International J. Seed Spices 10(2), July 2020:48-52

Seed spices: A boon for coastal farmers

L.K. Sharma[1*], V. Singh[1], P.K. Shukla[1], A. Dave[1] and S.N. Saxena[2]

[1]Centre for Agri-Horticulture development, Pidilite Industries Limited, Manar, Gujarat

[2]ICAR-National Research Centre on seed spices, Ajmer, Rajasthan

Introduction

Seed spices are annual herbs and their fruit or seed are used for flavorings, seasoning and making food tasty and tempting. Besides importance in food industry, the seed spices have been known for ages as effective therapeutic food. The power of spices to impart biological activity is now slowly reemerging as an area of interest for human health. The seed spices constitute an important group of agricultural commodities and play a significant role in our national economy. Historically, India has always been recognized as a land of spices. The states, Rajasthan and Gujarat have together contributed more than 80 per cent of the total seed spices produced in the country. About 20 seed spices are grown in India, on the basis of area, production and utility seed spices major seed spices are coriander, fenugreek, fennel, cumin, ajwain, dill, nigella, anise, celery and caraway. Seed spicesseeds are used in small quantities for flavorings numerous foods, as preservatives, in medicine and for the manufacture of essential oil for ultimate use in perfumery (Pruthi, 1992). India is leading in production, consumption and export of seed spices in the world.

Center for Agri-Hort Development Institute in Manar village, district-Bhavnagar is located near the Gulf of Cambay (Gulf of Khambhat) in the Arabian Sea, a part of Saurashtra peninsula, in central part of Gujarat, India.

Geographical Location

Center for Agri-Hort Development Institute, Manar is situated near the Gulf of Cambay (Gulf of Khambhat) in the Arabian Sea, a part of Saurashtra peninsula, in central part of Gujarat, India.

Climate, Soil, Geology & Socio-economic status

The region receives an average annual rainfall of 537 mm (IMD data) which is erratic in nature and the climate is semi-arid type (Gathala *et. al.*, 2011). The soil is mostly found in 3 categories- i) Medium black soils ii) Alluvial soils iii) Alkaline soils (Jat *et.al.,* 2009).

Geology

Geologically, 80% of the area is covered by Basalts and the remaining 20 % by alluvial formation and mudflats about 63 % of the region is cultivated of which 24 % is irrigated (Jat *et. al.*, 2005). The crops like ground nut, cotton, bajra, sorghum etc. are important crops of the areas. Vegetables like Brinjal, Chilies (Less pungent), Tomato, Onion are grown more. Fruits like kesar Mango, Sapota, Lemon and Guava are primarily grown by farmers (Singh *et.al.*, 2020).

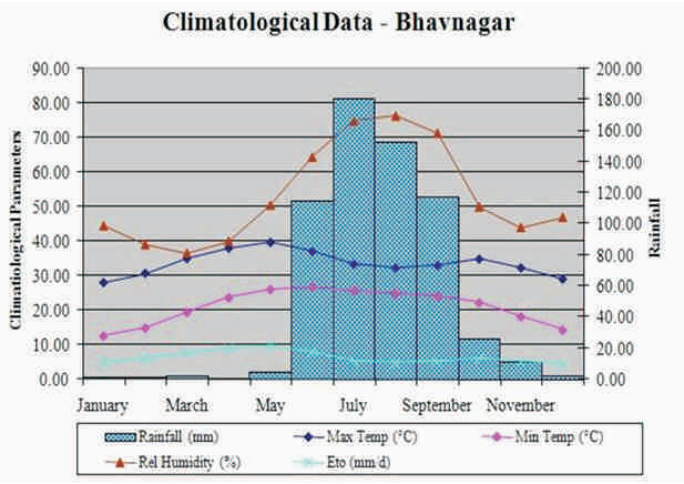

Fig 1: Climatological Data of Bhavnagar District.

Water

High TDS water is present of around 1500 due to coastal line location. Detailed analysis of water report indicates high calcium and magnesium presence in the water as well as high presence of calcium carbonate which gives hardening of water. Overall quality of water is not good enough for irrigation purpose.

The Center is 2 to 2.5 kms from the sea cost. The salinity levels have reached up to 4000 TDS at some plots, major reason being excess drafting of groundwater by the farmers. The average land holding of the farmers in the region is below 2 - 5 acres.

Seed material

Seed material of elite varieties was procured from ICAR-NRCSS.

Results

Fennel: Fennel is a perennial, pleasant-smelling herb with yellow flowers. It is native to the Mediterranean, but is now found throughout the world. Dried fennel seeds are often used in cooking as an anise-like spice. Fennel's

*Corresponding Author: lokesh.sharma61187@gmail.com

dried ripe seeds and oil are used to make medicine. Fennel plantation (AF-1 variety) has been done at Center for development of Agri-Horticulture from last three years and it has been cultivated successfully despite of poor quality of soil and water. For initial two year, fennel were planted in 1500 sq.m area which was increased to 2000 sq.m in last year with spacing of 60:45. Yield of last three year i.e. 2018-2020 were achieved to 458, 485, 487 kg acre^{-1} respectively. Salinity and PSB influence the yield of fennel (Mishra *et.al.* 2016).

Coriander: Coriander is an annual herb in the family Apiaceae. It is also known as Chinese parsley, dhania or cilantro. All parts of the plant are edible, but the fresh leaves and the dried seeds are the parts most traditionally used in cooking. Coriander plantation (AFg-3 variety) has been done at Center for development of Agri-Horticulture from last two years and it has been cultivated successfully despite of poor quality of soil and water. For last two years, coriander were planted in 250 and 85 sq.m area respectively with spacing of 20:10. Yield of last two year i.e. 2019-2020 were achieved to 388 and 333 kg acre^{-1} respectively. Salinity alters the yield of coriander and fennel (Mangal *et.al.,* 1986).

Dill: Dill is an annual herb in the celery family Apiaceae. It is the only species in the genus Anethum. Dill is grown widely in Eurasia, where its leaves and seeds are used as an herb or spice for flavoring food. Dill (AD-2 variety) has been cultivated from last two year at Center for development of Agri-Horticulture in 185 and 65 sq.m respectively with spacing of 45:15. Yield of last two year i.e. 2019-2020 were achieved to 491 and 471 kg acre^{-1} respectively.

Nagouri methi: Nagouri methi commonly known as kasoori methi or pan methi. Fresh leaves and dried seed are the part most traditionally used in cooking. Nagouri methi (local variety) has been cultivated from last two year at Center for development of Agri-Horticulture in 50 sq.m with spacing of 20:10. Yield of last two year i.e. 2019-2020 were achieved to 323 and 339 kg acre^{-1} respectively.

Fenugreek: Fenugreek is an annual plant in the family Fabaceae, with leaves consisting of three small obovate to oblong leaflets. It is cultivated worldwide as a semiarid crop. Its seeds and leaves are common ingredients in dishes from the Indian subcontinent, and have been used as a culinary ingredient since ancient times. Fenugreek (AFg-3 variety) has been introduced at Center for development of Agri-Horticulture from last two last year i.e. 2019-2020. Cultivation of fenugreek was

done in 250 and 85 sq.m area with spacing of 20:10. Yield was achieved to 388 and 333 kg acre^{-1} respectively.

Ajwain: Ajwain, ajowan, or *Trachyspermum ammi*—also known as ajowan caraway, thymol seeds, bishop's weed, or carom—is an annual herb in the family Apiaceae. Both the leaves and the seed-like fruit of the plant are consumed by humans. Ajwain (AA-1 variety) has been introduced at Center for development of Agri-Horticulture in last year i.e. 2020. Cultivation of ajwain was done in 100 sq.m area with spacing of 20:10. Yield was achieved to 566 kg acre^{-1}.

Table 1. Yield data of spices crop.

S. No.	Crop	Years	Area (Sq. meter)	Yield Production (Kg)	Yield production Kg/Acre
1	Fennel	2019	150	180	4800
		2020	200	241	4820
2	Fenugreek	2019	250	40	640
		2020	85	7	329
3	Coriander	2019	185	21	454
		2020	55	5	364
4	Dill	2019	185	22.5	486
		2020	60	7	467
5	Nagouri methi	2019	50	4	320
		2020	50	4.2	336
6	Ajwain	2019	100	13	520
		2020	100	14	560

Note: - all the demo was conducted on barren/ marginal land.

Inference: Theses studies conducted on the seed spices in dry regions of Bhavnagar conducted by Dr. Singh and entire team mainly offers a new paradigm for agricultural research and development different from the conventional one, which mainly aimed at achieving seed spices crop specific production targets. A shift in paradigm has become a necessity in view of widespread problems of income generation, crop diversification, resource degradation, which accompanied the past strategies to enhance production with little concern for resource integrity. This will call for greatly enhanced capacity of Scientists from NRCSS and Pidilite Manar Center for Agri-Hort Development to address problems from a farmer's perspective; be able to work in close partnerships with farmers and other stakeholders and strengthened knowledge and information-sharing mechanisms.

Acknowledgments: The Center in-Charge Dr. Virender Singh wish to express his deep sense of gratitude and devotion to the visionary Hon. MB Parekh, Chairman, Pidilite Industries Ltd. for giving financial and motivational support towards the landmark initiative of Manar Center for Agri-Hort. Institute dedicated for the welfare of farmers of the Bhavnagar District (Gujarat). Dr. Singh also owe his sincere gratitude to entire R&D team - Dr.Nikunj Balar, Yuvraj Gadhvi, Narendera. S. Chauhan, Karansinh Barad, Viratsinh Chauhan, Pavan Rajani, Prashant Bhil and Sachin Chaudhary for their hard work in field as well as administrative support to new seed spices crop initiatives in the center.

References

Gathala, M.K., Ladha, J.K., Saharawat, Y.S., Kumar, V., Kumar, V., Sharma, P.K. 2011. Effect of Tillage and Crop Establishment Methods on Physical Properties of a Medium-Textured Soil under a Seven-Year Rice – Wheat Rotation. *Soil Science Society of America Journal,* 75:1851-1862.

Jat, M.L., Gathala, M.K., Ladha, J.K., Saharawat, Y.S., Jat, A.S., Kumar, V.2009. Evaluation of Precision Land Leveling and Double Zero-Till Systems in Rice-Wheat Rotation: Water use, Productivity, Profitability and Soil Physical Properties. *Soil and Tillage Research*, 105:112-121.

Jat, M.L., Singh, S., Rai, H.K., Chhokar, R.S., Sharma, S.K., Gupta, R.K. 2005. Furrow Irrigated Raised Bed Planting Technique for Diversification of Rice-Wheat System of Indo-Gangetic Plains. *J. Japan Association for International Cooperation for Agriculture and Forestry*, 28(1):25-42.

Mangal, J.L., Yadava, A., Singh, G.P. 1986. Effect of different levels of soil salinity on germination, growth, yield and quality of coriander and fennel. *South Indian Horticulture (India)*, 34(1): 26-31.

Ministry of Water Resources, GOI Central Ground Water Board, West Central Region, Ahmedabad. (2013)

Mishra, B.K., Meena, K.K., Dubey, P.N., Aishwath, O.P., Kant, K., Sorty, A.M., Bitla, U. 2016. Influence on yield and quality of fennel (*Foeniculum vulgare* Mill.) grown under semi-arid saline soil, due to application of native phosphate solubilizing rhizobacterial isolates, *Ecological Engineering*, 97:327-333.

Pruthi, J.S. 1992. Spices and Condiments. 4th ed. New Delhi: National Book Trust; 1992.

Singh, V., Shukla, P.K., Sharma, L.K., Barnawal, V.K., Dave, A., Patel, C.M., Vaghamshi, M.B. and Singh, V.P. 2020. Role of innovative crop species diversification, mixed farming, polyculture, structural diversity and conservation agriculture in dry regions to end hunger & achieve sustainable development. *J. Pharmacognosy and Phytochemistry*, 9(5):110-116.

Received : October 2020; Revised : November 2020; Accepted : December 2020.