	15	55	40	266.67
Overall impact				224.45

Impact of front line demonstrations on adoption of clusterbean production technology

The adoptions of recommended varieties of clusterbean by farmers were less before demonstration period which was increased by 950% after demonstration (Table 3). This was followed by adoption of seed treatment which increased significantly by 300% while plant protection measure adoption was increased by 266.67% due to FLD. In addition, the per cent of adoption of recommended technologies such as seed rate, method of sowing and weed management also increased significantly. The overall adoption level of clusterbean production technology increased by 224.45% due to FLDs organized by ICAR-CAZRI, Jodhpur. Similar finding were also reported by Chapke (2012) and Mahale *et al.* (2016).

Impact of front line demonstrations on varietal replacement

The FLDs are proven extension intervention for making change in existing/traditional practices of farmers. Therefore, efforts were made to know if the varietal replacement could be attributed to FLDs in village. It was found that the local variety of clusterbean was replaced by RGM-112, RGC-936, RGC-1003 and HGS-365 on large scale (Table 4). Replacement of local variety with improved varieties of maize, paddy and wheat due to FLD was also reported by Balai *et al.*, 2013.

Table 4. Impact of front line demonstrations on varietal replacement

Crop	Previous grown variety	New varieties introduced
Clusterbean	Local	RGM-112, RGC-936, RGC-1003, HGS-365

Impact of front line demonstrations on horizontal spread of variety

In present study, efforts were made to study the impact of FLDs on horizontal spread of varieties. The data presented indicated that FLD organized on clusterbean crop helped to increase the area under recommended varieties. There was significant increase in area horizontally from 2.65 ha to 15.53 ha under RGM-112, RGC-936, RGC-1003 and HGS-365 of clusterbean (Table 5). Therefore, it was concluded that FLD organized by ICAR-CAZRI, Jodhpur made significant impact on horizontal spread of technologies.

Table 5. Impact of front line demonstrations on horizontal spread of variety of clusterbean crop

Crop	Area (ha)		Change in area (ha)	Impact (% change)
Clusterbean	Before demons-tration	After demons-tration		
RGM-112, RGC-936, RGC-1003, HGS-365	2.65	15.53	12.88	486.03

Conclusion

The front line demonstrations enhanced the yield of clusterbean vertically and ensured rapid spread of technologies horizontally. The area under improved varieties of clusterbean was increased from 2.65 to 15.53 ha. The FLD made positive and significant impact on yield

enhancement of clusterbean (32.71%). The knowledge and adoption too increased by 44.83 and 224.45%, respectively. FLDs also made positive impact on improved varieties, seed treatment and seed rate etc. Therefore, it is suggested that adequate financial support should be rendered to extension system for organizing FLDs under close supervision of agricultural scientists and extension personnel so as to cope up with target of improving crop productivity.

References

Balai, C.M., Bairwa, R.K., Verma, L.N., Roat, B.L. and Jalwania, R. 2013. Economic impact of front line demonstrations on cereal crops in tribal belt of Rajasthan. *International Journal of Agricultural Sciences* 3(7): 66-570.

Chapke, R.R. 2012. Impact of frontline demonstrations on jute (*Corchoruso litorius*). *Journal of Human Ecology* 38(1): 37-41.

Choudhary, B.N. 1999. Krshi Vighyan Kendra - A guide for KVK managers. Publication, Division of Agricultural Extension, ICAR. pp 73-78.

Dhaka, B.L., Meena, B.S. and Suwalika, R.L. 2010. Popularisation of improved maize technology through front line demonstration in south-eastern Rajasthan. *Journal of Agricultural Sciences* 1(1): 39-42.

Ghintalka, Akshya 2016. Impact of frontline demonstrations on clusterbean productivity in farmer's field. *Indian Journal of Extension Education and Rural Development* 24: 48-51.

Hiremath, S.M., Nagaraju, M.V. and Shashidhar, K.K. 2007. Impact of front line demonstration on onion productivity in farmer's field. In *National Seminar, Appropriate Extension Strategy Management of Rural Resources.* University of Agricultural Sciences, Dharwad, pp. 100.

Jeenangar, K.L., Panar, P. and Pareek, O.P. 2006. Front line demonstration on maize in Bheelwara district of Rajasthan. *Current Agriculture* 30(1/2): 115-116.

Khajuria, Shakti, Rai, A.K., Kumar Raj, Jadav, J.K. and Lata, Kanak 2016. Popularization of IPM practices for management of chickpea pod borer, through front line demonstrations under semi-arid conditions. *Indian Journal of Extension Education* 52(3&4): 117-121.

Kumar, Dileep, Agarwal, S.K. and Lawanis, Pankaj 2013. Transfer of technology of cumin cultivation in Sirohi District of Rajasthan. *Indian Journal of Extension Education and Rural Development* 21: 200-202.

Mahale, Mahesh, Patil, Sandeep and Chavan, Ashok 2016. Impact of FLD intervention on yield adoption and horizontal spread of oilseed crops in Konkan. *Indian Journal of Extension Education* 52(3&4): 79-83.

Meena, M.L., Singh, Deeraj and Sharma, N.K. 2012. Impact of frontline demonstration on yield enhancement of Cumin. A case study in arid zone of Rajasthan. *Indian Journal of Extension Education* 48(1&2): 103-105.

Naberia, S., Gautam, U.S. and Gupta, A.K. 2015. Psychological Characteristics affecting the adoption of agricultural technologies. *Indian Journal of Extension Education* 51(3&4): 130-132.

Nagrajan, S., Singh, R.P., Singh, R., Singh, S., Singh, A., Kumar, A. and Chand, R. 2001. Transfer of technology in wheat through front line demonstration in India: A comprehensive report 1995-2000. Directorate of Wheat Research Karnal, Research Bulletin No. 6: 21.

Narayanaswamy, C. and Eshwarappa, G. 1998. Impact of frontline demonstrations. *Indian Journal of Extension Education* 34(1&2): 14-15.

Patel, M.M., Jhajharia, Arvind Kumar, Khadda, B.S. and Patil, L.M. 2013. Front line demonstration: An effective communication approach for dissemination of sustainable cotton production technology. *Indian Journal of Extension Education and Rural Development* 21: 60-62.

Tiwari, R.B., Singh, V., Parihar, P. 2003. Role of front line demonstration in transfer of gram production technology. *Maharashtra Journal of Extension Education* 22(1): 19-23.

Tomar, L.S., Sharma, P.B. and Joshi, K. 2003. Study on yield gap and adaptation level of potato production technology in arid region. *Maharashtra Journal of Extension Education* 22(1): 15-18.

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