

# KSCSTE NEWS

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# KERALA STATE COUNCIL FOR SCIENCE, TECHNOLOGY AND ENVIRONMENT (KSCSTE)

കേരള ശാസ്ത്ര സാങ്കേതിക പരിസ്ഥിതി കൗൺസിൽ

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"Pterocarpis dalbergioides"  
(Andaman Paduk)

## COVER STORY

## Integrating in-situ and ex-situ management: A sustainable model for plant genetic conservation at JNTBGRI.

Ensuring the availability of a wide range of germplasm in the face of unpredictable changes is crucial for the future. The main goal of conservation is to preserve biodiversity, ecosystem services, species, and genetic diversity for future generations and mitigate their loss. The unsustainable use of natural resources is causing biodiversity loss in the natural world due to the rapidly growing human population.

Botanic Gardens are recognised as essential centers for ex-situ conservation of indigenous and imperative plant species. KSCSTE - The Jawaharlal Nehru Tropical Botanic Garden and Research Institute (JNTBGRI) has a unique natural landscape similar to the Agasthyamala Biosphere Reserve in the southernmost part of the Western Ghats, which is a biodiversity hotspot. The Institute's vision is to conserve and sustainably utilise India's plant biodiversity, particularly in the Western Ghats, for the benefit of people. For the last 40 years, the Institute has focused on several activities related to its vision. It has various conservatories containing over 4,000 taxa, including indigenous and exotic plants. The institute gives great importance to the conservation of the genetic material of plants that have the potential to thrive in tropical climates.

Within its 300-acre campus, JNTBGRI comprises around 80 acres of moist deciduous forest, bordered by a strip of evergreen patch along the Chittar River. This patch of natural forest is home to various unique species that can only be found in this area. Some of the notable endemic trees are *Humboldtia vahliana*, *Myristica malabarica*, *Vateria indica*, *Garcinia gummigutta*, *Holigarna arnotiana*, *Calophyllum apetalum*, *Semecarpus travancorica*, *Hopea parviflora*, *Ormosia travancorica*, etc. Other important native trees, naturally occurring, include *Madhuca neriifolia*, *Dillenia pentagyna*, *Wrightia tinctoria*, *Careya arborea*, *Holarhena pubescens*, *Symplocos cochinchinensis* etc, among which some are with fragmented populations. The *Acrotrema arnotiana* is a beautiful herb that grows naturally on the campus, but it has a limited distribution. Lianas such as *Spatholobus parviflorus*, *Strychnos colubrina*, *Tetracera akara* and *Entada rheedei* are also prominent in the natural flora.



This unique ecosystem merges in-situ and ex-situ conditions and is home to various plants. Some rare and endemic species were translocated to natural forest patches to create a simulated ecosystem. Several species in the trial thrived within the forested area and demonstrated natural regeneration, indicating successful acclimatisation to the new habitat. Within a few years, certain species tend to form sustainable populations.

Some noteworthy species successfully translocated are *Coscinum fenestratum* (endangered / data deficient), *Piper barberi* (rare and endemic to the Western Ghats), *Geophila repens*, *Trichopus zeylanicus* ssp. *travancoricus* (with restricted distribution) and *Rauvolfia micrantha* (endemic and rare). In situ conservation protects species in their native habitat. In contrast, ex-situ conservation ensures plant material is available for research, horticulture, and education activities that ultimately support reintroduction efforts to prevent species from going extinct. Despite their undoubted value, ex-situ collections only capture a snapshot in time, reflecting the genetic makeup of individual populations at the time of collection. However, the disappearance of various species due to natural disasters carries significant implications, especially when they cannot be restored. One such collection is the ex-situ conservatory of plants from Andamans. The 2004 tsunami wiped out most of the natural populations in Andamans, but they are now safely regrowing at JNTBGRI.



Andaman and Nicobar Islands, situated in the Bay of Bengal, consist of 306 islands and 206 islets. It comprises evergreen, semi-evergreen, moist deciduous, beach, mangrove forests, and grasslands. There are 2463 angiosperm species belonging to 181 families and 1018 genera, making these islands rich in floral diver-

sity. This region is prone to natural disasters and man-made threats like cyclones, volcanic eruptions, earthquakes, and tsunamis. These threats and habitat loss make it improbable for plant diversity to endure.



KSCSTE-JNTBGRI initiated the efforts for the ex-situ conservation of insular flora in 1994. Live accessions of different species were periodically explored and documented with passport data. Currently, JNTBGRI maintains 385 plants of 150 species, including rare and endangered plants, on ten acres of land. The collection contains wild relatives of spices like *Myristica andamanica*, *Piper sarmentosum*, and *Amomum andamanicum*, as well as plants of signif-



icant commercial value such as *Pterocarpus dalbergioides*, *Calamus andamanicus*, and *Etlingera fenzlii*. Most of these species are well-established and naturally regenerate in the conservatory. The islands' flora is a rich source of ethnobotanical knowledge of indigenous tribes such as Nicobarese, Shompens, Jarawas, Sentinels, Onges, Great Andamanese, and Karen. These tribal communities rely on a variety of plants for their basic needs, such as food, shelter, medicine, dye, and fodder. The conservation of Andaman Nicobar germplasm outside the islands is a significant venture. After three decades of efforts, a repository of insular species has been established, which is the first of its kind in the country. This achievement marks a great success in the field of conservation.



## PROGRAMMES/ PROJECTS INITIATED/CONDUCTED

### KSCSTE HQ

#### Orientation Programme to Newly Joined Scientists

An orientation programme was organised during 11-16<sup>th</sup> September 2023 to provide an overview of the functions and activities of the KSCSTE and its R&D Centres to the newly joined eleven scientists in KSCSTE systems. The



event began with an inaugural function at KSCSTE headquarters followed by scientific sessions and organization/field visit to the different R&D Centers namely JNTBGRI, NATPAC, KFRI,



KFRI-Nilambur subcentre, KSoM, MBGIPS, and CWRDM. Technical Sessions were focusing on KSCSTE administrative rules and management, KSCSTE Schemes & Programs, career prospective in council, Familiarization on E-office and GEM portal, Financial management, ethics in workplace, Technology incubation and Startup ecosystem, etc. The Participants were familiarized with the organization structure, functional activities and culture in the various centers under the KSCSTE system and to explore possibilities of inter-institutional research collaboration. The program concluded with the valedictory functions along with participant's feedback session at CWRDM



*Dr. Binuja Thomas, Principal Scientist, KSCSTE and Dr. Sarika A. R. Senior Scientist, KSCSTE attended the Annual meeting of State S&T Councils organised by Department of Science & Technology, GoI at IIT, Bombay during 12-13 September 2023.*

As part of the BIRD programme, a site visit was conducted on 20<sup>th</sup> September, 2023 at Integrated Rural Technology Centre (IRTC), Mundur, Palakkad to evaluate the skill based training programmes in waste management conducted under the project entitled "Skill based training on Organic Waste Management and its use in Agriculture" by Dr. P N Damodharan, Head and Senior Scientist, waste Management Division, IRTC, Mundur.

On 21<sup>st</sup> September 2023 another site visit was conducted to evaluate the training programme conducted under the project entitled "SPIRULINA: A Promise for Self-Employment and Health" by Dr. Ambili Mechoor, Assistant Professor, Dept. of Biotechnology, Sahridaya College of Engineering and Technology, Thrissur.

### CWRDM

A new Climate Change Learning Lab has been set up in CWRDM with the financial support of European Union (EU) and GIZ Germany. It is a knowledge centre and equipped to organize awareness creation and capacity building activities related to climate change. Dynamic information about the climatic factors, resilient strategies and mitigation measures are depicted in the Lab. The facility will be helpful to a wide variety of relevant stakeholders, including students from both schools and college, government officials from different departments, people representatives, vulnerable communities, NGOs and Media.





Sri. PTA Rahim MLA inaugurating the climate change learning lab at CWRDM on 18 August 2023 in the presence of Dr Beena Philip, Worshipful Mayor, Kozhikode Corporation, Mr. Edwin Koekkoek, First Counsellor, Energy and Climate Action, European Union (EU) Delegation to India, Ms. Karin Deckenbach, Project Manager Indo-German Climate Action Project in India, Mr. Jai Kumar Gaurav, Senior Advisor, Climate Change and Circular Economy, GIZ India, Mr. T P Madhavan, president Kunnamangalam Block Panchayath and Dr. Manoj P Samuel, Executive Director, CWRDM

## Centre of Excellence in Phytochemical - Nanotechnology (CEP) is established at KSCSTE-JNTBGRI.

**JNTBGRI** It is a 200 Lakhs programme granted to KSCSTE-JNTBGRI. Centre of Excellence in Phytochemical - Nanotechnology is a niche area in the advanced nanotechnology where great attention is needed for the development of useful products to the society as well as to create scientifically trained manpower in the concerned area of nanotechnology for the development of our State/Nation. Based on the necessity to fill up the lacuna in the above said points, KSCSTE put forward the idea of establishing a center of excellence in nanotechnology under the SHRESTA scheme. For this purpose KSCSTE invited proposal from its constituent R & D institutions in Kerala to award the establishment of a centre of excellence in nanotechnology. In this regard we submitted a detailed proposal for the establishment of a Centre Excellence in Phytochemical - Nanotechnology (CEP) at KSCSTE-JNTBGRI for the above mentioned scheme. Based on the merit of the proposals received, and after detailed evaluation and presentation of the proposals KSCSTE granted the establishment of Centre of Excellence in Phytochemical - Nanotechnology at KSCSTE-JNTBGRI only. The centre of excellence in Nanotechnology area with a total budgetary provision of 200 lakhs for five years. KSCSTE-JNTBGRI previously received centre of excellence in Conservation area from Ministry of Environment and Forest, Govt. of India. After this It is for the first time KSCSTE-JNTBGRI received a state level centre of excellence, which is not awarded to any of our sister concerns in Nanotechnology. The centre will be nurtured by the KSCSTE-SHRESTA for five years, and after five years it will become a permanent establishment of JNTBGRI. Through the CEP in phase one (1 and 2 years) and Phase II (3,4 and 5th years) deliverables like wound healing phytochemical embedded nano-pads and nano-encapsulated essential oil for food grain pest management are envisaged. In human resource development the programme envisages training to researchers, industrial collab-

orations, collaborations with national and international R & D centres (in I and II phases, SCTIMST Trivandrum is the national collaborator and University of Oklahoma Health Science Centre, Oklahoma City, USA is the International collaborator). The CEP also provides a platform for researchers and industries for the onsite synthesis of nano-material from phytochemicals. The patents and training fee, royalties are focused in the II phase of the programme, which will enhance the CEP as a self-sustainable entity. In a nut-shell the programme of establishing Centre of Excellence in Phytochemical - Nanotechnology at KSCSTE-JNTBGRI is a novel initiative and an asset to our institute in the future.



Central Instrumentation Facility (CIF) to foster the analytical needs related to plant science field.

- Dr. A. Nazarudeen has submitted a project proposal to Kerala State Biodiversity Board for financial assistance; the title of the project is "Survey, documentation, ex-situ conservation and propagation of RET species of Kerala - an approach for conserving genetic stock for PARP"
- Studies on conservation biological aspects of selected flowering plant wealth of Kerala (plan project) – Population study of medicinally important endangered tree *Humboldtia uni-juga* was initiated and established a permanent study plot of 60x40m at Athirumala of Agasthyamala Biosphere Reserve.
- As part of the "Triparty action plan for the reintroduction of Red plants of Kerala" funded by Kerala Forest Department field and nursery data collection on the IUCN listed species viz. *Hopea racophloea* and *Syzygium travancoricum* were continued. Seedlings of *Hopea racophloea* (100 Nos) raised at JNTBGRI were reintroduced at Rosemala forests with the help of Forest officials.

## Initiated the following projects

- Improving statistics and reporting capacities of the forestry sector in Myanmar, Food and Agriculture Organization of the United Nations (FAO)
- Soil seed bank dynamics in tropics - phase 1: characteristics and dynamics in the evergreen forests at Sholayar., KFRI Plan Grants
- Recovery and Conservation of Rare, Endangered and Overexploited Species of Kerala (Phase 1), Kerala Forest Development Fund

**KFRI**

● World Nature Conservation Day observed at MBGIPS on 31<sup>st</sup> July 2023. Mr. Mithun Venugopal, Project Fellow, KSCSTE-MBGIPS gave a lecture on the Theme: "Forests and Livelihoods: Sustaining People and Plants". 35 members of Nature club of JDT Arts and Science College, Kozhikode participated in this.

● An awareness programme on farming and plant propagation techniques was conducted at MBGIPS on 17<sup>th</sup> August 2023 with the participation of 100 students of Al Haramain English School, Kozhikode



## Understanding the dynamic coastal environment of Kerala: Decoding the oceanic climate change signals and the associated risks:

Coastal environments face climate challenges such as sea level rise, storms, and warming. The Arabian Sea is warming faster than other tropical basins, affecting rainfall and productivity. Regional ocean climate data is needed to predict and assess risks, and to protect coastal communities. This 3-year plan funded project is aimed to understand the dynamic coastal environment of Kerala by decoding the oceanic climate change signals and the associated risks.

## Youth for Climate: Enhancing Student Outreach Activities at ICCS:

ICCS is gearing up for a comprehensive outreach Programme/material for climate awareness. Engaging students in climate-related activities is paramount. By fostering a sense of curiosity and understanding at an early age, we can shape a generation of environmentally conscious

citizens. This 3-year plan funded project envisions interactive experiments, workshops, and educational campaigns that captivate students and inspire them to actively participate in climate action. The project also proposes to leverage innovative tools such as virtual reality, to create immersive experiences that convey climate related challenges to students.

## Studies conducted at ICCS during 01.07.2023 to 27.09.2023:

1. Analysis of extreme climate indices over Pamba river basin.
2. Spatial Interpolation and correlation analysis of INSAT data with MODIS and AERONET data.
3. Timeseries analysis of oceanic parameters in the satellite era along the Kerala coast.
4. Integrating satellite information on water bodies for estimating reservoir operation and its use in SWAT model. Setting up of VIC hydrologic model for various catchments of Kerala.

- RET Conservatory and crop germplasm (cowpea, tubers, wild edibles, etc.) maintained at the centre.
- Inaugurated a bamboo craft unit for the young women of Chandanchira hamlet, a rain shelter for the women of Paniya tribal community, a library constructed by renovating an old building in the hamlet, and a Pattupire co-constructed in the year 2022-23 as a panchayat project to learn folk songs



*A Smart School was inaugurated at SDPY KPAM High school, Edavanakkad, Ernakulam*

The centre supported local farmers on the festive week of Onam with WampCo FPO to avail local produce & help support farmers' livelihoods by establishing an Onam Shop for one week

- Participatory yield enhancement trial in paddy for the third year continued along with maintenance of traditional rice germ plasm conservation plot at farmer's field.



- One field trial to study the effect of biochar on soil health in coffee plantation and cowpea being continued at the centre. Biometric data including yield, number of berries, canopy, etc. will be taken up for this year.
- Studies continued in various Panchayaths of Wayanad to study the dynamics of NTFPs utilization and challenges faced by the Kattunaika community of Wayanad.

## IRTC

P. Rajeev Hon: Minister inaugurated the Food and Water Testing Laboratory of STIC on 20.05.2023. Executive Vice President, KSCSTE – Prof. (Dr.) K.P.Sudheer, CUSAT Vice Chancellor- Prof. (Dr.) P.G. Sankaran, Member Secretary, KSCSTE – Dr. S. Pradeep Kumar, Former CUSAT VC - Prof. (Dr.) K.N Madhusoodhanan, Director STIC – Dr. M. Gopalakrishna Pillai were also present. A development proposal of STIC was handed over to the Hon'ble Minister by EVP KSCSTE and Chairman GC, STIC – Prof. (Dr.) K.P Sudheer during this occasion.



## SIGNIFICANT INNOVATION/INVENTION

## CWRDM

Dr. D.S. Aniesrani Delfiya, Dr. S. Murali, Er. P. V. Alfya (ICAR-Central Institute of Fisheries Technology (CIFT), Kochi) and Dr. Manoj P Samuel (Executive Director, CWRDM) has developed a technology 'Hot Air-assisted continuous infrared dryer for fish and fishery products' and certified by ICAR as an innovative technology which can be commercialized.

## JNTBGRI

- With the addition of about 2000 new saplings the total number of RET species produced under the 'Green Kerala Initiative' programme reached 20,000 numbers; as a part of encouraging conservation of the endemic species 374 plants belong to 16 RET species were distributed to the 'Pachathuruthu' programme of Haritha Kerala Mission of State Government.
- As part of the in-house project 'Studies on conservation biological aspects of selected flowering plant wealth of Kerala' germination, viability, desiccation and dormancy breaking studies of 12 species are progressing and a total of 89 seedlings belonging to 9 species were given for field trials.
- Unraveling MicroRNA Mediated Gene Regulation in *Centella asiatica* (L.) Urb. by high-Throughput Sequencing Based Small-RNA Profiling: *Centella asiatica* is a widely spread herb mostly found in the tropics having extensive medicinal values. Transcriptome-wide characterization of miRNA profile from the leaves of *C. asiatica* using high-throughput Illumina sequencing is reported for the first time from JNTBGRI. Current study identified 227 conserved and 109 putative novel miRNAs. Computation-

al screening revealed potential mRNA targets for both the conserved and novel miRNAs encoding diverse transcription factors and enzymes involved in plant development, disease resistance, metabolic and signaling pathways. Gene ontology annotation and KEGG analysis revealed the miRNA targets to be involved in a wide range of metabolomic and regulatory pathways. The differential expression of the miRNA encoding genes in diverse tissues was determined by real-time PCR analysis. It was found that gene expression levels of miR156, 159 and 1171 was reduced in salicylic acid treated axenic shoot cultures of *C. asiatica* compared to its control. Furthermore, RLM-RACE experiments mapped miRNA-mediated cleavage at two of the mRNA targets. The present study represents the large-scale identification of microRNAs from *C. asiatica* and contributes to the base for the up-coming studies on miRNA-mediated gene regulation of plant secondary metabolite pathways in particular. (Fig.5).

- Systematic documentation and Bio-prospecting of ethnomedicinally important medicinal plants on tribal/traditional knowledge through molecular pharmacological approach (Plan Funded project): Kerala is rich in ethnobiology/ethnobotany related knowledge, the reason for taking up such a project, the rich knowledge base (both tribal and coastal) which is undocumented systematically so far. Unfortunately, this priceless Traditional Knowledge transpired over generations is deteriorating rapidly due to various factors including modernization, urbanization, deforestation, changing social and economic standards of the tribal and coastal communities, etc. Hence, the prime objective of this project is to immediately document the remaining traditional wisdom of particularly the elderly coastal and tribal communities of Kerala which could provide leads for further research and development. In vitro pharmacological screening of selected

medicinal plants/ nutraceuticals based on tribal/traditional/ Ayurvedic knowledge. Pharmacognostical characterization of selected ethnomedicinal plants of Western Ghats to enrich

Ayurvedic Pharmacopoeia of India. In vivo pharmacological screening of potent medicinal plants selected based on tribal/ traditional knowledge.

## FACILITIES/INFRASTRUCTURE CREATED

### CWRDM

- Climate Change Learning Lab
- The water quality analysis laboratory of CWRDM was audited by NABL and recommended to continue NABL accreditation without any major modification.

### JNTBGRI

Establishment of Centre of Excellence in Phytochemical-Nanotechnology (CEP) at KSCSTE-JNTBGRI under the scheme State Higher Research centres of Excellence in Science & Technology Applications (SHRESTA) -KSCSTE

LC-MS is a work horse in the plant metabolite analytical field, and will be useful in phytochemistry, metabolomics, chemotaxonomy and chemical ecology fields.

- Two poly houses (each with 10 x 7.5 m) with a total of 150 m<sup>2</sup> area were constructed at Threatened Species Park, under the Green Kerala Initiative Programme funded by KSCSTE as well as Conservation, Eco-restoration and Popularization of three endemic and threatened tree species of Kerala, funded by KFD
- Constructed a metallic chain link fence of 300m at Threatened Species Park and 600 m around Garcinia garden. The metallic chain links are fixed on 5 feet high metallic poles raised on cement brick foot, at 2 m intervals.

### KFRI

- Insectarium at Forest Entomology Department
- Bark and Ambrosia beetle culture room at Forest Entomology Department
- Imaging facility of the department were supplemented by one Dissection and Sterio microscopes which has a common digital imaging facility.



- Replacing the torn out Fernery and Cycad garden boundary fencing 332m (1.7m height); 346m cement block base lining provided to avoid entry of small animals; 3 double gates (each 4m width) and 1 single gate (2m width) were done new
- As a part of activities to enhance the aesthetic beauty of the garden the 20 m terrace trough of the VMC building is planted with Dracaena, Spathiphyllum and Cordyline provided with Achetaria azurea and Strobilanthes alternata 'exotica's ground cover.

### ICCS

- Domain registration for ICCS under ERNET (iccs.res.in)
- Setting up of an InfoDesk at ICCS. This includes monthly climate parameters as an infographic. Setting-up of Google Workspace including email under the domain name iccs.res.in.

## TECHNOLOGIES ESTABLISHED/DEMONSTRATED

### KSCSTE HQ

Coir Geotextile technology for combating stream bank erosion was demonstrated at Ranganthittu Bird sanctuary, Mysore as part of a consultancy project.

### MBGIPS

*Crinum malabaricum*, an endemic aquatic species of Kasaragod was successfully translocated at Maharashtra and Karnataka based on the locations of ideal habitat following Ecological Niche Modelling.



Nandgaon, Sindudurgh, Maharashtra (16.388534°N, 73.642227°E)  
Before After



Naringre, Sindudurgh, Maharashtra (16.314469°N, 73.455658°E)  
Before After



Lore, Sindhudurg, Maharashtra (16.387371°N, 73.774730°E)  
Before After



Perla, Enmakaje, Kasargod, Kerala (12.636339°N, 75.091584°E)



## RESEARCH/ACADEMIC PROGRAMMES

### CWRDM

#### Ongoing

Plan projects	: 56
External Funded	: 21
Consultancy	: 21

#### Completed

Plan projects	: 2
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PhD	: 10 (ongoing)
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PDF	: 3
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MSc Dissertation/internships	: 14 completed
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### KFRI

Continuing projects – 55

### JNTBGRI

PhD	: 34 (ongoing)
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MSc Dissertation/internships	: 7 completed
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### KSOM

#### Research

PhD	: 5 (ongoing)
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Integrated MSc-PhD program, PhD program continuing

### MBGIPS

Ongoing Ph. D. Programmes: 7 no's Academic Attachment

Programme (AAP) : from 08th to 10th August 2023 with

14 participants from Dept. of Botany & Biotechnology,

Bishop Moore College, Mavelikara, Alapuzha

### ICCS

Ongoing projects	: 5
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### MSSRF

17 Interns from various disciplines mainly Biotechnology, Agriculture, Social Work, Environment Science, etc. continuing internship at the centre

## TRAINING PROGRAMMES/ WORKSHOPS/INTERNSHIPS

KSCSTE HQ

**District level Stakeholders' Brainstorming workshop on Science and Technology for the sustainable development of Scheduled Caste (SC) and Scheduled Tribe (ST) communities in the Kasaragod district - 17th August 2023 at Government College Kasaragod.**

Scheduled Caste & Scheduled Tribe Cell at KSCSTE organized a District-level stakeholders' brainstorming workshop at Kasaragod to discuss the various issues that require Science and Technology (S&T) based solutions for the sustainable development of SC and ST communities in the district. The workshop was inaugurated by Shri. Naveen Babu, Additional District Magistrate, Kasaragod in a function

presided by Dr Ananthapadmanabha A. L, Principal, Government College Kasaragod. Prof. V. Gopinathan, former Deputy Director, Col-



legiate of Education, Dr. P Harinarayanan, Senior Principal Scientist, KSCSTE, and Smt. P Aparna Wilson, Tribal Development Officer, Parappa addressed the gathering. 71 participants from different government departments, scientists, academicians and community representatives participated. Scheduled Caste Development Officer and Tribal Development Officer presented the present problems and challenges faced by the SC and ST community in the district. Smt. Baby Balakrishnan, District Panchayat President, Kasaragod delivered the valedictory address.

### Workshop on Lifestyle for Environment

EIACP Kerala in association with Nehru Arts & Science College, Kanhangad jointly organise one day workshop on Lifestyle for Environment on 15th September 2023. The programme was inaugurated by Dr. K. V. Murali, Principal, Nehru Arts & Science College, Kanhangad. Keynote address was delivered by Dr. Khaleel K.M, Former Principal, Sir Syed College, Kannur on the topic 'Biodiversity & Life Style' & Dr. P. Harinarayanan, Senior Principal Scientist, KSCSTE & EIACP Coordinator, Kerala on



the topic Life Style for Environment & Climate Change. Mission LiFE Awareness posters were distributed among the students. Mission LiFE Awareness posters were distributed among the students. 200 participants were sensitized



## CWRDM

- Implant training to 49 B. Tech Agricultural Eng students from Kelappaji College of Agricultural Engineering, Tavanur, during 15-23 September 2023
- DST-SERB funded Karyashala High End workshop on 'Integrated Water Resources Management in the changing climatic Scenario: Application of advanced Geo hydrological and Geophysical Techniques' from August 14-26, 2023.



Prof. M. Radhakrishna, Head, Department of Earth Sciences, IIT-Bombay, Inaugurating the DST-SERB Karyashala

- Training (WRMTP) on Introduction to QGIS and QSWAT” from 19 to 22 July, 2023 and Sustainable Groundwater Management: Concepts and Tools” on 11-15 September 2023.
- CWRDM and ICAR- CPCRI, Kasaragod jointly organized a workshop on “Water budgeting and watershed management in local self-government institutions” on 26th July 2023.
- CWRDM and Central university of Kerala, Kasaragod jointly organized a workshop on “Water budgeting” on 27<sup>th</sup> July 2023.



Participants of the Workshop with the Vice Chancellor, central University Kerala and Executive Director, CWRDM

- Second State level Stakeholder's Consultation Workshop 2023, on 13.09.2023 at IMG Thiruvananthapuram



Sri. Roshy Augustine, Minister of Water resources, Govt. Kerala, inaugurating the 2<sup>nd</sup> State Level Stakeholder Workshop at IMG Thiruvananthapuram.

- DST-SERB sponsored High-End Workshop on “Advanced R Programming in Hydrology for Understanding the Impact of Climate Change on Water Resource Management,” held from July 18-29, 2023.



Prof. S Mohan, Vice Chancellor of Puthucherry Technological University inaugurating the DST-SERB Karyashala workshop in the presence of Dr. R Dinesh, Director, IISR.

- DST-SERB sponsored High-End Karyashala Workshop on ‘Advanced instrumentation techniques in isotopic and chemical analysis of environmental matrices’ during 11-23, September, 2023



Dr. Jose Mathew, Chairperson, TBI, NIT-Calicut Inaugurating the High end Karyashala Workshop

## JNTBGRI

- World Bamboo Day 2023: The World Bamboo Day was celebrated on 18 September 2023 at JNTBGRI auditorium with participation of students, public and the staff. The Bamboo Product Designer and Master Craft Trainer, Mr. Rajeev, V.K. has given training to the participants in the designing and preparation of bamboo products. Students from Mar Baselios College of Engineering, Mohandas College of Engineering and Iqbal College have attended the programme.
- One day training and scholarly guidance for Beat Forest Officers trainees (batch no 24) from Forest Department as four batches (13,15,19&29 September)
- Half day orientation programme to the newly recruited thirteen scientists from KSCSTE on 12 September 2023

- One-Week Compulsory Training Course on Techniques for combating Land Degradation and Agroforestry, Ministry of Environment, Forest and Climate Change (MoEF & CC), Govt. of India
- Green Entrepreneurship: Bamboo-Based Industry and Innovative Opportunities, Kerala State Bamboo Mission (K-Bip), Govt. of Kerala

### Training programme for IFS officers

KFRI organized a one-week mandatory training course on 'Techniques for Combating Land Degradation and Agroforestry' for Indian Forest Service Officers, with the support of the Ministry of Environment, Forest and Climate Change, Government of India. Officers of Indian Forest Service from various regions of the country participated in this program. The program consisted of both classroom sessions and field visits. As part of the program, a special book was published to honor Dr. Syam Viswanath for his valuable contributions to the Agroforestry sector.



### Bamboo Handicraft Training programmes

The KSCSTE- Kerala Forest Research Institute (KFRI) has organized two training programs for artisans with a specialization in bamboo handicrafts. These programmes were held at the Seraphic Handicrafts Industrial Cooperative Society Centre in Velikulangara, Thrissur, and Mulagramam, Idukki. The aim of this Kerala State Bamboo Mission supported programme is to provide 40 artisans with a valuable opportunity to enhance their skills and learn the art of creating new and innovative bamboo handicrafts.



### World Bamboo Day 2023

The BTSNG-KFRI & Extension Department of Kerala Forest Research Institute (KFRI) successfully organized a two-day workshop on Bamboo to celebrate World Bamboo Day 2023. The workshop took place on September 18<sup>th</sup> at KFRI Peechi. Distinguished guests, including Dr. R. Bindu, the Honorable Minister for Higher Education and Social Justice representing the Government of Kerala, were present at the event. Other notable attendees included Dr. M.C. Dathan, the scientific advisor to the Chief Minister, Prof. K.P. Sudheer, Ex Officio Principal Secretary of the S&T Department, Dr. Pradeepkumar, Member Secretary of KSCSTE, Dr. Syam Viswanath, Director of KFRI, Sri. P P Raveendran, President of Pananchery GP, Sri Chandy P Alexander, Sri Shyju Kurian, Smt. Beena Paulose, Sri Van Roy (GM, K bip), Prof. Kunjambu from KAU, and Dr. T V Sajeew (Registrar) from KFRI. They actively participated in the inaugural session.

Throughout the workshop, various experts delivered sessions on different aspects of bamboo. Dr. Susanth C. S from NID, Sri. Tony Paul, CEO of Uravu, Sri. Sivan Ambattu from EDII, Dr. Saji M. P., Handicraft Development Commissioner, Sri. Alok Thomas Paul, MD of Cedar, Dr. Seethalakshmi (Retd. Chief Scientist), Dr. Pandalai (Retd. Chief Scientist), Dr. Raghu AV, Dr. Sreekumar VB, Dr M Amruth, and Dr. Sreejith K A from KFRI shared their knowledge and insights.

By bringing together experts and enthusiasts, the workshop provided a platform to explore the potential of bamboo and its significance in various domains. The diverse range of participants ensured a fruitful exchange of ideas and fostered collaboration among stakeholders.



### NATPAC Training Course for Drivers of Vehicles Carrying Dangerous and Hazardous Goods

Government of Kerala accorded sanction to KSCSTE-NATPAC for conducting 'Training Course for Drivers of Vehicles Carrying Dangerous and Hazardous Goods'. A certificate for the same is issued to participants on the completion of training and this certificate is valid for 3 years. The training intends to ensure employee's safety, reduce incidents and crashes, increase employee's skills, ensure environmental protection, preclude penalties and reduce operating costs.





*48th Training Course for Drivers of Vehicles Carrying Dangerous and Hazardous Goods*

### ● TransTech Talk Series

KSCSTE-NATPAC has initiated a technical talk series entitled “TransTech Talk Series” focussing on various aspects of Transportation sector.

The sixth talk in the series was delivered online by Dr. Sunanda Dissanayake, Ph.D., P.E., F. ASCE, Chair and Professor of the Civil and Environmental Engineering Dept. at Kennesaw State University (KSU) on the topic “Data-Driven Road Design and Policy Decisions based on Traffic Safety Considerations: Case Studies” on 13<sup>th</sup> July 2023.

The seventh talk in the series was delivered online by Dr. Neeraj Buch, Ph.D., Professor of Pavement Engineering, Rochester Institute of Technology, USA on the topic “Performance Evaluation of Long-Life Rigid Pavements in Michigan” on 10<sup>th</sup> August 2023.

The eighth talk in the series was delivered online by Prof. Sabya Mishra, Professor, Department of Civil Engineering, University of Memphis on the topic “Optimal Integration of On-Demand Transit Services with Fixed Route Transit Network for Cost-Effective First and Last Mile Connectivity” on 15<sup>th</sup> September 2023.

### ● TransPedia Research Talk Series

TransPedia is a distinctive endeavor from NATPAC, envisioned to promote research for shared benefits, by disseminating knowledge on diverse topics from cutting-edge technologies to sustainable solutions. This also brings out a platform for young researchers across the globe to connect and interact to better shape the future of research and development in transportation.

The first talk in the series was delivered online on the topic “Saturation Flow Estimation at Signalized Intersections with Multi-Class Traffic Streams” on 24<sup>th</sup> August 2023 by Dr. Remya K Padinjaraapat who completed Ph.D from Indian Institute of Technology Bombay in 2021.

The second talk in the series was delivered online on the topic “Decision Support System for Maintenance Management of Indian Highways” on 27<sup>th</sup> September 2023 by Dr. Chethana Ramachandra, Assistant Professor, Dept. of Civil Engg., B.M.S. College of Engineering, Bengaluru.

### ICCS

Consultation and interaction with High Schools teachers in Kottayam to plan the outreach activities of ICCS on 31<sup>st</sup> July 2023.



*Consultation and interaction with High Schools teachers in Kottayam, a) Govt. HSS Karapuzha, b) St. George GVHSS Puthulappu.*

National Workshop on Atmospheric Aerosol Measurements and Modeling over India: Past decade, Current Status, and Challenges ahead from 26 July 2023 to 28 July 2023, organized by Centre for Atmospheric and Climate Sciences, IIT Madras, conducted at College of Engineering, Munnar.

High end workshop on Advanced R programming in Hydrology for understanding the impact of climate change on water resources management, from 18 July 2023 to 29 July 2023, organized by CWRDM at Calicut.

National Consultation Workshop on the Disaster Risk and Climate Action Tracker Tool (DCAT) from 18 August 2023 to 19 August 2023, organized by KILA at Trivandrum.

State Level Stakeholder Consultation Workshop on 13/09/2023, organized by CWRDM at IMG Trivandrum.

- KSCSTE Orientation program for newly joined scientists from 11 September 2023 to 16/09/2023.

- Two One-Day Webinars conducted on the theme “Conservation Conversations” in July and August by Dr. Ethan Freid, Dr. Heather Mason and Dr. CG Madhusoodan



- A workshop was organised to observe the International Day for the Conservation of Mangrove Ecosystem with the participation of students from KPMHS Edavanakkad



- MSSRF CABc participated in the coordination of 3-Day International Conference on Mighty Millets held at MSSRF, Chennai from August 6-8, 2023

- On World Bamboo Day, the centre organized a 17 Days Training program on Bamboo craft for SC & ST community of Kerala



## STIC

STIC organized Four day training Programme on “Laboratory Quality Management System and Internal Audit as per ISO/IEC 17025 : 2017 from 18 to 21 July 2023





## CONFERENCES/SYMPOSIA/SEMINARS ORGANIZED

KSCSTE HQ

Biotechnology Innovations for Rural Development (BIRD) is an initiative of the Kerala Biotechnology Commission to empower rural folks by providing training in biotechnology techniques that will enable them to earn a living. The Waste Management Division of IRTC, Mundur, through the KBC-supported BIRD project, provides training for rural women in vermicomposting and helps them set up their own household bins in their houses itself. The KBC-KSCSTE team visited the training site and the beneficiaries Kadampazhipuram GramaPanchayat in Cheruplassery region, Palakkad district on 20<sup>th</sup> September 2023.

The programme titled “Skill based training on Organic Waste Management and its use in Agriculture”.



College of Engineering and Technology, Thrissur on 21<sup>st</sup> September 2023.

The programme titled “SPIRULINA: A Promise for Self-Employment and Health”.



With the support of KBC's BIRD project, the team at Dept. of Biotechnology, Sahrdaya College of Engineering and Technology, Thrissur provides awareness in the people living in the panchayath on the benefits of spirulina, by providing training on developing and maintaining the culture. The KBC-KSCSTE team visited the lab Dept. of Biotechnology, Sahrdaya



CWRDM

International Webinar on Flood Management: learnings from Kerala Deluge-2018, organised on 10 August 2023 by CWRDM in coordination with Women for Water Partnership (WWP). Experts from India and abroad led the sessions and more than 100 persons participated.

Dr. Manoj P Samuel, Executive director attended Workshop on Biological soil quality assessment techniques in agricultural areas, jointly organized by Land Development Department and Institute de recherche pour le développement (IRD) French Nation Institute for Agricultural Research (INRA) and Center of Excellence for Soil Research in Asia (CESRA) held at Bangkok, Thailand from 21 August 2023 to 25 August 2023

KSOM

### Workshop on Words and Transcendence.

The programme focuses on the following interconnected topics of current research.

- Arithmetic and combinatorics of words.
- Diophantine approximation.
- Transcendental number theory.
- Diophantine properties of Zeta values.

From August 7 to 12, 2023, the workshop conducted at Kerala School of Mathematics. The senior professors from IMSc Chennai, CMI Chennai, RKMVERI Belur, NISER Bhubaneswar, ISI Delhi were given lectures to the Research scholars across India.

## KSCSTE-KERALA SCHOOL OF MATHEMATICS WORKSHOP ON Words&Transcendence 7-12 August 2023



ICCS

Spatio-Temporal Distribution of Aerosols over Kerala-A Satellite based Assessment in Polluting Climate. Poster presentation at the National Workshop on Atmospheric Aerosol Measurements and Modeling over India: Past decade, Current Status, and Challenges ahead, organized by Centre for Atmospheric and Climate Sciences, IIT Madras, conducted at College of Engineering, Munnar.

## SPECIAL NEWS IF ANY

JNTBGRI

Located and accessioned *Ixora johnsonii* Hook.f. (Rubiaceae, Coll. No. 99598), a Critically Endangered species (Criteria B1+2c, ver 2.3, IUCN, 1998) from the Kalakatti forests (Kottayam District, Kerala). Fifty accessions of the species were collected for ex-situ conservation along with sample specimens for taxonomic studies.



## AWARDS/ RECOGNITION

CWRDM

Kunnamangalam Block Panchayath appreciated Dr. Manoj P Samuel, Executive Director, CWRDM for being selected as a member of Subject Committee of world Water Forum to be held at Indonesia during 2024.

JNTBGRI

- Dr. Vinodkumar T G Nair, Senior Scientist was invited and attended the online meeting of KUHS-Meeting of School Board for School of Fundamental Research in Ayurveda on 04 August 2023.
- Dr. V. Gayathri has bagged the Best Women Researcher Award in the International Conference on Advances in Bioresearch, on 26-27<sup>th</sup> July, 2023 at held in Thiruvananthapuram.



## REMARKABLE/OUTSTANDING ACHIEVEMENTS:

CWRDM

- Dr. Manoj P Samuel, Executive Director, CWRDM for being selected as a member of Subject Committee of world Water Forum to be held at Indonesia during 2024.

a small genus with about 35 species known world-over. The species is described and named as *Candolleomyces albosquamosus* P.K. Nayana & C.K. Pradeep.

- Dr. Manoj P Samuel, Executive Director elected as a Governing Body Member of Wetland International South Asia (WISA)

- Deposited 8 strains of endomycorrhiza from orchids at CSIR- MTCC, Chandigarh and received the accession numbers.

- A new addition to the Bambusetum *Chimonobambusa marmorea* was planted on 18<sup>th</sup> September as a part of Bamboo Day 2023.

- Started sale of *Anthurium crystallinum* hybrid.

- A new Mushroom species of genus *Candolleomyces* was discovered from JNTBGRI campus. *Candolleomyces* is

MBGIPS

- Dr. Ethan Fried, Botanist from Bahamas Botanical Garden, Eleuthera, Bahamas visited MBGIPS and delivered a lecture on “Flora of Bahamas Island and about Bahamas Botanical Garden” on 31st July 2023.

- Dr Abdul Kareem, Marie Curie Postdoc at Swedish University of Agricultural Sciences (SLU), Australia visited MBGIPS on 24<sup>th</sup> July 2023.

JTBGRI

## PROMOTIONS/RETIREMENTS

### KSCSTE HQ

Dr.E.S.Anilkumar, Senior Scientist  
super annuated on 31<sup>st</sup> July 2023



### JNTBGRI

Dr. William Decruse, Principal Scientist super annuated on 31<sup>st</sup> July 2023

Dr. A.K. Sreekala, Principal Scientist super annuated on 31<sup>st</sup> July 2023



### MBGIPS

Dr. N S Pradeep, Principal Scientist designated as the ‘Scientist-in Charge’ with full administrative and financial responsibilities, w.e.f. 01 September 2023.



7 Garden trainees engaged on daily waged basis w.e.f. 14 August 2023



*Eminent geneticist, Father of Green Revolution and Humanitarian, Professor M S Swaminathan passed away on September 28 at his residence in Chennai.*

*Professor M.S. Swaminathan is a renowned Indian scientist and agricultural expert whose pioneering work in the field of agriculture and rural development has had a profound impact on India and the world. His contributions to sustainable farming practices and food security have been invaluable. He was a mentor to KSCSTE and he was honoured by conferring Sasthrapuraskaram, for his legendary contributions to science and technology.*

*KSCSTE pays respectful homages to him*



**KERALA STATE COUNCIL FOR  
SCIENCE, TECHNOLOGY AND ENVIRONMENT (KSCSTE)**

കേരള ശാസ്ത്ര സാങ്കേതിക പരിസ്ഥിതി കാൺസിൽ

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