

Original Research Article

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## Knowledge of Recommended Production Technology of Fennel Cultivation by the Farmers in Nagaur District of Rajasthan, India

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### ABSTRACT

Seed spices occupy prominent place in the total basket of spices of the country and play a significant role in our national economy. The group of spices account for about 37 per cent and 18 per cent of the total area and production of spices in the country, respectively. Fennel (*Foeniculum vulgare*) commonly known as 'Saunf' is an important and highly valued spice grown in India. This crop is widely grown throughout the temperate and subtropical region of the world for its aromatic fruits used in various food preparations such as soups, meat dishes, sauces, pastries, confectionaries, pickles, liquors etc. The fennel seeds are aromatic, stimulants and carminative. Rajasthan is the third largest producer of spices in the country and accounts for 12.48 % of the total production of major spices. The major fennel producing districts of Rajasthan are Nagaur, Sirohi, Jalore, Dausa, Tonk, Sawai Madhopur and contribute above 90 per cent of area and production of fennel crop. Fennel is an important commercial cash crop of arid and semi arid region. There is a wide scope to improve and increase the fennel production and productivity by enhancing the knowledge and adoption of fennel production technology. The present study was conducted in eight villages (four villages from Mertacity tehsil and four villages from Degana tehsil) in Nagaur district of Rajasthan. A sample of 120 fennel growers was selected from these selected villages by using simple random sampling with proportion sample method. The results indicated that the majority of respondents (49.17 per cent) fall in high level knowledge group whereas, 35.00 per cent fennel growers were observed in the medium level knowledge group and remaining 15.83 per cent respondents possessed low level of knowledge. It was also observed that large farmers had more knowledge than small and marginal farmers.

#### Keywords

Fennel growers, Knowledge, Adoption, Large, small and marginal farmers.

#### Article Info

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### Introduction

India is known the world over as 'The Home of Spices', thus Spices and condiments need no introduction. The climate of the country is ideal for the growth of almost all spices. Spices are an important group of agricultural goods, which are virtually indispensable in the culinary art. They also play a significant

role in our national economy and also in the economies of several spice producing, exporting and importing countries. India accounts for about 45% of the global spice exports. In India, from the point of view of both domestic consumption and export, spices are important commercial crops.

Seed spices occupy prominent place in the total basket of spices of the country and play a significant role in our national economy. The group of spices accounts for about 37 per cent and 18 per cent of the total area and production of spices in the country, respectively. Seed spices are mainly cultivated in the states of Rajasthan, Gujarat, Andhra Pradesh, and Madhya Pradesh. Among these fennel, coriander, cumin, fenugreek, and Ajwain are cultivated on sizeable acreage as compared to other spices. It is the world's largest producer, consumer and exporter of seed spices which are being cultivated widely in the country over different agro climatic zones. Seed spices are not only for home consumption but also for improving economic status of the farmers.

According to the International Organization for Standardization [ISO], there are about 109 spices and India produces as many as 75 in its various agro climatic regions. The term "spices and condiments" applies to natural plant or vegetable products or mixtures in whole or ground form, which are used for imparting flavor, aroma and piquancy to the food items. Spices are also being used within the country for flavoring foods and in medicines, pharmaceutical, perfumery, cosmetics and several other industries.

In India fennel is cultivated over an area of 1,00,000 ha with the production of 1,43,000 MT and productivity of 1,430 kg/ha

Fennel (*Foeniculum vulgare*) commonly known as 'Saunf' is an important dominant and highly valued spice grown in India. This crop is widely grown throughout the temperate and subtropical region of the world for its aromatic fruits used in various food preparations such as soups, meat dishes, sauces, pastries, confectionaries, pickles and liquors etc. The fennel seeds are aromatic, stimulants and carminative.

Fennel oil is used as a flavoring agent in various culinary preparation, confectionary cordials and liquors. The percentage volatile oil in seed varies from 1.5 to 3.5 per cent. It contains 14-22 per cent protein with 12 to 18.5 per cent fat. It is used as a gripe water given to colicky infants. It is used to relieve bronchial spasms because of its antispasmodic properties. It targets the smooth muscles of the respiratory system, stomach muscles and intestines. Herbalists have used it for centuries to induce milk production in nursing mothers.

Rajasthan is the third largest producer of spices in the country and accounts for 12.48 of the total production of major spices. The state produces about 6,96,700 tones of seed spices from an area of 9,01,628 ha with productivity 4,832 kg/ha.

The major fennel producing districts of Rajasthan are Nagaur, Sirohi, Jalore, Dausa, Tonk, Sawai Madhopur and occupy above 90 per cent of area and production of fennel crop. The average area, production and productivity of last five years are 13,404 ha, 11,085 tones, 827 kg/ha respectively.<sup>2</sup> So there are possibilities to increase its production by 40 to 50 per cent by adoption of improved technologies.

Fennel is an important commercial cash crop of arid and semi arid region. The production of spices is largely in the hands of small and marginal farmers and the level of productivity of most of the spices in India is below the level as prevailing in other countries. The lower productivity is attributed to lack of knowledge of high yielding varieties, ravages due to pest and diseases, inadequate post-harvest technology and poor processing and storage facilities. Keeping this fact in view the present study entitled "The knowledge And Adoption of Recommended Production Technology of Fennel Cultivation by the

Farmers in Nagaur District of Rajasthan” was undertaken.

<sup>1</sup>National Horticulture Mission 2011-12

### **Research Methodology**

The present investigation was conducted in purposively selected Nagaur district of Rajasthan state highest area and great potential of increasing production and productivity. The researcher himself is resident of the area and acquainted with the farmers and their local dialect which facilitated easy rapport building and authentic data collection from the farmers.

The selected consist of twelve tehsils, Out of which two tehsils namely Mertacity and Degana with maximum area under fennel crop production were selected for the study purpose. Separate lists of gram panchayats of the selected tehsils were prepared with the help of concerned ‘patwaries’ of the Mertacity and Degana tehsils. Mertacity and Degana tehsils comprise of 42 and 34 gram panchayats respectively. Out of which two gram panchayats (Dava and Jaroda kala) from Mertacity tehsil and two gram panchayats (Sanjoo and Chonsli) from Degana tehsil were selected on proportionate random basis. Initially, a complete list of all the major fennel growing villages of the selected tehsils was prepared in consultation with the personnel of revenue department and Agriculture department of the concerned area. From the list so prepared, 4 villages from each Tehsil were identified on the random basis under fennel crop. Thus, in all eight villages were selected for the present investigation. A comprehensive list of all fennel growers was prepared separately for all selected villages of identified tehsils. In preparing the list, the help of revenue personnel and agricultural supervisor of the concerned area were taken for authenticity and counter check of information then, after

the farmers were categorized in to three categories *i.e.* large, small and marginal farmers. Following the procedure laid down above a sample of total 15 respondents *i.e.* 5 in each category from every selected village was drawn randomly. Thus the study sample for the present investigation was comprised 120 respondents (*i.e.* 60 from each Tehsil). Keeping in mind the objectives of study, the interview schedule was developed for the collection of data from the selected respondents.

### **Knowledge of Farmers about Recommended Fennel Production Technology**

Under this section the effort was made to find out the level of knowledge of farmers about improved fennel production technology. Knowledge as a body of understood information possessed by an individual is one of the important components of behavior and plays an important role in adoption of an innovation. Keeping this view in mind, the level of knowledge of farmers about improved fennel production technology was assessed. The results are presented in subsequent tables.

### **Distribution of respondents according to their knowledge about recommended fennel production technology**

To get an overview of the knowledge level, the respondents were grouped into (i) low (< 41.42), (ii) medium (41.42 to 73.30) and (iii) high (>73.30) knowledge level on the basis of calculated mean and standard deviation of the obtained knowledge scores. The distribution of respondents in each category is given in table 1.

The data in table 1 reveal that out of 120 respondents, majority of respondents (49.17 per cent) fell in high level knowledge group whereas, 35.00 per cent fennel growers were

observed in the medium level knowledge group and remaining 15.83 per cent respondents possessed low level of knowledge about improved fennel cultivation technology. Further analysis of data in table indicates that 10.00 per cent marginal farmers, 52.50 per cent small farmers and 85.00 per cent large farmers had high level of knowledge about improved fennel cultivation technology. Whereas, 67.50, 27.50 and 10.00 per cent marginal, small and large farmers possessed medium level of knowledge about improved fennel cultivation technology, respectively. On the other hand, 22.50 per cent marginal farmers, 20.00 per cent small farmers and 5.00 per cent large farmers were kept in the low level of knowledge group as they had poor knowledge about improved fennel cultivation technology. On the basis of above data, it could be inferred that majority of the large farmers possessed high level of knowledge about improved practices of fennel cultivation. With the results at hand it can be safely concluded that the existing knowledge of large farmers is comparatively higher than the marginal and small farmers in the study area

The present finding is in conforming to that of Jaitawat *et al.*, (2010) who revealed that majority of the respondents *i.e.* 72.50 percent fell in the medium knowledge group whereas 16.67 percent had low knowledge and only 10.83 per cent fennel growers possessed high level of knowledge.

### **Aspect-wise knowledge of respondents about recommended fennel production Technology**

To get a clear picture of knowledge possessed by fennel growers, aspect-wise knowledge of fennel growers was worked out. For this mean per cent scores for each practice were calculated and ranks were accorded. The results of the same have been presented in table 2.

The data presented in table 2 show that large farmers possessed 93.50 per cent of knowledge about soil and field preparation aspect of fennel production technology whereas, knowledge of small and marginal farmers about this practice was comparatively less with 58.00 per cent and 74.00 per cent scores. The knowledge about this aspect was ranked first by the marginal and large farmers and small farmers, ranked it sixth.

Regarding extent of knowledge about high yielding varieties of fennel, the large farmers possessed 79.50 per cent of knowledge about improved fennel varieties, whereas knowledge of small and marginal farmers about this practice was comparatively less with 65.50 and 51.50 per cent respectively. It was observed that majority of the farmers had knowledge about the name of varieties of fennel namely RF-101, RF-125, Deepak, GF-1 and GF-2. They were fully acquainted with duration and average yield of these recommended varieties of fennel in the study area. The knowledge about this aspect was ranked sixth by the marginal, fourth by small and second by large farmers.

The knowledge about Seed treatment, it was noted that marginal, small and large farmers had 26.67, 45.00 and 70.00 MPS of knowledge, respectively. The knowledge about this aspect was ranked tenth by the marginal, ninth by small and eighth by large farmers.

The knowledge about Time of sowing, it was noted that marginal, small and large farmers had 71.43, 66.79 and 81.79 mean per cent scores of knowledge, respectively. The knowledge about this aspect was ranked second by the marginal and small farmers and fifth by large farmers.

Regarding knowledge about seed rate and spacing, it was noted that marginal, small and

large farmers had 70.00, 62.50 and 79.38 per cent knowledge, respectively. The above practice was ranked third by marginal and large respondents and fifth by small farmers. Majority of the respondents from all categories of farmers had full knowledge about recommended seed rate as 12 – 15 kg/ha and plant to plant distance as 10 -15 cm and row to row distance as 40 cm, the most appropriate spacing for fennel.

In case of fertilizers application, marginal, small and large farmers had 32.66, 57.97 and 69.06 per cent knowledge and were ranked ninth by marginal and large farmers and seventh by small farmers.

Whereas, in case of irrigation management, marginal, small and large farmers had 60.25, 67.75 and 88.50 per cent knowledge and was ranked fifth by marginal, first by small and fourth by large farmers, respectively.

Regarding knowledge about weed management practice it was placed at eighth rank by marginal farmers and small farmers whereas, at sixth by large farmers with 38.93, 52.86 and 76.07 MPS, respectively. The knowledge about quantity of chemicals used in weed management was observed poor in the study area.

Regarding knowledge about plant protection measures, it was found that marginal, small and large farmers had knowledge about 45.29, 29.12 and 65.88 per cent, respectively. Table 5.9 clearly shows that all the categories of farmers had high knowledge about plant protection measures and this aspect was ranked seventh by marginal farmers and tenth by large farmers and small farmers. It means that fennel growers were acquainted with plant protection measures; they had fairly

good knowledge about insect-pest of fennel in comparison to chemicals quantity used to control them.

As far as the knowledge about harvesting, threshing and storage was concerned, it was found that 64.00, 66.00 and 74.00 per cent knowledge was recorded by marginal, small and large farmers, respectively. The knowledge about this aspect was ranked fourth by the marginal, third by small and seventh by large farmers.

Thus, from the above discussion, it could be concluded that the extent of knowledge possessed by marginal farmers was 51.17 per cent, by small farmers it was 55.90 per cent, whereas in case of large farmers the extent of knowledge was observed to be 75.98 per cent in all the improved practices of fennel cultivation technology. Further, it could be concluded that large farmers had more knowledge than small and marginal farmers about all the fennel cultivation practices in the study area.

The findings of this study are in line with the findings of Chodhary (1999), Meena (2001), Jaitawat and Sharma (2008), Jangid (2001) Mahendra Singh (2012) and Surendra Kumar (2013).

### **Comparison of knowledge among marginal, small and large farmers about recommended fennel production technology**

To find out the significance of difference among the marginal, small and large farmers with respect to knowledge about improved fennel production technology, analysis of variance test (f test) was applied. The results are presented in table 3.

### Hypothesis

NH <sub>01</sub>	:	There is no difference among marginal, small and large farmers with respect to knowledge about improved fennel production technology.
RH <sub>01</sub>	:	There is a difference among marginal, small and large farmers with respect to knowledge about improved fennel production technology.

**Table.1** Distribution of respondents on the basis of level of knowledge about recommended fennel production technology

n =120

S. No.	Knowledge level	Marginal farmers		Small farmers		Large farmers		Total	
		F	%	F	%	F	%	f	%
1	41.42 (Low)	9	22.50	8	20.00	2	5.00	19	15.83
2	57.36(Medium)	27	67.50	11	27.50	4	10.00	42	35.00
3	73.30(High)	4	10.00	21	52.50	34	85.00	59	49.17
	Total	40	100.00	40	100.00	40	100.00	120	100.00

f = Frequency,  
% = per cent

$\bar{x}$  =57.36  
S.D= 15.94

**Table.2** Extent of knowledge of farmers about recommended fennel cultivation practices

n=120

S. No	Aspect/ Practices	Marginal farmers		Small farmers		Large farmers		Total	
		MPS	Rank	MPS	Rank	MPS	Rank	MPS	Rank
1.	Soil and field preparation	74.00	<b>i</b>	58.00	<b>vi</b>	93.50	<b>i</b>	75.17	<b>i</b>
2.	High yielding varieties	51.50	<b>vi</b>	65.50	<b>iv</b>	79.50	<b>ii</b>	65.50	<b>vi</b>
3.	Seed treatment	26.67	<b>x</b>	45.00	<b>ix</b>	70.00	<b>viii</b>	47.22	<b>ix</b>
4.	Time of sowing	71.43	<b>ii</b>	66.79	<b>ii</b>	81.79	<b>v</b>	73.33	<b>ii</b>
5.	Seed rate and spacing	70.00	<b>iii</b>	62.50	<b>v</b>	79.38	<b>iii</b>	70.63	<b>iv</b>
6.	Fertilizer application	32.66	<b>ix</b>	57.97	<b>vii</b>	69.06	<b>ix</b>	53.23	<b>viii</b>
7.	Irrigation management	60.25	<b>v</b>	67.75	<b>i</b>	88.50	<b>iv</b>	72.17	<b>iii</b>
8.	Weed management	38.93	<b>viii</b>	52.86	<b>viii</b>	76.07	<b>vi</b>	55.95	<b>vii</b>
9.	Plant protection measures	45.29	<b>vii</b>	29.12	<b>x</b>	65.88	<b>x</b>	46.76	<b>x</b>
10.	Harvesting, threshing and storage	64.00	<b>iv</b>	66.00	<b>iii</b>	74.00	<b>vii</b>	68.00	<b>v</b>
	Overall	51.17		55.90		75.98		61.02	

MPS = Mean per cent score

**Table.3** Comparison of knowledge among marginal, small and large farmers about recommended fennel production practices

Source of variation	d.f.	SS	MSS	'f' Value
Between the categories of farmers	2	12268.32	6134.16	59.0194*
Error	117	12160.35	103.9346	
<b>Total</b>	119	30243.59		

\*Significant at 1 per cent level

**Mean value table**

S. No.	Categories of farmers	Mean value	CD	SEM
1.	Marginal farmers			
2.	Small farmers	48.10	0.714	0.255
3.	Large farmers	52.55 71.43		

The data presented in table 3 show that calculated 'f' value 59.0194 is higher than tabulated value at 1 per cent level of significance. Thus, the hypothesis (NH<sub>01</sub>) is rejected and alternative hypothesis which stated that "there is a difference among marginal, small and large farmers with respect to knowledge about improved fennel production technology" was accepted. It infers that there was a significant difference in knowledge among marginal, small and large farmers about fennel production technology.

By comparing the mean value with critical difference (C.D.) value, it was found that there was a difference between large, small and marginal farmers about knowledge of improved fennel production technology. This reveals that large farmers possessed more knowledge than small and marginal farmers about fennel production technology. Higher knowledge of large farmers about improved practices of fennel cultivation was not unexpected. The large farmers of the study area had contacts with scientists of K.V.K. located in the district.

**Knowledge level of farmers about recommended production technology of fennel**

In conclusion, it was found that majority of respondents 49.17 per cent fell in high level knowledge group whereas, 35.00 per cent fennel growers were observed in the medium level knowledge group and remaining 15.83 per cent respondents possessed low level of knowledge about improved fennel cultivation technology..

It was observed that the extent of knowledge among marginal farmers was 26.67 to 74.00 per cent, whereas in case of small farmers and large farmers it was from 29.12 to 67.75 and 65.88 to 93.50 per cent in all the practices of fennel production respectively. Further, it was found that large farmers had more knowledge than small and marginal farmers about most of the fennel production technology.

The study revealed that there an existed difference among marginal, small and large

farmers with respect to knowledge about fennel production technology.

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