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Impact of front line demonstrations on yield, knowledge adoption and horizontal spread of cumin crop in arid zone

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Abstract

Front line demonstrations were conducted in Bheenjwadia village of Jodhpur district of Rajasthan by Central Arid Zone Research Institute, Jodhpur during 2010-11 to 2014-15. Total 67 farmers from Bheenjwadia village were selected. The demonstrations were laid out on farmer's field according to recommended package of practices of Central Arid Zone Research Institute (CAZRI), Jodhpur. The farmers practice was considered as control plot in demonstration cluster. A significant enhancement in the yield of cumin was recorded over the control by 26.06, 15.17, 18.90, 28.24 and 47.07 percent for the year 2010-11, 2011-12, 2012-13, 2013-14 and 2014-15, respectively. The overall knowledge and adoption level of cumin production technology was increased by 39.76 and 198.29 per cent, respectively due to front line demonstrations. The local variety of cumin replaced by GC-4 in demonstration area and significantly increased in area horizontally by 443.07 per cent.

Key words: Adoption level, cumin, front line demonstration, horizontal spread, package of practices.

Introduction

Cumin (*Cyminum cyminum* L.) is grown in about 5.11 lakh ha area with a production of about 2.01 lakh tons in Rajasthan. Though cumin occupies 44.70 % of total condiments and spices area of the state, its productivity is very low 393 kg ha^{-1} in Rajasthan. Various technologies are being generated by the State Agricultural Universities and ICAR's Institutes to increase the production and productivity of cumin in the state. In its context, the front line demonstration is an important method of transferring the latest package of practices to farmers by which farmers learn latest technology production factors under real farming situations at their own fields, which in turn may lead to higher adoption of improved package of practices. Further, these demonstrations are designed carefully where provisions are made for speedy dissemination of the demonstrated technology among the farming community through organization of other supportive extension activities, such as field days and farmers convention. The main objective of front line demonstration is to demonstrate newly release crop production and protection technologies at the farmers' field under different agro-climatic regions and farming situations. Keeping this in view, the present study was under taken to study the impact of front line demonstrations (FLDs) on yield, knowledge, adoption and horizontal spread of cumin crop in Arid Zone.

Material and methods

The front line demonstrations were conducted in Bheenjwadia village of Jodhpur district during 2010-11 to 2014-15. Total 67 farmers from Bheenjwadia village were selected. The demonstrations were carried out at farmer's field according to recommended package of practices of CAZRI, Jodhpur. The farmers practice was considered as control plot in demonstration cluster. All critical inputs *viz*, seed, fertilizer, IPM and bio-fertilizers were supplied to the farmers. The demonstration plots were supervised by the CAZRI scientists. The data of FLD was collected by scientists and used to assess the impact of yield. However, data about knowledge, adoption and horizontal spread of technologies were collected from farmers with help of interviewed schedule. Data were subjected to the suitable statistical methods. The following formulas were used to assess the impact on different parameters of cumin crops.

Impact on yield (% appreciation) =

$$\frac{\text{Yield of demonstration plot - Yield of control plot}}{\text{Yield of control plot}} \times 100$$

Impact on adoption (% appreciation) =

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

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Impact on horizontal spread (%appreciation)

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

Results and discussion

Impact of front line demonstrations (FLDs) on yield

The findings of impact of front line demonstrations on yield enhanced of cumin are presented in table-1. It is evident from the study that, the yield of cumin in demonstrations 653, 645, 327, 495 and 478 kg ha^{-1} were recorded during 2010-11 to 1014-15, respectively in ascending in order. This showed that there was significant increase in yield of cumin over the control by 26.06, 15.15, 18.90, 28.24 and 47.07 per cent for the year 2010-11, 2011-12, 2012-13, 2013-14 and 2014-15, respectively. The overall impact was 25.87 per cent. This showed the positive impact of FLD programme of cumin crop. Yield enhancement in different crops in front line demonstration was showed by Tiwari *et al.*, (2003), Mishra *et al.*, (2009), Kumar *et al.*, (2013), Tomar *et al.*, (2003), Singh and Meena (2011), Meena *et al.*, (2012), Patel *et al.*, (2013), Naberia *et al.*, (2015) and Mahle *et al.*, (2016).

The low yield level of control plot was mainly due to low yielding local variety, improper fertilizers and improper plant population measures. However in case of demonstration plot, the factors led to enhance the yield of crop were timely sowing, use of recommended variety, balanced nutrient management and strong technology back stopping from CAZRI scientists.

Impact of front line demonstrations on knowledge of cumin production technology

Knowledge level of farmers on various aspect of scientific cumin production technology before conducting front line demonstrations and after implementation was measured and compared by applying dependents' test. It could be seen from table 2 that before conducting front line demonstrations, farmers mean knowledge score was 45.26 per cent which increased upto 63.26 per cent after implementation of FLDs. The knowledge score increased by 39.77 per cent after implementation of FLDs. The increase mean knowledge score of farmers was observed significantly higher as the compared 't' value (11.056**) was statistically significant at 1 % probably level. The results at par with Narayanaswamy and Eshwarappa (1998) and Khajuria *et al.*, (2016). It means there was significant increase in knowledge level of the farmers due to front line demonstrations. 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 be due to the concerted educational efforts made

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

Year	No. of demonstration	Area (ha)	Yield (kg ha^{-1})		Impact (% appreciation)
			Demonstration plot	Control plot	
2010-11	10	4.00	653	518	26.06
2011-12	18	7.40	645	560	15.17
2012-13	12	4.80	327	275	18.90
2013-14	15	6.00	495	386	28.24
2014-15	12	4.80	478	325	47.07
	67	27	519.60	412.80	25.87

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

	Mean score		Mean difference	Knowledge increased (%)	Calculated 't' value
	Before FLD implementation (A)	After FLD implementation (B)			
Knowledge	6.79 (45.26 %)	9.49 (63.26%)	2.7 (18.00%)	39.77	11.056**

**-Significant at .01 per cent level

Impact of front line demonstrations on adoption of cumin production technology

Impact of front line demonstrations (FLDs) on adoption of cumin production technology by the farmers is presented in table 3. It was found that adoption of recommended variety of cumin by farmers was less before demonstration period which was increased by 587.50 per cent after demonstration. This was following by method of sowing which was increased significantly by 366.67 per cent. Seed treatment with *Trichoderma* and plant protection measures increased by 354 per cent and 237 per cent, respectively due to FLD. In addition, the per cent of adoption of recommended technologies such as seed rate, method of sowing, fertilizer management and weed management were increased significantly. The overall adoption level of cumin production technology was increased by 198.29 per cent due to FLDs organized by CAZRI, Jodhpur. Similar finding was also reported by Chapke (2012), Mahadik and Tripathi (2016) 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. It was found that the local varieties of cumin were replaced by GC-4 on large scale. Replacement of local variety with improved varieties of maize, paddy and wheat due to FLD was reported by Balai *et al.,* (2013).

Impact of front line demonstrations on horizontal spread of variety of cumin crop varietal replacement

Table 4 indicated that FLDs organized on cumin crop helped to increase in the area under recommended variety. There was significant increase in area horizontally from 0.65 ha to 3.53 ha under GC-4 of cumin. The FLD made positive impact on horizontal spread of varieties of cumin. Therefore study concluded that FLDs organized by CAZRI, Jodhpur made significant impact on horizontal spread of technologies.

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

Technology	Number of adopters		Change in No. of adopters	Impact (% appreciation)
	Before demonstration	After demonstration		
Land preparation and application of FYM	50	63	13	26.00
Improved variety (GC-4)	8	55	47	587.50
Seed rate (4-5 kg/ha)	22	53	31	140.90
Seed treatment with *Trichodrma* @ 4gm/kg seed	11	50	39	354.55
Time of sowing	32	64	32	100.00
Method of sowing or spacing	3	14	12	366.67
Fertilizing management	30	49	19	63.33
Weed management	39	62	23	58.97
Irrigation (4-5)	40	59	19	47.50
Plant protection measures	16	54	38	237.50
Overall impact				198.29

Table 4. Impact of front line demonstrations on horizontal spread of variety of cumin crop

Crop	Area (ha.)*		Change in area (ha)	Impact (% appreciation)
Cumin	Before demonstration	After demonstration		
GC-4	0.65	3.53	3.88	443.07

*-Area of cumin of sampled farmers

Conclusion

The FLD made positive and significant impact on yield enhancement of cumin by 25.87 per cent. The knowledge and adoption increased by 39.76 and 198.29 per cent respectively. Further, local varieties of cumin were replaced by GC-4 on large scale in the village. FLDs organized by CAZRI, Jodhpur made significant impact on horizontal spread of technologies. The area under GC-4 of cumin was increased by 443.07 per cent.

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