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RESEARCH PAPER

Transfer of technologies for cultivation, constraints and its adoption of cumin in Barmer district

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Abstract : Cumin (*Cuminum cyminum*) is an important low volume high value seed spices crop grown in India. India is the largest producer and consumer of cumin seed in the world. In India, Gujarat is the leading state in cumin production while Rajasthan in acreage. Cumin is the major *Rabi* crop of Barmer district. It is grown in 104828 ha area with an annual production of 28410 tones (*Rabi* 2010-11). Average productivity of cumin is 348 kg/ha while in Gujarat it is 749 kg/ha. The yield of cumin crop is adversely affected by incidence of wilt and blight diseases and attack of aphid. To increase the productivity of cumin, high yielding cumin variety RZ 19 was evaluated at farmer's field during *Rabi* 2010-11. Thirty demonstrations were conducted at farmer's field. Grain yield of cumin variety RZ 19 under improved practices was 5.15q/ha, increased significantly by 20 per cent over farmers practice (control). In terms of monitory return the net gain per hectare was Rs. 60150/- and was Rs. 11000/- higher by investing additionally Rs. 1900/-. Improved package of practices fetched a higher B:C ratio of 3.5 while farmers practice gave 3.2. The yield range in improved practice was 3.10-7.30 q/ha while under farmers practice it ranged from 2.54 - 4.50 q/ha. In improved package of practices, inputs supplied to farmers were improved seed, seed treatment by chemicals and bio fertilizers. During crop period and after harvest the reaction of farmers about critical input supplied under demonstration was asked and they replied variety showed vigorous plant growth, gave good seed yield than other local seed available in the region, seed treatment with carbendazim, *Trichoderma* resulted in less incidence of wilt. While the farmers suggested wilt resistant varieties should be developed and major constraints were the unavailability of newly released seeds and plant protection chemicals in time.

Key Words : Transfer of technology, Cumine, Constraints and adoption of cumin cultivation

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INTRODUCTION

Cumin (*Cuminum cyminum*) is an important low volume high value seed spices crop grown in India. India is the largest producer and consumer of cumin seed in the world. In India, Gujarat is the leading state in cumin production while Rajasthan in acreage (Table 1). Cumin is the major *Rabi* crop of Barmer district. It is grown in 104828 ha area with an annual production of 28410 tones. Average productivity of cumin is 348 kg/ha while in Gujarat it is 749 kg/ha. Out of the total production, about 90 per cent of the total is produced by five contiguous districts of this region *i.e.* Barmer, Jalore, Nagaur, Pali and Jodhpur. The yield of cumin crop is adversely affected by incidence of wilt and blight diseases and attack of aphid. Cumin seeds have an aromatic fragrance due to an alcohol, cuminol. The seeds are largely used as condiments in the form of an essential ingredient in all mixed spices and in curry powder for flavouring, vegetables, pickles, soups etc. Besides, it has medicinal properties and is used as a carminative, stomachic, astringent and is useful against diarrhea. Cumin is largely exported in form of seed. Some quantities are also exported in form of cumin seed oil, cumin powder and cumin oleoresin.

MATERIALS AND METHODS

A study of 30 frontline demonstrations on cumin as a

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major spice crop was conducted on farmer's field during 2010-11 in arid region of western Rajasthan to evaluate the economic feasibility of technology transfer and adoption under front line demonstration programme. These demonstrations were conducted at farmer's field at village Balera, Katarala, Rohilla, Bhilo ki Basti and Bhimda. Out of thirty demonstration, 11 demonstrations were conducted on farmers belonging to SC and ST category. The crop was sown from 2nd week of November to 4th week of November. During this period extension activity like field days, farmer's trainings, literature, SMS, diagnostic visits etc were undertaken which benefitted the farmers. The farmers selection was made as per guidelines provided by Zonal Project Directorate to bridge the gap existing between state productivity and district productivity (Table A) and the whole package approach demonstrated to farmers through FLD trials included component such as variety, seed rate, seed treatment, weed management and irrigation through sprinkler, fertilizers and plant protection measures. Under strict supervision of KVK scientists study was conducted from sowing to harvesting. Data on crop yield was recorded by per sq. meter observation method randomly from 3 to 4 place from an acre. The data generated were utilized for calculating the technology index, technology and extension gaps using the following formula:

Table A : Area, production and productivity of cumin in Rajasthan *Rabi* 2010-11

Districts	Area(ha)	Production (tonnes)	Productivity (kg/ha)
Barmer	104828	28410	271
Jalore	88885	27030	304
Jodhpur	58157	25379	436
Ajmer	7586	2235	295
Nagaur	33281	15153	455
Jaisalmer	16129	8254	511
Pali	8627	3896	452
Sirohi	3591	1248	348
Rajasthan	330637	114925	348
Gujarat	293000	219000	749

Technology gap: Improved yield – Farmers yield

Extension gap: Potential yield - Improved yield

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

RESULTS AND DISCUSSION

The study revealed that improved technology (5.15 q ha^{-1}) registered 20 per cent increase in seed yield over the farmers practice (4.29 q ha^{-1}). The ranges of average yield were 3.10-7.30 qha^{-1}, 2.54-4.50 qha^{-1} in demonstration and farmers plots, respectively. The most favourable one for cumin when the highest yields of 7.30 and 4.50 qha^{-1} in FLD and farmer's practice, respectively were recorded. It was evident from the yield levels recorded in demonstrations that the improved package of practices can boost the yield to the tune of even 2.80 qha^{-1} (Table 2). These results confirm those obtained by conducting in FLD trials on various pulse crops (Das and Willey, 1991). Overall, the yield of demonstration plots exceeded to that of farmer's plots in all FLD. This was attributed to the quality seed used, adequate seed rate, management practices and judicious use of fertilizers. In terms of monitory return, the net gain per hectare was Rs. 60150/- and was Rs. 11000/- higher by investing additionally Rs. 1900/-. Improved package of practices fetched a higher B:C ratio of 3.5 while farmers practice gave 3.2 (Table 1). The data revealed that the technological gap existing between the potential and demonstrable yields was not substantial (0.86). Thus indicating that it was possible to replicate the results obtained in research experiments in real farm situation too. Results also indicated an extension gap between the improved technology and farmers practice. Due to this, a gap of 3.85qha^{-1} was in yield and which could be overcome by adopting improved varieties and efficient management practices. Technology index 22.33 gave evidence that there was a scope for further improvement in the productivity of isabgol. The marginal difference between benefit-cost ratio of improved practice and farmer's practice proved adoption of improved technologies by the farmers. However, to further bridge the gap between technology developed and technology transferred, there is a need to strengthen the extension network besides emphasis on specific local recommendations.

Table 1 : Impact of improved technology on the economics of cumin cultivation (Rs./ ha)

Sr. No.	Particulars	Year 2010-11
1.	Production cost	
	Improved practice (IP)	17100
	Farmers practice (FP)	15200
2.	Additional cost over FP	1900
3.	Gross return	
	IP	77250
	FP	64350
4.	Net return	
	IP	60150
	FP	49150
5.	B:C ratio	
	IP	3.52
	FP	3.23
6.	Additional return	11000
7.	Increase in net return (%)	22.4
8.	B:C on additional input in demonstration	5.78

IP- Improved practice; FP- Farmers practice

Table 2 : Impact of improved technologies on the productivity and gaps of cumin cultivation

No. of FLD's	Variety	Mean yield (q/ha^{-1})		Range yield index (q/ha^{-1})		Technology gap (q/ha^{-1})	Extension gap (q/ha^{-1})	Technology index (%)
		Improved practice	Farmers practice	Improved practice	Farmers practice			
2010-11 (30)	RZ 19	5.15	4.29	3.10-7.30	2.54-4.50	0.86	3.85	22.33

Potential yield of cumin -09 q/ha TG=IP-FP and EG= PY-IP TI=TG/PY*100

Reactions and constraints:

During crop period and after harvest the reaction of farmers about critical input supplied under demonstration was asked and they replied good seed germination, early maturity of the variety than local seeds. While the farmers suggested wilt tolerant varieties should be developed and major constraints were the unavailability of newly released seeds and plant protection chemicals on time and in view of marketing lack of proper post harvest management and value addition and lack of centralized facilities for cleaning, grading, processing, packing and storage in the state are prior requirement.

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