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Richa Sachan
Assistant Professor, Extension Education, College of Agriculture, Sumerpur, Pali Agriculture University, Jodhpur, Rajasthan, India

Hanuman Prasad Parewa
Assistant Professor, Soil Science, College of Agriculture, Sumerpur, Pali Agriculture University, Jodhpur, Rajasthan, India

Anirudh Choudhary
M.Sc. Scholar, Soil Science College of Agriculture, Sumerpur, Pali Agriculture University, Jodhpur, Rajasthan, India

Corresponding Author:
Richa Sachan
Assistant Professor, Extension Education, College of Agriculture, Sumerpur, Pali

Scenario of seed spices production in Rajasthan

Richa Sachan, Hanuman Prasad Parewa and Anirudh Choudhary

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Abstract
India is renowned world over for its rich repository of spices and is popularly called as the "land of spices". Altogether 9.7 lac ha of area is under cultivation of seed spices with the production ranging between 5-6 lac tones annually.
There is a large scope of seed spices by introducing them in new areas, the higher yields can also be achieved effortlessly by implementing new technologies and introducing modern cultural practices, enhancing the knowledge of latest techniques to the farmers and putting more area under these seed spices crops. The global demand for Indian Spices is increasingly day by day. It can be analysed that there is still a huge demand for Indian Spices all over the world.

Keywords: Seed spices, constraints, area, production

Introduction
Seed Spices are annual herbs, whose dried seed or fruits are used as spices. Spices are an integral part of our daily lives in Indian food. We use many spices in our food. We use leaves, flowers, fruits, seeds and roots of various plants as spices. Most part of these is seed spices such as coriander, cumin, celery, fennel, fenugreek etc. They are nature's gift to humankind and add flavour to our food in addition to having preservative and medicinal value.
Crop diversification in India is generally viewed as a shift from traditionally grown less remunerative crops to more remunerative crops. This intended to give a wider choice in the production of a variety of crops in a given area so as to expand production related activities on various crops and also to lesson risk (kalaiselvi, 2012) [2]. In this context, the seed spices have emerged as one of the important group of crops in India. 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. Otherstates where seed spices are commonly grown are Bihar, West Bengal, Uttar Pradesh, Madhya Pradesh, Orissa, Punjab, Karnataka and Tamil Nadu. Total 109 spices are listed by ISO and 63 spices are grown in India and out of which 20 are being classified as seed spices. The most prominent among them are cumin, coriander, fennel, fenugreek, ajwain, dill, nigella, celery, aniseed and caraway.
Seed spices play a significant role in our national economy because of its large domestic consumption and growing demand for export. India is exporting about14 percent of its production annually and full fill nearly 50percent of world demand. India is exporting only 15 percent of its production annually and full fill the 50-60 percent of world demand. The total export of seed spice crops is Rs 3738 crore, out of which cumin alone contributes Rs 2418 crore annually (Spice Board India, 2017-18). Other than India, seed spices are grown in different part of the world covering mainly Mediterranean region, South Europe and Asia. Morocco, Russia and Bulgaria are the major producing countries for coriander, Turkey, Iran and Egypt for Cumin; Egypt, China, Romania and Russia for fennel; Morocco and Bulgaria for fenugreek; Iran and Egypt for Ajwain. There is an increase of 29% in Coriander, 70% in Cumin, 3.1% in celery, 58% in Fennel, 49% in Fenugreek and 97% in others and overall 62%. It can be analysed that there is still a huge demand for Indian Spices all over the world. Keeping in view researcher can say that Seed Spices are not only the cash crops but there is also ahuge export potentiality.
The Rajasthan state occupies 10 percent of the total geographical area of the country, but the vast geographical area commands only 1 percent of the total water resources in the country. In Rajasthan, Pali, Jodhpur, Jaisalmer, Barmer, Nagaur and Bikaner districts contributes major

Area (Sahu, 2002) [9]. The major seed spices grown in Rajasthan are cumin, coriander, fennel, fenugreek and ajwain. Farmers in Rajasthan are growing seed spices as a cash crop next to their regular crops.

Table 1: Trends of seed spices production in Rajasthan

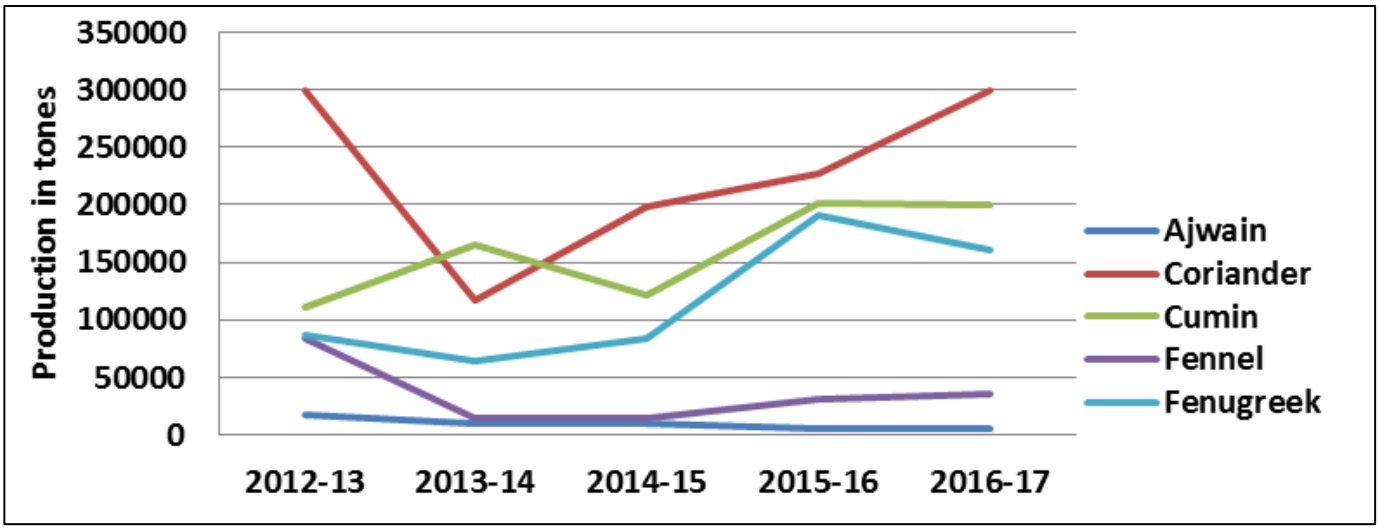
Common Name	Scientific Name	Family	Area Covered ha. (2016-17)		Remarks
			India	Rajasthan	
Ajwain	Trachyspermumammi	Apiaceae	24230	11658	Ajmer Ajwain 1 (AA-1), Ajmer Ajwain 2 (AA–2), Ajmer Ajwain -93 (AA-93), PratapAjwain 1, GA – 1, Lam Selelction–1, Lam Selection–2, Pant Ruchika, RPA-68
Coriander	Coriandrumsativum L.	Apiaceae	662345	214365	Ajmer Coriander -1 (ACr 1), Ajmer Coriander -2 (ACr- 2), RCr – 41, RCr – 20, RCr – 435, RCr – 436, RCr – 684, RCr – 446, RCr-728, GCr – 1, GCr – 2, CO- 1, CO- 2, CO- 3, CS- 287, RajendraSwathi, Rajendra Sonia, Sadhna, Swathi (CS – 6), Sindhu, GCr – 1, GCr – 2, CO- 1
Cumin	Cuminumcyminum L.	Apiaceae	760130	479674	RZ – 19, RZ – 209, RZ – 223, RZ-345, GC- 1, GC – 2, GC – 3, GC – 4
Fennel	Foeniculumvulgare Mill.	Apiaceae	74660	30720	Ajmer Fennel-1 (AF – 1), Ajmer Fennel-2 (AF-2), RF – 101, RF – 125, RF – 143, RF-205, PF – 35, GF – 1 (Gujarat Fennel – 1), GF – 2, GF – 11, Guj. F.-12, Co – 1, HisarSwarup
Fenugreek	Trigonellafoenumgraecum L	Fabaceae	218430	150000	Ajmer Fenugreek 1, Ajmer fenugreek 2, Ajmer Fenugreek 3, Ajmer Fenugreek 4, Ajmer Fenugreek 5, RMt – 1, RMt – 143, RMt – 305, RMt-361, GM – 1, CO – 1, RajandraKranti, Andhra Pradesh, Lam Selection–1, APHU Methi-1, HisarSonali, HisarSuvarna, HisarMukta, HisarMadhavi (HM – 350), HM-219, Pant Ragini, Pusa Early Bunching, PusaKasuri

***Source*:** NRCSS Vision 2050.

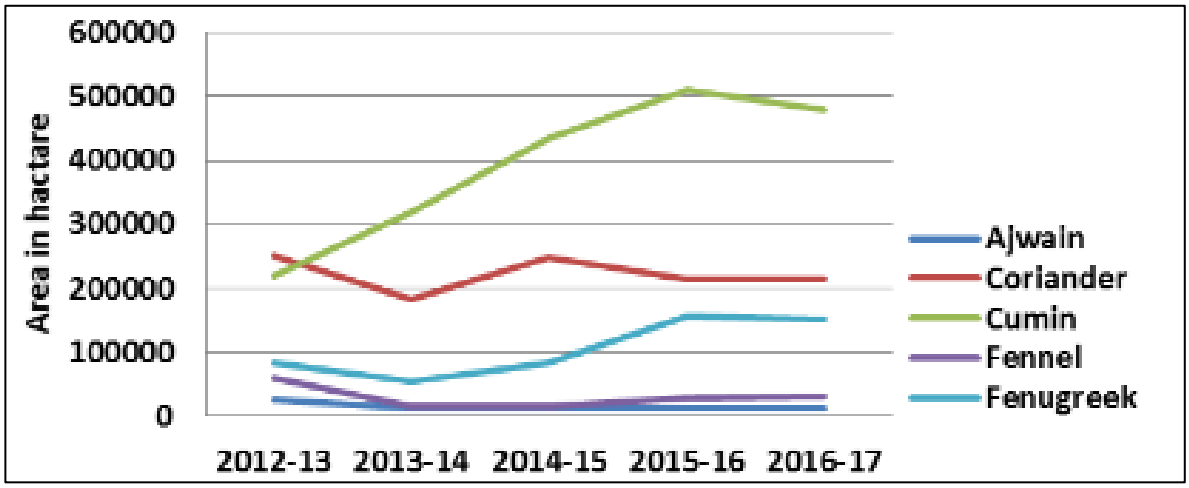
Table 2: Area and production of seed spices in India and Rajasthan

(Area in hectare and production in tones											
Seed spices		**2012-13**		**2013-14**		**2014-15**		**2015-16**		**2016-17**	
		Area	**Production**	**Area**	**Production**	**Area**	**Production**	**Area**	**Production**	**Area**	**Production**
Ajwain	India	39690	26620	39260	26610	24010	17180	26600	16010	24230	13820
	Rajasthan	24430	18011	12624	9220	12620	9220	11660	4670	11658	4672
Coriander	India	531070	503240	516070	496240	604090	546800	624780	572990	662345	609350
	Rajasthan	250000	300000	182725	117084	249310	198760	212730	227200	214365	300000
Cumin	India	593980	394330	690080	445030	701560	372290	808230	503260	760130	485480
	Rajasthan	220000	111000	320080	165030	434780	120830	511080	200850	479674	200000
Fennel	India	99610	142940	94070	135930	46760	78570	76000	129350	74660	124610
	Rajasthan	59044	84070	15161	14277	15560	13850	27590	30720	30720	35500
Fenugreek	India	93110	112870	90500	110530	124710	134100	227960	248350	218430	220160
	Rajasthan	82350	87382	55375	64101	81700	84190	157000	190360	150000	160000

***Source*:** Spice Board India



Graph 1: Year wise Production of seed spices in Rajasthan



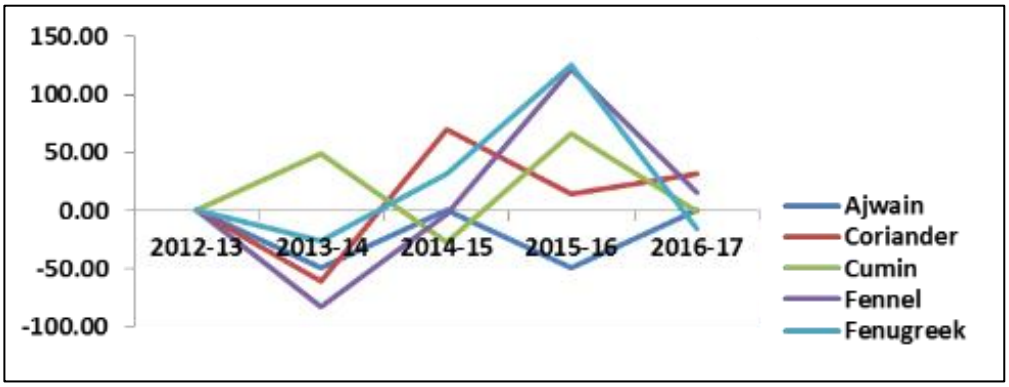
Graph 2: Year wise Area of seed spices in Rajasthan

Table 3: Productivity of seed spices in Rajasthan

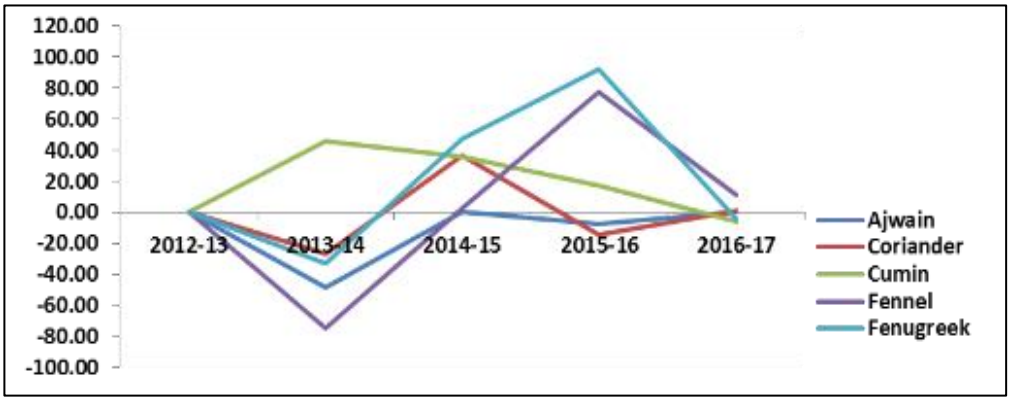
Year	Ajwain	Coriander	Cumin	Fennel	Fenugreek
2012-13	0.74	1.20	0.50	1.42	1.06
2013-14	0.73	0.64	0.52	0.94	1.16
2014-15	0.73	0.80	0.28	0.89	1.03
2015-16	0.40	1.07	0.39	1.11	1.21
2016-17	0.40	1.40	0.42	1.16	1.07

Table 4: Percent change in Area and Production of seed spices in Rajasthan during 2012-13 to 2016-17, Area (ha); Production (Tons)

Year	Crop wise change in (%)									
	Ajwain		Coriander		Cumin		Fennel		Fenugreek	
	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production
2012-13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2013-14	-48.33	-48.81	-26.91	-60.97	45.49	48.68	-74.32	-83.02	-32.76	-26.64
2014-15	-0.03	0.00	36.44	69.76	35.83	-26.78	2.63	-2.99	47.54	31.34
2015-16	-7.61	-49.35	-14.67	14.31	17.55	66.23	77.31	121.81	92.17	126.11
2016-17	-0.02	0.04	0.77	32.04	-6.15	-0.42	11.34	15.56	-4.46	-15.95



Graph 3: Percent change in Area of seed spices in Rajasthan during 2012-13 to 2016-17



Graph 4: Percent change in Production of seed spices in Rajasthan during 2012-13 to 2016-17

Major insect pests of seed spices

Seed spices crops attacked large number of predators and parasitoides due presence of its specific aroma, nectar and pollen on these crops. With the increase of temperature in Rajasthan the population of parasitoids found increased. The parasites *Aphaleeinuskurdijmovi* occurs regularly, reaches to its maximum (98 percent) which was observed during November-December, Kumaresan D, Regupathy A, Baskaran P (1988) [3]. The noctuids moth larvae *Spodoptera* and *Helicoverpa* attracted large number of parasitoides in field conditions. The common parasitoides are *Sturamiainconspicuoides, Actiamonticola, Euplectrusgopimohani*. For managing noctuids moth larvae at field conditions 4-6 inaculative releases egg parasitoids 150,000 like *Trichogramma Chilonus. T. Brasielensis* @150000 parasitoides/ha or starting at first appearance of the moths at 1-15 days interval is found useful., release of larval parasitoids such as *Chilonusblackburnii, Braconbrevicornis, Telenoumsheliothinae, Carceliaillota, Coteriakazat or Campoletiscloridae*, take care of the already hatched larvae. Coccienellied consist of major predator found feeding on various sucking pests of seed spices. Major coccienellid found predating on seed spices crops are, *Coccinella septumpunctata* L. *Bromoidessuturalis* F. *Menoochilussesxma calatus* and Adoniasp. Predatory bird myna (*Acridotherestristis*) was also found feeding on the aphid the other common predators of aphids are Chrysoperlacarnea, Episyrphusbalteatus and Ischiodonscutellaris, Singh MP (2007) [10] and Mittal VP, Butani PG (1994) [5].

Natural Control

Application of neem based commercial formulation like Neemarin at 1% and seed extract of neem (*Azadirachataindica*), karanj (*Pongamiasp.*), buken (*Meliasp.*) and pride of India (*Lagerstroemia indica*) reduce the aphid's population by 50 per cent within 7 days of application (Singh, 2007) [10]. Gupta and Rai, 2004 observed 80 per cent reduction of aphid *H.coriandri* population on coriander crop through spraying of 1.0% neem oil and achieve highest grain yield 983 kg/ha.In cumin crop aphid *M. Persicae* population was reduced more than 50% for 15 days by application Neem Seed Kernal Extract (NSKE) at 5%. Applications of neem oils and karanj oils successfully controlled early instars larvae of *H. armigera* and *S. litura*. Sharma KL, Kumawat KC, Yadav SR (2007) [11].

Chemical control

In coriander crop uses of aldicarb side dressing at 1.0kg/ ha, corbofuran 3G at 0.5kg ai/ha., phorate 10 G at 1.0kg/ha., endosulfan, 0.03%, phosphomidon 0.03%, monocrotophos 0.03% effectively reduce the aphid population and increased yield. Thrips (*Thripstabaci* and *Scirtothripsdorsalis*) and mite on coriander was controlled by use of monocrotophos at 0.5 kg/ha and chlorpyriphos at 0.05- 1.0%.

In cumin crop spraying of phosphomidon-0.03%, monocrotophos -0.03% at 2-week intervals after first appearance of aphids give effective protection. The seed yield o treated plot was 4.7q/ha in compared to 3.0 qt/ha on untreated plot. Gupta BM, Yadav CPS (1986) [1].

In fennel crop at flowering stage application of methyl parathion 0.025% and endosulfan 0.07% minimizes infestation of seed midge during storage.Mittal VP, Butani PG (1995) [6]. Two application of metasystox at 0.05% significantly reduce thrips population on fennel crop. Sagar P (1987) [8].

In fenugreek crop application of dimethoate at 0.045% and metasystox at 0.03% gave maximum aphid control and give highest yield (6.87 and 6.27 qt/ha).

Effective management of *Spodopterlitura* and *Helicoverpaarmigera* on cumin, coriander, fennel ajwain and fenugreek were achieved by application of 0.05% monocrotophos fallowed by 0.2% aldicarb after 10 days, fenvalerate 50g ai/ha. or endosulfan at 700 g a.i./ha Kumawat KC, Singh SP (2001) [3].

Table 5: Major disease of seed spices

Seed Spice	Major Disease
Ajwain	Alternaria blight, collar rot, powdery mildew
Coriander	Stem gall, powdery mildew, wilt, Blight disease
Cumin	Wilt, powdery mildew, Blight
Fennel	Wilt disease, leaf Blight, powdery mildew, Blight
fenugreek	Dumping off, leaf spot, leaf blight, downey mildew, powdery mildew

Control

Methodology developed and recommended by NRCSS, Ajmer for control of important diseases are as under.

- Application of mustard residue (2.5 t/ha) + mustard cake (0.5 t/ha) + neem cake (0.5 t/ha) as soil amendment with one irrigation during hot summer.
- Application of T. viride or A. versicolar as seed treatment @10g/kg seed and soil application @ 2.5 kg/ha mixed with 50 kg of FYM at the time of sowing.
- ST with Trichoderma, SA with cator cake and FS with chlorothalonil followed by two sprays of difenoconazole and azoxystrobin was found most effective for the management of Alternaria blight of cumin.
- Soil Solarization in combination with oil cakes has been found highly effective.
- Two sprays of Neem oil (2%) at 10 days intervals during flowering in evening hours.

Other constraints in cultivation of seed spices in Rajasthan are

Scanty rainfall and inefficient water management, Non availability of high yielding disease resistant varieties, Lack of proper training to the seed spices growers, traders, processors and exporters, lack of quality management (intrinsic as well as extrinsic quality parameters), socio-economic constraints and Integrated Farming Approach needs preferential attention.

Summary

Seed spices contribute 10-12% of total export of spices. India ranks second in agriculture in all over the world. The seed spices productionhas increased and has also established the record in export quantity and value. Seed spices are good alternative crops in terms of economic returns for crop diversification in Rajasthan. They fetch more price and increases farm income as compared to traditional crops. Constraints of Seed spices production in Rajasthan can be solved with the increase the various sources of production. More effective and continuous efforts are needed to increase the area under cultivation of Seed spices. Integrated water and nutrient management approach should be considered for agro-climatic regions. There is need to train seed spices growers, traders, processors and exporters and also need to develop integrated pest management which are environment friendly.

References

1. Gupta BM, Yadav CPS. Susceptibility of released and elite cumin germplasm to aphid. Indian Cocoa, Arecanut and Spices Journal. 1986; 9(3):174-76.
2. Kalaiselvi V. Pattern of crop diversification in Indian scenario. Annals of Bio Res. 2012; 3(4):1914-1918.
3. Kumawat KC, Singh SP. Bio efficacy of insecticide against aphids, Acyrthosiphonpisum on fenugreek. Annals of Plant Protection Science. 2001; 8:167-171.
4. Kumaresan D, Regupathy A, Baskaran P. Pest of Seed Spices. Rajalakshmi Publication, 1988, 1-241.
5. Mittal VP, Butani PG. Pests of Seed Spices. In Advances in Horticulture Volume-10Plantation and Spice Crop part-2. (Chadha KL, Rothinan P, eds.). Malhotra publishing House, New Delhi, India, 1994; 825-855.
6. Mittal VP, Butani PG. Chemical control of seed midge (Systole albipennis walker) infesting stored fennel. Gujarat Agriculture University Research Journal. 1995; 20:189-192.
7. NRCSS Annual Report, 2015-16 NRCSS Vision (2050) NRCSS, Ajmer, India.
8. Sagar P. Efficacy of some insecticide against thrips, Thrips flavus Schrank, a pest of fennel in the Punjab. International Pest control. 1987; 29(6):130-133.
9. Sahu MP, Rathore PS. Seed spices production in Rajasthan-Status &strategies presented at Directorate of spices & medicinal plants, Calicut, 2002.
10. Singh MP. Integrated pest management (IPM) in seed spice. Paper presented in National Seminar on Production, Development, Quality and Export of seed spices. NRC Seed Spices, Tabiji, Ajmer, Rajasthan, India, 2007, 139-148.
11. Sharma KL, Kumawat KC, Yadav SR. Relative bio efficacy of different insecticide against aphids Myzuspersicae Sulzer on cumin. Paper presented in National Seminar on Production, Development, Quality and Export of seed spices. NRC Seed Spices, Tabiji, Ajmer, Rajasthan, India, 2007, 336-341.