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Research Article

Impact of Front Line Demonstration (FLD) on Cumin Farmers in Jodhpur and Nagaur District

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Abstract

Keeping in view of an effective extension approach of Front Line Demonstration (FLD) for transfer of technology in cumin, a study on impact of FLDs was conducted by ARS, Mandor in Jodhpur and Nagaur districts of Rajasthan under CSS-MIDH project of DASD, Calicut. It was also noticed that the farmers adopted new high yielding variety followed by crop rotation, integrated nutrient management and used recommended seed rate after acquiring trainings from the ARS. The results clearly showed that due to enhanced knowledge and adoption of scientific practices, the yield of cumin increased by 21.9 per cent and 19.8 per cent over the yield obtained under farmers practices during the year 2015-16 and 2016-17, respectively. The reduction of technology index from 22.03 per cent observed during 2015-16 to 10.92 per cent in 2016-17 exhibited the feasibility of technology demonstrated. Thus, study suggests the need of conducting intensive trainings and FLDs to educate the cumin growers for achieving higher production of cumin in the district.

Keywords: Impact, Training, Knowledge adoption, cumin

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Introduction

Indian government have introduced a number of programmes for the farming community to increase the agricultural production and income, but the outcome of these programmes in terms of achieving higher agricultural production is not satisfactory (Singh and Singh,2004). The most important factor identified was lack of understanding about various technological recommendations made by the research institutes to the farmers, for this poor outcome. It is a known fact that training to farmers increases the technical efficiency of an individual. As a result, more emphasis on farmers training activities is being given by the ICAR, SAUs along with the respective State department of Agriculture. In Nagaur and Jodhpur districts, farmers grow cumin in large area due to low water requirement but obtain very low yield due to use of low yielding variety and poor knowledge about scientific cultivation of cumin. ARS, Mandor made an effort and conducted many on-campuses as well as off-campus training programmes for the benefit of farmers and farm women. Additionally, a number of farmers were also covered under front line demonstrations in different villages. In order to evaluate the impact of training programmes as well as other extension activities of ARS, the present study was undertaken with the objectives to assess the knowledge and adoption level of package of practices under FLD and to find out the yield gap in cumin production.

Materials and Methods

The present study was carried out by the Agricultural Research Station, Mandor under Agriculture University, Jodhpur under Centrally Sponsored Schemes- Mission for Integrated Development of Horticulture (CSS-MIDH) project of Directorate of Arecanut and Spices Development (DASD), Ministry of Agriculture and Farmers Welfare, Calicut, during *rabi* season from 2015-16 to 2016-17 (2 years) in the farmers' fields of villages *viz.*, Shiv, Indawad, kurchi and Thebri of Nagaur district & Mansagar and Anvana of Jodhpur district in Arid Zone of Rajasthan. In total 50 frontline demonstrations in 50 ha area in different villages were conducted. Materials for the present study with respect to FLDs and farmers' practices are given in **Table 1**. In case of local check plots, existing practices being used by farmers were followed. In general, soils of the area under study were sandy loam to clay loam, low in fertility status. The FLDs were conducted to study the gaps between the potential yield and demonstration yield, extension gap and technology index. In the present evaluation study, the data on output of cumin cultivation were collected from FLD plots, besides the data on local practices commonly adopted by the farmers of this region were also collected. In demonstration plots, a few critical inputs in the form of quality seed, balanced fertilizers, agro-chemicals etc. were provided and non-monetary inputs like timely sowing in lines and timely weeding were also performed whereas, traditional practices were maintained in case of local checks. The demonstration farmers were facilitated by ARS scientists in performing field operations like sowing, spraying, weeding, harvesting etc. during the course of training and visits. The technologies demonstrated are mentioned in Table 1 and compared with local practices. From each village 8 to 10 farmers were selected thus, making a total sample size of 50 farmers. The data were collected through personal interview by designing a questionnaire. The data were collected, tabulated and analyzed by using statistical tools like frequency and percentage.

Table 1 Particulars showing the details of cumin cultivation practices under FLD and existing practices

S. No.	Operation	Existing practice	Improved practices demonstrated
1.	Use of quality seed	Local seed	GC 4 an improved variety from SDAU, Gujarat
2	Seed treatment	None	Fungicide Carbendazim @ 2gm/kg
2.	Sowing method	Broadcasting	Line sowing by tractor operated seed drill followed by thinning at 30 DAS
3.	Fertilizer application	20 :0 : 0 (Kg. N:P:K/ha)	30:20:15 (Kg N:P:K \ha)
4.	Weed control	Two hand weeding	Oxadiargyl 6% EC @50 gm a.i. per ha. at 20 DAS followed by one hand weeding at 45 DAS
5.	Control of cumin aphid	No any control measure	One spray of Thiamethoxam, 25 WG @ 100 gm dissolving in 500 litters of water/ha followed by one spray of Acephate, 75 WP @ One Kg dissolving in 500 litters of water/ha, respectively at 15 days interval.
6.	Control of powdery mildew and blight disease	Spray with Mancozeb 75WP @ 2 gm/liter water	For control of blight disease two sprays with Mancozeb 75WP @ 2 gm/litter water, one spray of Matiram 55% + Pyraclostrobin 5% @ 3.5gm/ litter of water and for control of powdery mildew, one spray of wettable sulphur 80% @ Two Kg/ha.

The extension gap, technology gap and the technology index were worked out as per formulae given by the Samui *et al*. (2000).

Technology gap = Potential yield - Demonstration yield
Extension gap = Demonstration yield - yield under existing practice
Technology index = {(Potential yield - Demonstration yield)/Potential yield} x 100

The practices followed under the front line demonstration (FLD) and farmers' practices are given in Table 1.

Results and Discussion

In order to assess the impact of training programmes on the knowledge level of farmers regarding cumin cultivation practices, the data were classified in to pre and post training programme (**Table 2**). It was observed that initially 75 per cent farmers were possessing low, 17 per cent medium and 6 per cent high level of knowledge whereas after acquiring training the values were 11 per cent for low, 7 per cent for medium and 80 per cent for high level of knowledge. Thus, indicating that there was a considerable increase in the knowledge level of farmers who attended the ARS programmes organized both on campuses as well as off campus.

On perusal of the data (**Table 3**), it was inferred that demonstration of various production technologies resulted in the increased level of adoption, thus confirming the notion that "Seeing is believing".

Though in the adoption of an enterprise number of factors is responsible but economic factor is the most important. In case of front line demonstrations, it was observed that farmers generally make use of all the required inputs at their plots but the method of application, dose or time of application is not as per recommendations. Most of the time farmers take advice from the fallow farmers. Hence, conductance of FLD programmes proved an important activity of the ARS and resulted in the increased adoption of the technology demonstrated. The data showed that 75.0 per cent of the farmers had low level of adoption which was increased to 77.0 per cent. Thus, it can be said that overall knowledge level and adoption level of the farmers about package of practices of cumin had increased up to 80.0 per cent and 77.0 per cent, respectively after acquiring training at ARS, Mandor.

Similarly all the ex trainees were interviewed about individual production technology and the data are presented in **Table 4**. It was evident that farmers took keen interest about the performance of new and improved varieties as well as all were knowledgeable about seed rate, time of sowing, weeding, harvesting and storage. The knowledge was quiet low with regard to physiological aspects of crop management and bio fertilizers.

Table 2 Change in knowledge level of farmers before and after training

S No	Knowledge level	Pre training	Post training
1	Low	75	11
2	medium	17	07
3	High	06	80

Table 3 Change in adoption level of scientific cultivation of cumin

S No	Category	Before training (%)	After training (%)
1	Low level of adoption	75	09
2	Medium level of adoption	19	12
3	High level of adoption	04	77

Table 4 Knowledge level of farmers about package of practices of cumin

S No	Particulars	Knowledge level		
		Low	Medium	High
1	High yielding and disease resistant varieties	14	15	69
2	Soil treatment and field preparation	8	15	85
3	Seed treatment	7	11	80
4	Crop rotation	12	22	64
5	Time of sowing	6	13	79
6	Seed rate and spacing	14	8	76
7	Manure, Bio-fertilizer and Chemical fertilizers	19	6	73
8	Irrigation management	17	12	69
9	Weeding	5	12	81
10	Plant protection measures	12	15	71
11	Physiological aspects	23	34	41
12	Integrated nutrient management	17	10	71
13	Harvesting, thrashing and storage	8	10	80

Yield Gap Analysis of Cumin Cultivation

Results of frontline demonstrations conducted during 2015-16 and 2016-17 in 50 ha area on farmers' fields of three villages each of Nagaur & Jodhpur districts indicated that the cultivation practices comprised under FLD *viz*., use of improved variety (GC 4), line sowing, balanced application of fertilizers (N:P:K @ 30:20:15 kg/ha^{-1}) and control of cumin aphid through insecticide, blight and powdery mildew by fungicides at economic threshold level, produced on an average 20.85% more yield of cumin as compared to local check (5.96 q/ha). The results clearly showed that due to enhanced knowledge and adoption of scientific practices, the yield of cumin increased by 21.90 per cent and 19.80 per cent over the yield obtained under farmers practices during the year 2015-16 and 2016-17, respectively. The year-to-year fluctuations in yield and cost of cultivation can be explained on the basis of variations in prevailing social, economical and prevailing microclimatic condition of that particular village. Mukherjee (2003) has also opined that depending on identification and use of farming situation, specific interventions may have greater implications in enhancing systems productivity. Yield enhancement in different crops in Front Line Demonstration has amply been documented by Haque (2000), Tiwari and Saxena (2001), Tiwari *et al*. (2003), Singh *et al*. (2012), Sharma(2004), Jaitawat (2006) and Dubey *et al*. (2010). The results further indicated that the yield of cumin in the following years increased successively due to FLD which had a very good impact over the farming community of Nagaur and Jodhpur districts as they were motivated by the new agricultural technologies applied in the Front Line Demonstration plots (**Table 5**).

% = Per cent,

(EG) Extension gap= Demonstration yield- Farmers yield

(TG) Technology gap = Potential yield - Demonstration yield

(TI) Technology index= $\frac{\text{Potential yield - Demonstration yield}}{\text{Potential yield}} \times 100$

Table 5 Exploitable productivity, technology gaps, technology index, extension gaps and cost benefit ratio of cumin as grown under FLD and existing package of practices

Year	Area (ha)	No. of FLDs	Yield (q/ha)		% increase over existing practices	Extension gap (q/ha)	Technological gap (q/ha)	Technology index (%)	Cost benefit ratio	
			FLD	Existing practices					FLD	Existing practice
2015-16	25	25	5.46	4.48	21.90	0.98	1.54	22.03	3.12	1.82
2016-17	25	25	8.91	7.43	19.80	1.47	1.09	10.92	2.89	1.94

Moreover from first year onwards, farmers co-operated enthusiastically in carrying out of Front Line Demonstrations which lead to encouraging results in the subsequent years. More and more use of latest production technologies with high yielding varieties will subsequently change different this alarming trend of galloping extension gap. The new technologies will eventually lead to the farmers to discontinuance of old varieties with the new technology. Average extension gap was 1.22 q/ha and it ranged from 0.98 q/ha to 1.47 q/ha during the period of study which emphasized the need to educate the farmers through various means for the adoption of improved agricultural production technologies to reverse this trend of wide extension gap. The technology gap observed may be attributed to difference in the soil fertility status, agricultural practices, local climate conditions, rainfed agriculture and timeliness of availability of inputs. Hence, variety wise location specific recommendation appears to be necessary to minimize the technology gap for yield level in different farming situations. Lower the value of technology index, more is the feasibility of the technology demonstrated (Sagar and Chandra, 2004). Economic analysis of the yield performance revealed that cost benefit ratio of demonstration plots were observed significantly higher than control plots. The cost benefit ratio of demonstrated and control plots were 3.12 and 1.82 & 2.89 and 1.94 during year 2015-16 and 2016-17, respectively. Hence, favourable cost benefit ratios proved the economic viability of the intervention made under demonstration and convinced the farmers on the utility of intervention. Similar findings were reported by Haque (2000) in rice, Sharma (2003) in moth bean and Singh and Meena (2011) in cumin. The data clearly revealed that the maximum increase in yield observed was during 2015-16, while maximum cost benefit ratio was observed during 2016-17. The variation in cost benefit ratio during different years may mainly be on account of yield performance and input output cost in that particular year. Thus FLD obtained a significant positive result and also provided the researchers an opportunity to demonstrate the productivity potential and profitability of the scientific management under field conditions.

Conclusion

From the above results and discussion it can be concluded that knowledge level and adoption level of the farmers enhanced after imparting training and conducting FLDs by ARS scientists. ARS is working as a knowledge hub for latest agricultural technology in Rajasthan Agro-climatic Zone IA. The frontline demonstration conducted on cumin at farmer's fields in Nagaur and Jodhpur district of Rajasthan revealed that the farmers can get increased cumin yield by following the recommended package of practices. It can improve the quality as well as productivity of the cumin. The productivity gain under FLD over farmer's practice created awareness and aggravated the other farmers to adopt scientific crop management and high yielding variety of cumin in the district. This study suggests for conducting intensive trainings, FLDs and effective use of all means of extension education to educate the cumin growers for higher production of cumin and to increase net return on sustainable basis. Thus, it can be concluded that timely training and well framed frontline demonstration conducted under the close supervision of scientists is one of the most important tool of extension to demonstrate newly released crop production and protection technologies and its management practices in the farmers' field under different agro-climatic regions and farming situations. Trainings and FLDs are playing important role in motivating the farmers for adoption of improved agriculture technology resulting in increasing their yield and profits.

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