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Knowledge and adoption of recommended cumin production technology by the farmers in Barmer district of Western Rajasthan

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Abstract
The study was carried out in four (Barmer, Chohatan, Dhanau and Sheo) blocks of Barmer district of Rajasthan. The Barmer, Chohatan, Dhanu and sheo blocks were purposively selected because of large number of farmer participation in KVK's training programme. The data regarding gain in knowledge and adoption level about improved cumin production technologies were recorded under two heads like; knowledge before training and knowledge after training. The findings of the study revealed that farmers had gained knowledge about cumin production technology ranging from 31.67 per cent of crop rotation to 89.17 per cent of land preparation after training programmes.

Keywords: Adoption of recommended cumin production technology, farmers

Introduction
Arid and semiarid parts of the India are known as Seed Spices Bowl (Rajasthan and Gujarat) and contribute more than 80% of total seed spices production. India has an old history of cultivation of spices and takes benefit of being a largest producer, exporter and consumer in the world. There are about 63 spices which are grown in India and out of which 20 have been classified as seed spices. The major seed spices grown in India are cumin, fenugreek, coriander and fennel.

Cumin (*Cuminum cyminum* L.) commonly known as Jeera is an important seed spice crop grown in western part of India (Fig. 1). Cumin seeds have an aromatic fragrance due to an alcohol 'cuminol'. It is mainly used in flavoring foods and also used in Ayurvedic medicines. and its seeds are largely used as condiments in the form of an essential ingredient in all mixed spices and in curry powder for flavoring, vegetables, pickles, soups etc. It also has medicinal properties and is used in treatment of carminative, stomachic, astringent and in diarrhea. Essential oil and oleoresin from cumin have a good international market. The essential oil quality of cumin grown under different AESR of Rajasthan and Gujarat has been studied by Dubey, *et al*., 2016 and 2017 [1, 9]. India is the single largest producer as well as consumer of cumin in the world, accounting for about 70% of world production. Other important producers of cumin country are Syria, Iran and Turkey (Fig. 1).

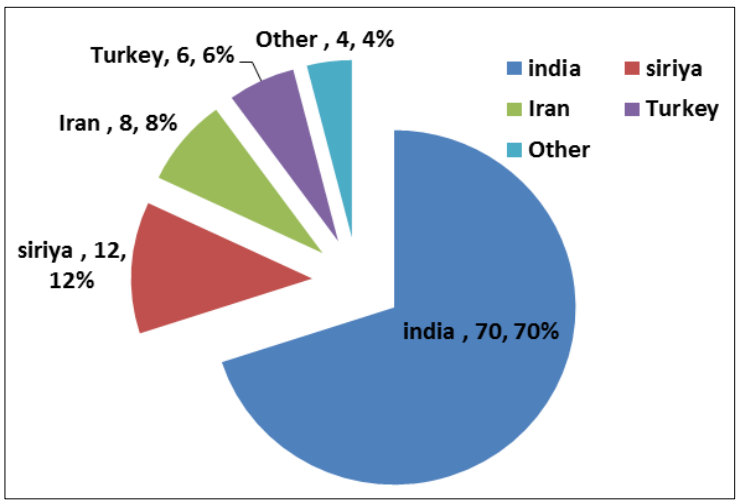

Fig 1: Share of India in world cumin production

The exporters must consider the permissible limits of chemical in export material to avoid rejection of material to get more foreign exchange. Cumin is the major Rabi crop of western Rajasthan (Jodhpur, Barmer, Jalore, Jaiselmer, Nagore, Pali etc.) and contributes around 96% of total acreage and production (Table 1). More than 50% of the total production is marketed in Krishi Upaj Mandis of Gujarat i.e. Unjha, Deesa, Mehsana etc instead in local Mandies.

The major factors responsible for low production and productivity are: less availability of high yielding and resistant varieties, lower adoption of recommended plant production and protection technologies and low level of awareness among the farming community about area specific recommended package of practices of cumin.

The farmers could increase their benefit through adoption of new technologies. The adoption of improved technologies requires high level of technical knowledge in areas package of practices and synchronized with needs and requirement of farmers like sowing method & time, proper post-harvest handling, selection of suitable variety, proper nutrient management, insect-pest and diseases management, etc. Due to technological advancement in cumin cultivation, there is a strong need to train the growers to keep them abreast about improved technologies for improving their knowledge and increasing income. Thus, the present study was designed to know the extent of Knowledge level of farmers about improved production technology of cumin.

Table 1: Area, production and productivity of cumin in Rajasthan during 2017-18

Districts	Area (ha)	Production (t)	Productivity (kg/ha)
Barmer	151231	50254	332
Jalore	91902	48604	529
Jodhpur	157616	105417	669
Nagaur	73418	43666	595
Jaisalmer	62312	32879	528
Pali	16900	6553	388
Sirohi	6839	3914	572
% contribution in state production	96%	96%	
Rajasthan	581364	302928	521
Gujarat*	382720	384470	1020

Source: Rajasthan Agricultural Statistics at a glance (2017-18): Directorate of Agriculture, Rajasthan, Jaipur

*****Horticulture Statistics at a glance 2018: NHB Govt of India

Materials and Methods

The study was conducted in Barmer, Chohtan, Dhanau and Sheo blocks of Barmer district in Rajasthan. In the district there were 17 blocks. Out of which Barmer, Chohtan, Dhanau and Shoe blocks (Four) were selected purposively and only 12 villages (three villages each block) were selected. From each selected village, 10 cumin growers were selected on the basis of random sampling method. Thus the total sample size was 120 respondents for the purpose of investigation. A well-structured and pre-tested schedule and faced to faced voice interviews were used to collect the information from the cumin growers. The productivity in state could be enhanced through adoption of good agricultural practices particularly by adequate supply of improved seed (wilt resistant variety), availability of non-persistent chemicals for soil and seed treatment, IPM and ICM practices have been assessed (Table:-3). The responses observed from the different farmers were divided into two categories i.e., correct and wrong. The statement having "wrong" responses was given zero mark and the statement having "correct" was given one mark. So, individual Cumin grower can get maximum marks of 15 as good Agricultural practices and thus a minimum mark was zero. The scores obtained under various practices were summed up with both respondent wise and as well as component wise and computed in to low, medium and high knowledge level on the basis of socio economic status. The collected data were analyzed with suitable statistical tools.

Results and Discussion

Background information of the cumin growers

The respondents were categorized into different groups on the basis of their some of the important characteristics like:- age, education, occupation, size of land holding and animal possession were selected for the study and the findings of which have been presented in (Table-2). These all result; similar results were reported by Choudhary M.K., *et al*. (2016) [4] & Singh B (2010) [7].

Age: The data presented in (Table-2) shows that nearly half (53.33 per cent) of the cumin growers were belonged to young age followed by 35.00 per cent and 11.67 had middle age and old age, respectively.

Education: The data presented in (Table-2) shows that slightly more than two fifth (45 per cent) of the cumin growers were having primary level of education followed by 27.5 per cent illiterate, 17.5 per cent had education up to higher secondary and 10 per cent were had above higher secondary level, respectively. Similar results were reported by Choudhary, M.K., *et al* (2016).

Occupation: The data presented in (Table-2) shows that vast majority (65.00 per cent) of the cumin growers were engaged in the farming and animal husbandry, followed by 18.33 per cent farming, 10.00 per cent Business men respectively. Whereas only 6.67 per cent had farming + service of them were engaged in farming only and none of the growers were found to have engaged in job.

Size of land holding(Type of farmer): The data presented in (Table-2) shows that nearly half (42.50 per cent) of the cumin growers had semi medium size of land holding followed by 21.67 per cent, 16.66 per cent, 12.50 per cent and 6.67 per cent had, medium, small, large and marginal size of land holding, respectively.

Experience of cumin cultivation: The data presented in (Table-2) shows that vast majority (55.00 per cent) farmers, in case of medium experience of cumin scientific cultivation the data revealed that highest cumin growers whereas cumin experience had 35 low and 10 medium respectively. These result similar reported by Choudhary M. *et al*, (2019) [5].

Mass media exposure: The data presented in (Table-2) out of total 120 respondents under study, 50.00 per cent had a medium exposure to the mass media followed by31.67 per cent and 18.33 per cent had low and high exposure to the mass media, respectively, Choudhary *et al* (2019) [5] and Singh *et al* (2014) also lending support to the present findings shows that nearly half (47.00 per cent) of the growers had marginal size of land holding followed by 28.00 per cent, 19.00 per cent and 06.00 per cent had small, medium and large size of land holding, respectively.

Table 2: Distribution of farmers according to their characteristics n=120

No	Category	Frequency	Per cent (%)
1	**Age**		
	Young (Up to 30 years)	64	53.33
	Middle age (31 to 55 years)	42	35.00
	Old age (above 55 years)	14	11.67
2	**Education**		
	Illiterate	33	27.5
	Primary level	54	45
	High school and Higher secondary	21	17.5
	Above Higher secondary	12	10
3	**Occupation**		
	Farming	22	18.33
	Farming + Animal husbandry	78	65
	Business	12	10.00
	Farming + service	8	6.67
4	**Type of farmer (land holding)**		
	Marginal (below to 1.00 ha)	8	6.67
	Small (1.1 ha to 2.00 ha)	20	16.66
	Semi Medium (2.1 ha to 4 ha)	51	42.50
	Medium (4.1 ha to 10 ha)	26	21.67
	Large (10 ha & above)	15	12.50
5	**Experience of cumin cultivation**		
	Low (1-5 year)	42	35
	Medium (5-10 year)	66	55.00
	High (above 10 year)	12	10.00
6	**Mass media exposure**		
	Low	38	31.67
	Medium	60	50.00
	High	22	18.33

The level of knowledge of the respondents regarding recommended cultivation practices technology of cumin

Table 3: Comparison of Improved v/s farmers practices for cumin cultivation

S. No.	Particular	Improved package Practice	Farmers practices
1.	Variety	GC 4, RZ 223	Local
2.	Seed rate	12 kg/ha Broadcasting & line sowing 6-7 kg ha.	15 – 20 kg/ha
3.	Seed treatment	Carbendazim @ 3g/kg. PSB + Azotobactor 500 g/ha each application of Trichoderma @ 2.5 kg/ha	Not applied
4.	Sowing method	Line Sowing	Broadcasting
5.	Fertilizer doses	30: 22: 00 (N: P: K kg/ha)	Imbalance use
6.	Plant protection measures	Need based spray of pesticides	No use of pesticides

It was evident from the data presented (Table 4) that the highest level of good agricultural practices of cumin knowledge was observed in soil and field preparation (89.17 %), followed by time of sowing (85.83%), harvesting, thrashing and storage (81.67%), seed rate (79.17%),use of high yielding varieties (73.33%), irrigation management (72.50), integrated pest management (70.83), integrated disease management (68.33%), sowing methods (67.50%), use of manure and bio fertilizer (65.83%), weed management (60.00%), seed treatment (40.83%), soil testing (35.83%) and crop rotation (31.67 %) respectively. Similarly findings were also reported by Dheeraj Singh *et al*, (2013), Chandawat, M.S. and Singh, H.P. (2012), Mahendra Kumar and S R Kumawat, (2019) [6] & S.K. *et al* (2017) [8].

Table 4: Knowledge level of farmers after training about Improved Cumin Production Technology for cultivation

Sr. No	Parameter	Knowledge level (N=120)	
		Frequency	Percentage
1	Soil & Field Preparation	107	89.17
2	Soil testing	43	35.83
3	Use of high yielding varieties	88	73.33
4	Seed treatment	49	40.83
5	Time of sowing	103	85.83
6	Seed rate	95	79.17
7	Sowing method	81	67.50
8	Use Manure & Bio-fertilizers	79	65.83
9	crop rotation	38	31.67
10	Integrated nutrient management	74	61.67
11	Irrigation management	87	72.50
12	Weed management	72	60.00
13	Integrated pest management	85	70.83
14	Integrated Disease management	82	68.33
15	Harvesting, thrashing and storage	98	81.67

Table 5: Distribution of the cumin growers under different knowledge levels categories (N=120)

S. N.	Knowledge level category	No. of respondent	Percentage of Respondent
1.	Low Knowledge (Score below 10)	12	10.00
2.	Medium Knowledge (Score 10-13)	83	69.17
3.	High Knowledge (Score above 13)	25	20.83
	Total	120	10.00

The respondents were categorized into three groups low (score below 10), medium (10-13) and high (above 13). It was observed data (Table 5) that majority of the respondents (69.17%) possess medium level of knowledge, followed by 20.83 % respondents having high level and 10.00 % having high level of knowledge regarding of recommended cumin production technology. A few of the respondents were having low knowledge which might be attributed due to the fear among them about the new innovations. Respondents and lack of specialized trainings about improved production technology of cumin crop in the area. Similar findings were reported by Jat *et al* (2011) [2], Patel *et al* (2004) [3] and Choudhary, M. *et al* (2019) [5].

Conclusion

From the above results and discussion it can be knowledge is one of the basic components that greatly affect the extent of adoption of scientific practices. By enhancing farmers knowledge and capabilities for applying new scientific techniques in farm sector will help them to maximization of profit. For enrich farmers knowledge training is one of the important aspects. Transfer of technology holds key to rapid development and transformation of rural society. Krishi Vigyan Kendras having district as jurisdiction, are playing crucial role in training and thereby enhancing productivity and income of the farming community. Thus, for organizing effective training programme, the present study was conducted in Barmer district of western Rajasthan to know the extent of Knowledge level of farmers about good agricultural production technology of cumin. The overall level of knowledge of cumin production technology was medium. Maximum knowledge was noticed in the practice of Soil & Field Preparation, Time of sowing and harvesting, thrashing and storage. Knowledge level of farmers should be increased in various aspects of cumin production technology i.e., Seed rate, Use of high yielding varieties, Irrigation management, Integrated pest & disease management, Sowing method, Use Manure & Bio-fertilizers, Integrated nutrient management, Weed management, Seed treatment, Soil testing and crop rotation through systematic training programme as well as field demonstration which could be more effective in future cumin production.

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