

Presidential address

Research and development of spices in India¹

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Esteemed Vice President, Secretary, Members of the Executive Committee, Members of the Society, Ladies and Gentlemen.

At the outset I take this opportunity to express my sincere gratitude to all the members of the Society for having bestowed upon me the honour and privilege of delivering the presidential address at the V Annual General Body Meeting of the Society. I have chosen to talk on 'Research and development of spices in India' since we are at the dawn of a new era on spices development in our country and I have been associated with research and development of spices for the past 15 years.

Introduction

From time immemorial spices and India have always been synonymous and been part of history ever since the days of landing of Vasco da Gama near Calicut in 1498. Spices are grown in about 2.1 million ha in India producing about 2.5 million tonnes annually. We had the prestige of exporting nearly 40% of the world's requirement of spices at one time but it slid down to about 15-18% in recent years in physical terms, although the value has increased. We have produced spices worth Rs. 8000

millions last year and have consumed almost 90% of it in our domestic market. The chief importing countries still remain to be USA, Japan, Germany, Canada, Saudi Arabia, Bangladesh, UK, Australia and Sri Lanka. We are also cautious about new competitors in spices trade like Thailand, Vietnam, China and Cambodia besides traditional rivals like Brazil, Indonesia, Malaysia, Gautemala and Sri Lanka. Though the situation appears to be rather complacent, the challenges in regaining India's preminent position in spices production and trade are great. Will the king and queen of Indian spices, namely black pepper and cardamom, respectively, retain their regality?

Research support

Spices research in the country has made rapid strides and has been strengthened over the years through the concerted efforts of the Government of India. The Indian Council of Agricultural Research (ICAR) being the apex body to conduct, coordinate, manage and fund various research, teaching and extension programmes on spices, has a major research institution under the ICAR, and state agricultural universities under the All India Coordinated Research Project on Spices.

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The first Pepper Research Scheme was initiated in 1949 by the Government of Madras at Panniyur, Kerala. It was followed by Cardamom Research Scheme at Mudigere (Karnataka) and Pampadumpara (Kerala) in 1951. The Spices Enquiry Committee set up in 1953 by the Government of India made strong recommendations to commence specific research activities/centres on spices. Accordingly, the research base was expanded to have centres at Chethalli (Karnataka), Dergaon (Assam) and Sirsi (Karnataka) for black pepper, Kandaghat (Punjab), Tasgaon (Maharashtra), Thodupuzha and Ambalavayal (Kerala) for ginger and turmeric; Burliar (Tamil Nadu) for clove and nutmeg and Fulia (West Bengal) and Coimbatore (Tamil Nadu) for seed spices and condiments. The pre-plan period also had research schemes for cardamom in Madras (Tamil Nadu), for ginger in Kerala and for turmeric in Orissa.

The First Plan emphasized research on black pepper, cardamom, clove, nutmeg and seed spices such as cumin, coriander, fennel and fenugreek. During the Second and Third Plan periods, the scope of research on spices increased in a number of states like Orissa, Andhra Pradesh and West Bengal and additional schemes for seed spices and vanilla were initiated. Research on spices was however limited to standardization of input requirements on a regional basis by the State Departments of Agriculture, till the end of the Fourth Plan. The establishment of the All India Coordinated Spices and Cashewnut Improvement Project (AICSCIP) by the ICAR in 1971 with its coordinating cell at Central Plantation Crops Research Institute (CPCRI), Kasaragod was the

first major step towards a concerted programme of research on spices.

With the increasing importance of spices as a major source of earning foreign exchange and the crucial role it plays in the economies of many states, the ICAR established a Regional Station of the CPCRI at Calicut in 1975 for conducting research on crop production, protection and technological aspects of black pepper, ginger, turmeric, cinnamon, clove, nutmeg and allspice. This was followed by the establishment of the Indian Cardamom Research Institute at Myladumpara under the erstwhile Cardamom Board in 1976. This Institute has the mandate to conduct research on cardamom and has three Regional Stations at Sakaleshpur (Karnataka), Thadiyankudisai (Tamil Nadu) and Pangthang (Sikkim), the last one for large cardamom. In addition, the Council of Scientific and Industrial Research was entrusted with research on spices quality to the Central Food Technological Research Institute, Mysore. Of late, the Regional Research Laboratory at Trivandrum has also taken up analysis of quality of spices. The Spices Board with its headquarters at Cochin has a Quality Upgradation Laboratory for spices since 1989.

New thrusts

The National Research Centre for Spices (NRCS) was created in 1986 during Seventh Plan period by upgrading the Regional Station of the CPCRI at Calicut, and merging the CPCRI Research Centre on cardamom at Appangala (Karnataka). The NRCS was upgraded to the status of a full-fledged research institute, the Indian Institute of Spices Research (IISR) in 1995 with greater responsibilities. A Krishi Vigyan Kendra

has also been added in 1992 at IISR to provide skill-oriented and need-based training on spices to farmers. The headquarters of the AICRPS was also shifted from Kasaragod to Calicut in 1986.

Achievements

The various achievements in spices research, development and trade have been well documented over the years and several technologies to improve the performance level of spices are readily available. The significant achievements in spices research and development are:

1. Development of nearly 70 varieties of various spices - hardly a dozen were available two decades ago. A comprehensive list of improved varieties of spices is provided in Table 1.
2. Development of a mechanism to produce and distribute quality planting materials on a large scale since the Seventh Plan.

3. Integrated management techniques (including biocontrol) for major pests and diseases of spices. A list of technologies available for the management of major pests and diseases are listed in Tables 2 and 3.

4. Quality assurance and upgradation to meet the stringent needs of importing countries.

The future

The future scenario for spices, though appearing bright, is beset with certain in-built weakness in our system especially for enabling adoption of technologies by small farmers. An organized and corporate sector approach for most of the spices is not available and hence there is a gap between the rich and poor farmers. Intensive campaigns for use of biocontrol agents to control pests and diseases, organic farming, farm front processing, etc. deserve to be nurtured. There is also a need to sustain adequate

Table 1. Improved varieties of spices

Crop	Variety
Black pepper	Panniyur - 1, Panniyur - 2, Panniyur - 3, Panniyur - 4, Panniyur - 5, Subhakara, Sreekara, Panchami, Pournami, PLD - 2.
Cardamom	Mudigere - 1, Mudigere - 2, PV - 1, CCS - 1, ICRI - 1, ICRI - 2, ICRI - 3, ICRI - 4.
Ginger	Suprabha, Suruchi, Surabhi, Himgiri, IISR Varada.
Turmeric	Co-1, Krishna, Sugandham, BSR-1, BSR-2, Roma, Suroma, Ranga, Rashmi, Rajendra, Sonia, Suvarana, Suguna, Sudarshana, IISR Prabha, IISR Prathiba, Kanthi, Sobha (Megha turmeric).
Coriander	Co-1, Co-2, Co-3, CS-287, Guj. Coriander-1, Guj. Coriander-2, Rajendra Swati, RCr-41, Sadhana, Swathi, Sindhu, RCr-20, Hisar Anand (Pant Dhania).
Cumin	S-404, MC-43, Guj.Cumin-1, Guj. Cumin-2, RZ-19.
Fennel	S-7-9, PF-335, Guj. Fennel-1, Co-1, Guj. Fennel-2.
Fenugreek	Co-1, Rajendra Kanti, Rmt-1, Lam Sel.1, Hisar Sonali (Pusa Early Bunching).
Cinnamom	Nithyasree, Navasree, YCD-1, Konkan Tej.

Table 2. Management of major pests of spices

Crop	Pest	Scientific name	Management
Black pepper	Pollu beetle	<i>Longitarsus nigripennis</i>	Spray endosulphan 0.05% (or) quinalphos 0.05% during July and September.
	Top shoot borer	<i>Cydia hemidoxa</i>	Spray monocrotophos 0.05% during July and September.
	Scale insect	<i>Lepidosaphes piperis</i>	Spray monocrotophos 0.1% (or) dimethoate 0.1%.
Cardamom	Nematode	<i>Meloidogyne incognita</i>	Apply phorate 10G (30 g/vine) during June and September.
	Thrips	<i>Sciothrips cardamomi</i>	Spray quinalphos 0.025% (or) monocrotophos 0.05% (or) phosal-one 0.05% (or) fenthion 0.05% during March, April, May, August and September.
	Root grub	<i>Basilepta fulvicorne</i>	Collect and destroy adult beetles; apply phorate 10G (30g/clump) (or) chlorpyrifos 0.05%.
	Shoot and capsule borer	<i>Conogethes punctiferalis</i>	Spray monocrotophos 0.075% (or) fenthion 0.075% during January/February and September/October.
Ginger and Turmeric	Shoot borer	<i>Conogethes punctiferalis</i>	Spray malathion 0.1% (or) monocrotophos 0.05% (or) dimethoate 0.1% at monthly intervals during July-October.
	Rhizome scale	<i>Aspidiella hartii</i>	Soak seed rhizomes in quinalphos 0.1% prior to storage and sowing.
Coriander, Cumin, Fennel and Fenugreek	Aphids	<i>Hyadaphis coriandri</i> and <i>Myzus persicae</i>	Spray endosulfan 0.05% during floral initiation and a fortnight later.
	Seed midge	<i>Systole albipennis</i>	Spray fenvalerate 0.01% (or) methyl-o- demeton 0.025%.

infrastructure for multiplication and distribution of good quality planting material of improved varieties. On the research front, further attention is needed to exhaustively collect the available germplasm from Western Ghats as well as attend to newer methods of propagation especially in clove, cinnamon and nutmeg. New end uses are also to be developed for cardamom which has

almost disappeared in our export market and it is sheer nostalgia that until 1950s, the whole world depended on Indian cardamom. There are several spices used in tribal medicine and their value and potential remain to be tapped and fully exploited; concurrently intellectual property rights and tribal farmer's knowledge and rights are also to be protected. Non-conventional areas

Table 3. Management of major diseases of spices

Crop	Disease	Causal organism	Management
Black pepper	Foot rot	<i>Phytophthora capsici</i>	Phytosanitation; spray Bordeaux mixture (BM) 1% and drench copper oxychloride 0.2% during June and September (or) spray BM 1% on foliage and apply <i>Trichoderma</i> .
Cardamom	Capsule rot	<i>Phytophthora meadii</i>	Spray BM 1% or copper oxychloride 0.2% during June (or) apply <i>Trichoderma</i> along with organics.
	Katte	Virus	Phytosanitation; control aphid vector.
Ginger and Turmeric	Rhizome rot	<i>Pythium</i> spp. <i>Ralstonia solanacearum</i>	Treat seed with mancozeb 0.25%. Spray Streptocycline 200 ppm during June.
Coriander	Wilt	<i>Fusarium oxysporum</i>	Seed pelleting with <i>T. viride</i> ; neem cake application.
	Stem gall	<i>Protomyces macrosporus</i>	Treat seed and soil with Thiram; grow RCr-41.
	Powdery mildew	<i>Erysiphe polygoni</i>	Spray sulphur fungicide 0.1% at disease initiation and 10 days later with carbendazim 0.1% (or) wettable sulphur 0.25% (or) 5% onion leaf extract as foliar spray.
	Grain mould	<i>Alternaria</i> sp. <i>Curvularia</i> sp. <i>Helminthosporium</i> sp.	Spray carbendazim 0.1% 20 days after flowering.
	Root rot	<i>Macrophomina phaseolina</i>	Drench carbendazim (0.1%) twice at 20 days intervals.
	Sugary disease	<i>Sclerotinia sclerotiarum</i>	Control vector (aphid) - spray phosphomidon 0.02% (or) dimethoate 0.02%.
Fennel	Powdery mildew	<i>Erysiphe polygoni</i>	Dust sulphur (25 kg/ha) (or) spray wettable sulphur 0.25% twice fortnightly, 45 days after germination.
Fenugreek	Root rot	<i>Rhizoctonia solani</i>	Apply neem cake @ 1 tonne/ha combined with seed pelleting with <i>T. viride</i> or <i>T. harzianum</i> . Drench carbendazim 0.1% once initially and a month later.
	Powdery mildew	<i>Erysiphe polygoni</i> and <i>Leveillula taurica</i>	Dust sulphur (25 kg/ha) or spray wettable sulphur (or) Dinocap 0.2% thrice at an interval of 15 days commencing from 40 DAS.
	<i>Cercospora</i> leaf spot	<i>Cercospora</i> sp.	Spray carbendazim 0.05% twice.

like the Konkan, Eastern Ghat hills, the tribal areas in Kerala, Tamil Nadu, Andhra Pradesh, Madhya Pradesh and Orissa and the entire North-East deserve to be tapped for their full potential to bring out the best of our spices both in quantity and quality. There is also an

immediate need to create opportunities for training and exposure of our scientists and development workers to advanced laboratories and extension systems. A massive R & D programme is therefore necessary to restore India's glory in the world of spices. Thank you.