

Spicing up the
nation's progress



Indian Institute of Spices Research
A research organization under ICAR

Indian Institute of Spices Research

is a not-for-profit research organization under Indian Council of Agricultural Research (ICAR) that aims to serve the farming community by conducting research, training and knowledge transfer pertaining to 12 mandate spice crops viz. black pepper, cardamom, ginger, turmeric, nutmeg, garcinia, clove, cinnamon, cassia, allspice, vanilla and paprika.



Black pepper
(*Piper nigrum* L.)



Cardamom
(*Elettaria cardamomum* Maton)



Ginger
(*Zingiber officinale* Rofc)



Turmeric
(*Curcuma longa* L.)



Nutmeg
(*Myristica fragrans* Houtt)



Garcinia
(*Garcinia gummi-gutta* (L.) Robson)



Clove
(*Syzygium aromaticum* (L.)
Merr. & Perry)



Cinnamon
(*Cinnamomum verum* J. Persl)



Vanilla
(*Vanilla planifolia* Andr.)



Paprika
(*Capsicum annum* L.)

OUR MISSION

“Our mission is to serve the spice growers by conducting goal-directed, peer-reviewed research and educating future generation to be science literate. Our institute seamlessly integrates research, education and global networking into its programs, products and services”.

Director

OUR MANDATE

To extend services and technologies to conserve genetic resources of spices as well as soil, water and air of spices agroecosystems.

To develop high yielding, high quality spice varieties and sustainable production and protection systems using traditional and novel biotechnological approaches.

To develop post harvest technologies of spices with emphasis on product development and product diversification for domestic and export purposes.

To act as a centre for training in research methodology, technology upgradation and to coordinate national research projects.

To monitor the adoption of new and existing technologies to make sure that research is targeted to the needs of the farming community.

To serve as a national centre for storage, retrieval and dissemination of technological information on spices.

OUR SCIENCE

Our current science expertise and knowledge domains include:

- Conserving and understanding spice genetic diversity
- Spice breeding through conventional, marker-assisted and molecular approaches
- Management of spice crops and natural resources
- Secondary agriculture and post harvest technologies
- Eco-friendly measures to manage pest and diseases of spice crops
- Spice bioinformatics
- Spice knowledge base and capacity building



Appangala



Peruvannamuzhi

A BRIEF HISTORY

Research on spices had its modest beginning with the establishment of All India Coordinated Spices and Cashew Improvement Project by Indian Council of Agricultural Research (ICAR) in 1971. Later a Regional Station of Central Plantation Crops Research Institute (CPCRI) was established at Calicut, Kerala in 1975 to conduct research exclusively on spice crops. This Regional Station was upgraded as National Research Centre for Spices (NRCS) in 1986 by merging with it the Cardamom Research Centre of CPCRI at Appangala, Karnataka. The NRCS was further elevated to a full-fledged institute, the Indian Institute of Spices Research (IISR), during 1995.

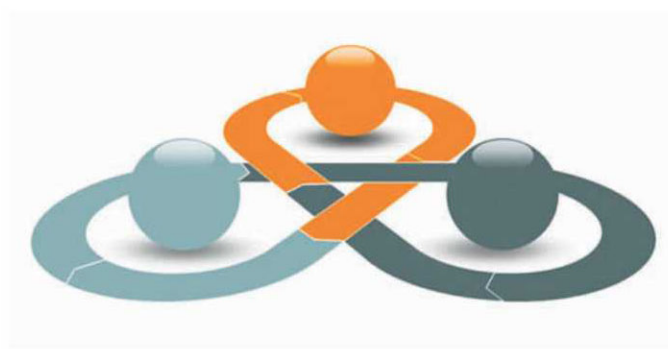
IISR HEADQUARTERS AND RESEARCH CENTRES

IISR is headquartered in Calicut (Kozhikode, Kerala, India), the city of spices where Vasco da Gama landed in 1498. The laboratories and administrative offices of the institute are located at Chelavoor, in Calicut city of Kozhikode District, Kerala, on the Calicut-Kollegal road (NH 212), in an area of 14.3 ha. The research farm is located 55 km away from Calicut at Peruvannamuzhi, on the Peruvannamuzhi-Poozhithode road in an area of 94.08 ha. The one and only research centre, Cardamom Research Centre, is at Appangala in Hervanad Village, Kodagu District, Karnataka on the Madikeri - Bhagamandala Road, 8 km away from Madikeri town, in an area of 17.4 ha.



ORGANIZATIONAL HIERARCHY

The Quinquennial Review Team (QRT), Institute Management Committee (IMC), Research Advisory Committee (RAC) and Institute Research Committee (IRC) assist the Director in matters relating to management and research activities of the institute. IISR conducts research within three divisions and a section (i) Division of Crop Improvement and Biotechnology, (ii) Division of Crop Production and Post Harvest Technology, (iii) Division of Crop Protection and (iv) Social Science Section.



DIVISIONS AND SECTIONS

1. Division of Crop Improvement and Biotechnology

Major disciplines: Horticulture, Plant breeding, Cytogenetics, Economic botany, Biotechnology

2. Division of Crop Production and Post Harvest Technology

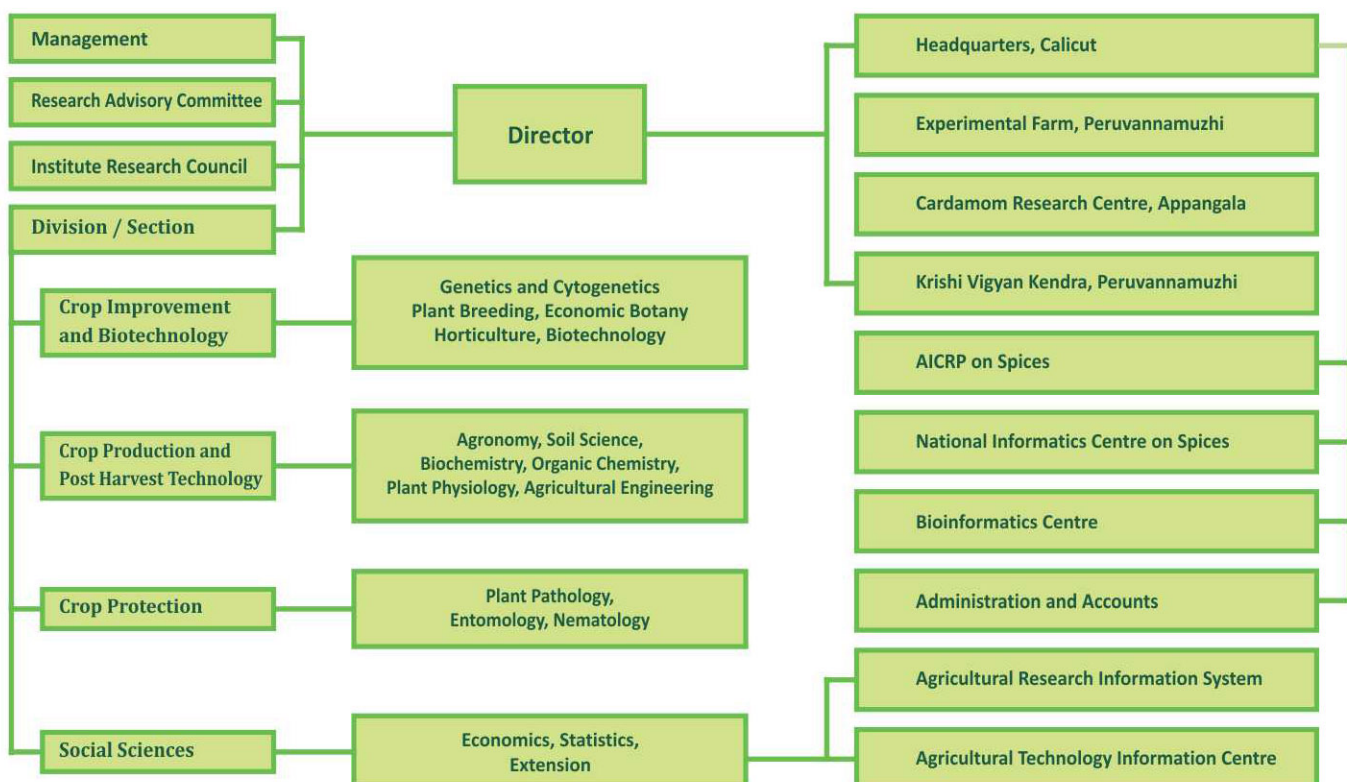
Major disciplines: Agronomy, Soil science, Plant physiology, Plant biochemistry, Organic chemistry and Agricultural engineering

3. Division of Crop Protection

Major disciplines: Plant pathology, Nematology and Entomology

4. Social Sciences Section

Major disciplines: Agricultural economics, Agricultural extension, Statistics, Computer applications



OUR SALIENT ACHIEVEMENTS

- Established one of the world's largest germplasm collections of spice crops
- Different vegetative and micropropagation technologies in spices for production of quality planting materials
- Standardized integrated nutrient management including organic farming technologies for black pepper, ginger and turmeric
- Bio-intensive integrated strategies to manage major pests and diseases of spice crops
- Bioformulations of *Trichoderma harzianum* and *Pochonia chlamydosporia* for the management of *Phytophthora* foot rot and slow wilt diseases of black pepper, and rhizome rot of cardamom and ginger
- A repository of microbial biocontrol agents of bacterial, fungal and nematode pathogens affecting spice crops
- Released 24 high yielding and high quality varieties in various spices
- A single tube multiplex reverse transcription (RT) coupled PCR assay (mRT-PCR) for simultaneous detection of viruses in black pepper and cardamom
- Characterized flavour profiles of essential oils from black pepper, cardamom, ginger, cinnamon, garcinia and nutmeg
- The institute also holds a large collection of multi-trait PGPR isolates with proven ability for biocontrol and nutrient mobilization in soil.
- A microbial method of producing good quality white pepper, free from off-odour compound skatole, superior in colour and other chemical quality parameters
- Developed around 15 online databases and eight software tools dealing with biodiversity, genomics and cheminformatics of spices

CROP	VARIETIES RELEASED
Black pepper	Sreekara, Subhakara, Panchami, Pournami, PLD-2, IISR Shakthi IISR Thevam, IISR Girimunda and IISR Malabar Excel
Cardamom	Appangala-1, IISR Avinash and IISR Vijetha
Turmeric	Suguna, Suvarna, Sudarsana, IISR Prabha, IISR Prathibha, IISR Kedaram and IISR Alleppey Supreme
Ginger	IISR Varada, IISR Mahima and IISR Rejatha
Cinnamon	Navashree and Nithyashree
Nutmeg	Viswashree



OUR FACILITIES

IISR has an excellent team of scientists and experts in different disciplines, supported by advanced technologies and modern tools. Our headquarters in Calicut houses different laboratories with state of art facilities and latest equipments, greenhouses, modern library, conference hall, guesthouses and a scientist hostel. The 94.08 ha experimental farm at Peruvannamuzhi holds the National Active Germplasm Centre for spices, various experimental plots and nurseries. Some of the major facilities established in the Institute are

DUS Testing Facility

A centre for testing the distinctiveness, uniformity and stability (DUS) for registration and protection of black pepper, small cardamom, ginger and turmeric varieties established by the PPV & FR Authority, New Delhi.

Tissue Culture Accreditation Facility

An accreditation laboratory for certification of tissue cultured spices plants for virus indexing and genetic fidelity funded by Department of Biotechnology, New Delhi.

Institute Technology Management Unit

An official unit for the effective management of all issues related to intellectual property and technology commercialization in spices.

ITMU also addresses specific requests of other agencies for training, consultancy and contract research in frontier areas wherein the institute has expertise. (e-mail: itmu@spices.res.in)

Bioinformatics Centre

The Bioinformatics Centre is established under the Biotechnology Information System (BTIS) network of Department of Biotechnology, New Delhi. The Centre has dedicated Internet connectivity and advanced IT infrastructure with necessary hardware and software resources. For more details please visit <http://www.spicebioinfo.res.in> (e-mail: disc@spices.res.in)

Library

IISR library is known as National Informatics Centre for Spices (NICS). It provides support to research and development work of the Institute by acquiring global scientific literature, organizing them for ease of use and better access. It also caters to the needs of the scholarly community of other institutes, universities and organizations. It has excellent print and digital resources, e-journals, offline and online databases, Internet connectivity etc. More details can be obtained from the web portal of the library 'SpicE- Library' (<http://www.spices.res.in/elibrary/>) (e-mail: library@spices.res.in)



KNOWLEDGE PRODUCTS

IISR offers a wide range of tools and resources and a huge knowledge base on past and ongoing research to partners and clients seeking information on spices. Besides several regular publications, such as research highlights, annual reports, newsletters etc., traditionally used to showcase and disseminate the knowledge, it also produces various knowledge products which are available online. Some of which are featured below.

IISR web portal - <http://www.spices.res.in>

Besides serving as a corporate portal, the site is an excellent information resource on spices with access to electronic versions of institute's publications.

DSpice - <http://220.227.138.214:8080/dspace/>

The digital institutional repository of IISR developed using the open source tool DSpace. It archives research publications, reviews, and other publications emanating from the Institute.

PhytoFuRa portal

<http://220.227.138.213/phytofura/>

The portal of the outreach project on *Phytophthora*, *Fusarium* and *Ralstonia* diseases of horticultural and field crops provides information on the project as well as the pathogens.

Spice Genes - <http://220.227.138.213/htmls/>

The germplasm database of major spices like black pepper, cardamom, ginger and turmeric. Provides the passport and evaluation data of hundreds of accessions maintained at the Institute.

PASSCOM - <http://220.227.138.213/passcom/>

A database of more than 800 secondary metabolites in spices, their descriptors, biological activity, druggability, metabolic pathway information and ADMET properties.

Spicebibliography

<http://www.spices.res.in/biblio/index.php>

A bibliography service from IISR library providing the world literature on various spices.

ARISoft

ARISoft is a novel office automation software developed and implemented by IISR for the first time in ICAR. 'ARISoft' is a fully integrated system that automates the multifarious functions and day to day operations in an agricultural research institute.



TECHNOLOGY TRANSFER

The research achievements are delivered to the stakeholders through the Agricultural Technology Information Centre (ATIC) and Krishi Vigyan Kendra (KVK) using different instruments like on-farm trials, demonstration plots, training programmes and mass media.

Agricultural Technology Information Centre

The ATIC deals with the production and distribution of superior quality planting materials, production and distribution of printed literature, farm advisory services including crop diagnostic services, information dissemination through multimedia, video and interactive databases, providing audio visual aid support to the institute activities, organizing technology dissemination services like exhibitions, seminars to farmers and other users.

(e-mail: atic@spices.res.in)

Krishi Vigyan Kendra

Krishi Vigyan Kendra (KVK) established at the Experimental Farm, Peruvannamuzhi spearheads effective transfer of technology to the farming community of Kozhikode District. KVK organizes, training programmes and field demonstrations on proven technologies in farmers' fields, exhibitions and kisan meals on agriculture, animal husbandry, fisheries and home science for the benefit of farmers,



unemployed women and youth and development workers. The KVK also operates a plant and animal clinic to cater various services to farmers. For more details please visit <http://www.kvkcacicut.gov.in> (email: kvk@spices.res.in)

Satellite Technology Based Village Resource Centre

The Satellite Technology based Village Resource Centre (VRC) Scheme is a video conferencing project sponsored by the Kerala State Planning Board and implemented by ISRO. The scheme envisages interactions between experts in eight identified knowledge centers and farmers enrolled in five village resource centers in Wyanad District of Kerala.



CAPACITY BUILDING

IISR trains spice extension officers and scientists from all over the country to build knowledge, skills, and scientific capacity. IISR also helps to educate tomorrow's scientists by providing opportunity to post graduate students in doing their summer training, M.Sc. project work, post M.Sc. training, M.Phil. and Ph.D. thesis work. Many universities have recognized the institute as a centre for post graduate studies.

- Bharathiar University, Coimbatore
- Kannur University, Kannur
- Kerala Agricultural University, Thrissur
- Mangalore University, Mangalore
- Nagarjuna University, Nagarjunasagar
- Tamil Nadu Agricultural University, Coimbatore
- University of Calicut, Calicut

Besides advanced training programmes are organized periodically in frontier areas of molecular biology, bioinformatics, biochemistry, biological control etc. Need based training is offered to officials from developmental and extension agencies in processing and evaluation of chemical quality in spices, pest and disease management, integrated pest and disease management, insect pest management, nematode management, mass rearing of coccinellid predators of scale insects, biological control of diseases, techniques on *Phytophthora* research, integrated nutrient management etc.



LINKAGES AND PARTNERSHIPS

The institute has linkages with other ICAR Institutes and SAUs (State Agricultural Universities) and many collaborative research projects have been taken up. Besides, the institute works in tandem with the developmental agencies such as Spices Board, Directorate of Arecanut and Spices Development and State Department of Agriculture and Horticulture of Kerala, Karnataka and Tamil Nadu. A few institutions with which the institute has linkages are:

- Department of Biotechnology, New Delhi
- Ministry of Environment and Forestry, New Delhi
- Ministry of Food Processing Industries, New Delhi
- Indian Agriculture Research Institute, New Delhi
- Indian Institute of Horticultural Research, Bangalore
- National Bureau of Plant Genetic Resources, New Delhi
- National Bureau of Agriculturally Important Microorganisms, Mau
- National Bureau of Agriculturally Important Insects, Bangalore
- Central Research Institute for Dryland Agriculture, Hyderabad
- Central Plantation Crops Research Institute, Kasaragod
- Central Institute of Agricultural Engineering, Bhopal
- Project Directorate on Cropping Systems Research, Modipuram
- National Horticulture Mission, New Delhi
- Spices Board, Kochi
- Directorate of Arecanut and Spices Development, Calicut
- Kerala Agricultural University, Thrissur
- Kerala State Council for Science, Technology and Environment, Trivandrum
- Centre for Water Resources Development and Management, Calicut
- ERNET India, New Delhi
- DOEACC, Calicut
- National Institute of Technology, Calicut
- State Planning Board, Government of Kerala



AICRP ON SPICES

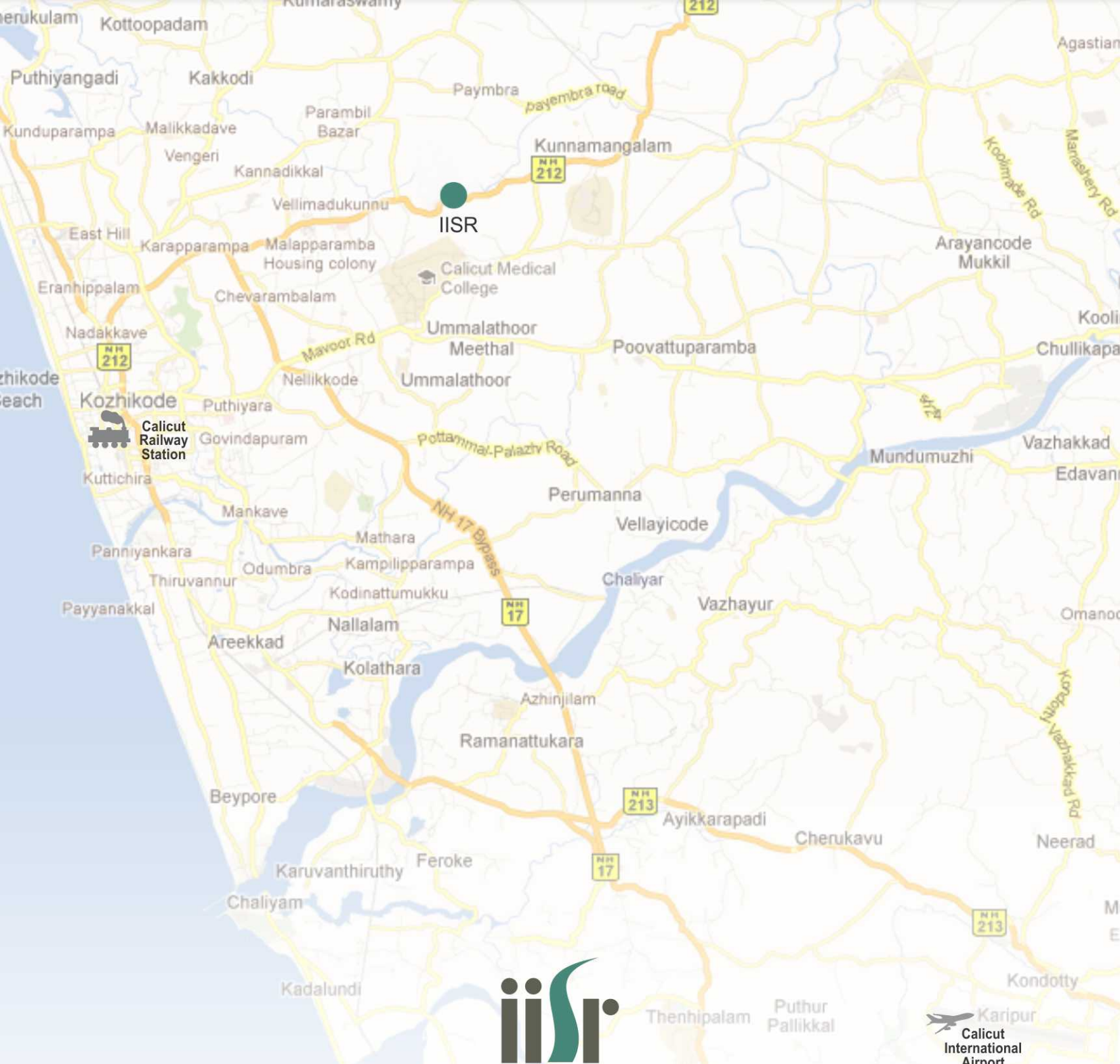
The All India Coordinated Research Project on Spices (AICRPS), the largest network in the spices research in the country is housed at IISR. The AICRPS centers are spread over 21 states and 21 state agricultural universities in the country, the research on 12 crops (black pepper, cardamom, large cardamom, ginger, turmeric, clove, nutmeg, cinnamon, coriander, cumin, fennel, and fenugreek) by 19 coordinating centers, eight coopting and 7 voluntary/ research centers. More details on the project can be had from <http://www.aicrps.res.in> (e-mail: aicrps@spices.res.in).

CO-HOST @ IISR

The Indian Society for Spices (ISS) was founded in 1991 for the advancement of research and development in spices, aromatic and related crops. Journal of Spices and Aromatic Crops, which is the official publication of Indian Society for Spices, is published twice a year at present during June and December. It is an international journal devoted to the advancement of spices, aromatic and related crops (<http://www.indianspicesociety.in>, e-mail: iss@spices.res.in)

AWARDS





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