

# SUCCESS STORIES...2013



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# Tractor Operated Seed Spices Planter

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## Introduction

India being the land of seed spices is also the largest producer, consumer and exporter of seed spices. The varied agro-climatic condition is quite conducive for cultivation of different seed spices. Among the major 20 seed spices, cumin, fenugreek, fennel and coriander are the major seed spices which occupy large area. The minor seed spices group consists of ajwain, dill, cerely, aniseed, nigella etc. It is largely cultivated in almost 7 lakh ha area in Rajasthan with productivity ranged from 300 to 1500 kg/ha. The contribution of Rajasthan in area under cultivation of coriander, cumin, fenugreek, fennel and Ajwain is 66.5, 33, 82, 6 and 100%, respectively of the country which is almost 43% production of seed spices at national level. Seed spices are mainly used for culinary, confectionary and pharmaceutical industries. Table 1.1 indicates the area, production and productivity of seed spices in Rajasthan.

**Table 1.1 Area, production and productivity of major seed spices in Rajasthan**

S. No.	Name of seed spices	Cultivated area (thousand), /ha	Production (thousand), t	Productivity, t/ha
1.	Cumin	507.8	314.2	0.6
2.	Coriander	530.5	482.0	0.9
3.	Fenugreek	81.2	118.4	1.5
4.	Fennel	61.8	105.4	1.7
5.	Ajwain	25.8	22.2	0.9

The production of seed spices is highly labour intensive and the main reason behind this is traditional techniques being adopted by the growers. The major constraints in mechanization of cultivation practices for seed spices is related to seed shape, size and density beside its cropping practices like depth of sowing, row to row and plant and plant spacing and branching pattern of plants. The sowing of seed spices is mainly done through broadcasting method or in the small field plots, lines are made by an iron or wooden hook at 250-300 mm distance and seed is dropped manually by hand. The broadcasted seed has an inherent problem of manual labour intensive intercultural operation which increases its cost of cultivation. The problem in spraying operation is also felt in such condition. The broadcasted seed is covered by a sickle or broom or bushes as sowing depth is very low of 10 to 15 mm.

The seed rate is kept at 12-15 kg/ha for cumin, 20 kg/ha for fenugreek, 10-12 kg/ha for coriander and 10 kg/ha for fennel. From the Department of Agriculture, Govt. of Rajasthan and from NRC on Seed Spices at Ajmer the demand was made for the development of a seed spices planter, so sowing of this operation can be mechanized with line sowing for effective control of weeds and to increase the productivity of crop.

### **Salient Features of Seed Spices Planter**

MPUAT, Udaipur centre designed and developed seed spices planter in association with M/s Dharti Agro Industries, Rajkot (Figs. 1.1 and 1.2). The design of planter was planned with individual hopper box and seed metering mechanism mounted on a common frame. The hopper box was made of rectangular size with tapering at bottom and hopper boxes were mounted on frame. The height of machine was kept at 450 mm from ground level for effective placement of seed in rows. The metering mechanism was made of plastic with 98 mm diameter rotor having 10 cells of 27 mm length and 6 mm width. The centre hole was of square mounted on common square shaft of 14 mm. The power to planter was given by a steel lugged drive wheel of 350 mm in diameter with chain sprocket arrangement of 12 and 18 teeth sprockets. The inverted T type furrow openers of small size were designed than conventional as depth of sowing was 10 to 15 mm only. Transparent plastic tube of 25 mm outer diameter was used for dropping of seed spices seeds the specification of seed spices planter his given in Table 1.2.

**Table 1.2 Specifications of 7 row seed spices planter**

<b>S. No.</b>	<b>Particulars</b>	<b>Specifications</b>
1.	Overall dimensions (L x W x H), mm	1973 x 1230 x 1196
2.	Power source	35 hp Tractor
3.	Number of rows and minimum spacing (Adjustable), mm	7 No. and 300 mm
4.	Weight of machine, kg	225
5.	Seed metering mechanism	Star wheel type (plastic), 98 mm rotor, 10 cells of 27 mm length and 6 mm width
6.	Seed rate (adjustable), kg/ha	6-8 kg/ha for cumin, 18-20 kg/ha for fenugreek and 10 kg/ha for coriander
7.	Fertilizer metering mechanism	Star wheel (plastic), 98 mm rotor, 10 cells of 22 x 14 mm
8.	Seed tube, mm and numbers	30.4(OD), 14
9.	Furrow opener	Seven, Inverted T type

10.	Tyne (L x W x H), mm	312 x 50.2 x 15.8
11.	Chain drive transmission	Sprocket fitted with chain on drive shaft, intermediate shaft and driven shaft
12.	Hopper number and capacity	7. 5-10 kg
13.	Drive wheel diameter with lugs, mm	350

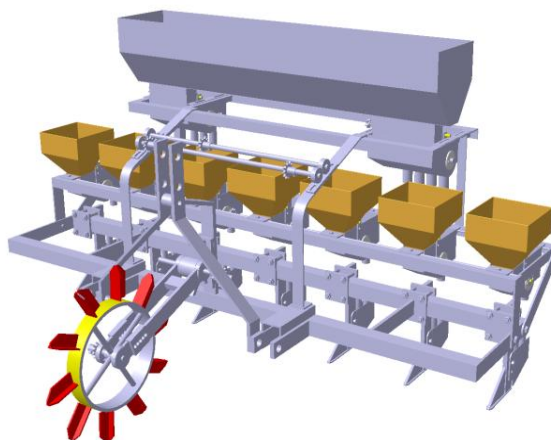


Fig. 1.1 Isometric view of seed spices planter.



Fig. 1.2. Commercial model of seed spices planter.

### Performance of the Machine

The performance of 7 row seed spices planter was evaluated at farmer's field covering an area of more than 40 ha in Danta and Bhinmal villages of Jalore district in Rajasthan during the last two years. For Ajwain sowing, trials were conducted in Kapasan Tehsil of Chittorgarh and Vallabhnagar of Udaipur. The major sowing was done for cumin and ajwain crops.

The field capacity of the machine was 0.4-0.5 ha/h as compared to 0.2 ha/h during broadcasting. The seed rate was substantially reduced to 6-7 kg/ha at row to row spacing of 300 mm for cumin as compared to the normal seed rate of 12-15 kg/ha in broadcasting method and for ajwain also it was 4.55-4.85 kg/ha. The saving in seed rate with the seed spice planter was up to 40% as compared to broadcasting method. It helped in accurate placement of seed and fertilizer in lines at proper depth. The performance data of machine for sowing of ajwain and cumin are given in Table 1.3. The operation of seed spices planter is shown in Fig. 1.3 whereas crop stand by broadcasting and line sowing by seed spices planter is shown in Fig. 1.4.

**Table 1.3 Performance of 7 row seed spices planter for sowing of ajwain and cumin crops.**

S. No.	Parameters	Planting of crops	
		Ajwain	Cumin
1.	Type of soil	Silt loam soil	Sandy loam soil
2.	Effective working width, mm	2130	2150
3.	Working depth, mm	11	14
4.	Soil moisture, % db (before testing)	16.5-18.3	13.2
5.	Seed rate, kg/ha	4.55-4.85	6.8
6.	Type of fertilizer	DAP	DAP
7.	Fertilizer rate, kg/h	80	80
8.	Speed of operation, km/h	2.6	2.8
9.	Field capacity, ha/h	0.38	0.44
10.	Field efficiency, %	69.0	72.0
11.	Fuel consumption, l/ha	3.5-3.7	3.3
12.	Cost of operation, Rs./h	510	510
13.	Cost of operation, Rs./ha	1330	1160

#### **Status of the Technology**

The seed spice planter was evaluated successfully at farmer's field and was commercialized and manufactured by M/s Dharati Agro Engineering, Rajkot. More than 20 units of the machines had been sold by the manufacturer. The list of farmers using this machine for sowing of seed spices crops is given in Annexure I.

### Feedback of Farmers

The seed spice machine was extensively tried by farmers and they were satisfied with its performance for sowing of cumin, ajwain, fenugreek, fennel and coriander crops. In 2012, farmers used this machine for sowing of cumin and ajwain in large area with good crop stand.



Fig. 1.3. Sowing of ajwain and cumin seeds by seed spices planter.



(a) Broadcasting



(b) 7 row seed spices planter

Fig. 1.4. Cumin crop stand sown by broadcasting method and with seed spices planter.

## Manufacturer Address

M/S Dharti Agro Engineering,  
Survey No. 35, Plot No. 6  
Near Saurashtra Paper Board Mill  
Behind Olympic Pipe, Gondal Road  
Shaper, Veraval, Rajkot – 360024 Gujarat, India  
Tel: + 91-9428035616, +91-9879598099  
Email: dhartiagro@rediffmail.com; info@dhartiagro.net

## Annexure I

### Farmers using tractor operated 7 rows seed spices planter in Rajasthan

S. No.	Name of Farmer	Address	District
1.	Chela Ram s/o Bhallaji	Khaprol Dhan, Jalore	Jalore
2.	Kaira Ram s/o Madho Ram	Danta, Sanchore	Jalore
3.	Nav Devi s/o Ukaji	Golasan, Sanchore	Jalore
4.	Thanaji s/o Nagaji	Pratap Pura, Sanchore	Jalore
5.	Hansaji s/o Dhannaji	Lunia, Sanchore	Jalore
6.	Madharamji s/o Vadhaji	Nainol, Sanchore	Jalore
7.	Bhuraji s/o Bhallaji	Kiludia, Sanchore	Jalore
8.	Velaram s/o Durgaji	Dantal, Sanchore	Jalore
9.	Velaram s/o Mallaji	Virul, Sanchore	Jalore
10.	Ghudaji s/o Mallaji	Maghmeda, Sanchore	Jalore
11.	Narain Bhai	Shirodi, Revdar	Sirohi
12.	Dalpat Singh	Bhootgaon, Sirohi	Sirohi
13.	Ganesh Lal Jat	Gordhanpura, Mavli	Udaipur
14.	Suresh Janva s/o Chhoga Lal	Nawania, Vallabhnagar	Udaipur
15.	Heera lal s/o Bhagwan lal	Chhapli, Kapasan	Chittorgarh
16.	Ganpat Lal Nagars/o Chhotu	Gulabpura, Anta	Baran
17.	Ghansi Lals/o R.P.Meena	Chhatarpura, Mangrol	Baran
18.	Jagdish Patidars/o Ramprasad	Samelikham	Jhalawar
19.	Hukum Patidars/o Permanand	Manpura	Jhalawar
20.	Sugna Ram s/o Pola ram	Falodi, Jodhpur	Jodhpur