

# KSCSTE NEWS

A Quarterly Newsletter of KSCSTE

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

കേരള ശാസ്ത്ര സാങ്കേതിക പരിസ്ഥിതി കാൺസിൽ

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*Cover Photo*

*Crinum malabaricum* is a critically endangered aquatic perennial flowering plant, belonging to the family *Amaryllidaceae*. It is endemic to the seasonal streams of laterite plateaus in Northern Kerala. This plant is the key species in its habitat which provide suitable breeding ground for fresh water fishes, amphibians and odonates. *C. malabaricum* is well known for the presence of Galantamine, a inhibitor of *acetylcholine esterase* used for treating Alzheimer's patients. Also it is a source for anticancerous drug Lycorine. Currently this species faces imminent threats due to habitat loss and lack of dispersal. KSCSTE-MBGIPS has initiated programs to develop conservation strategies for this critically endangered species.

# Editorial Desk

## Greetings from KSCSTE

Science and Technology have created phenomenal impact in shaping the lifestyle of human beings throughout the world and the role of science and technology as an important element of national development is also well recognized. Such a significant role is played in the Kerala State by the Kerala State Council for Science, Technology and Environment (KSCSTE), for the promotion of excellence in science and technology through learning, research and development with the participation of academia, industry and research organisations and to the benefit of the society for improving quality of life through interventions for the improvement of infrastructure, livelihood, amenities and environment.

The Editorial Board proudly present before you the first Newsletter of KSCSTE in this Golden Jubilee Year of Science & Technology in the Kerala State. In this first edition, a coordinated effort is made to make a humble attempt to glimpse through the breakthrough R&D achievements, new Initiatives and Research Programmes, Technology Development and Innovation, Patents, Publications and Awards, etc. Special emphasis is prearranged to highlight the achievements of the KSCSTE R&D Centres and HQ separately.

The KSCSTE drives the Research and Development efforts of the State through amalgamated management and concerted activities through its eight R&D centres which were established at different periods and conduct research and development activities in specific mandated domains. They are: Kerala Forest Research Institute (KFRI-1975), National Transportation Planning and Research Centre (NATPAC-1976), Centre for Water Resources Development and Management (CWRDM-1978), Jawaharlal Nehru Tropical Botanic Garden and Research Institute (JNTBGRI-1979), Kerala School of Mathematics (KSoM-2007), Srinivasa Ramanujan Institute for Basic Sciences (SRIBS-2013) and Malabar Botanical Garden and Institute for Plant Sciences (MBGIPS-2015) and the Institute for Climate Change Studies (ICCS-2021). Apart from the R&D Institutions, the grant-in-aid Institutions like Integrated Rural Technology Institute (IRTC), Sophisticated Testing and Instrumentation Centre (STIC), and the Community Agrobiodiversity Centre of M S Swaminathan Research Foundation (MSSRF) have been active in promoting development of S&T in rural sectors as well as providing instrumentation support both for academic institutes as well as industries and also to strengthen the agrobiodiversity initiatives in the Kerala State. The major contributions of these Centres are portrayed with due acknowledgement to the institutions.

The Schemes and Programmes narrated in this Newsletter are operated at the KSCSTE HQ are aimed at the development of high quality science education system in the State, and also to implement programmes to achieve excellence in S&T within the State and to provide service to the society at large, with a focus on science popularisation and promotion, research and development, ecology and environment, innovation and technology development and transfer, biotechnology development, school level promotional activities and science programmes for women.

Since the scientific achievements of all the institutions together are voluminous and capacious; all inputs from the Divisions/Centres could not be included due to the space restrictions. However, sincere efforts are taken to acknowledge the hard work of brilliant scientists atleast by sketch lines and dots. There may be some lacunas and shortcomings which we believe that the readers will try to understand and hopefully appreciate the sweat behind bringing this landscape. Your impressions and reactions are most welcome for us to improve upon the following issues (may be mailed to : [sasthranews2022@gmail.com](mailto:sasthranews2022@gmail.com) ).

We take this opportunity to wish you a Happy Onam !

**Editorial Team**



**PINARAYI VIJAYAN**  
CHIEF MINISTER



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No. 520/Press/CMO/22

24<sup>th</sup> August, 2022

### **MESSAGE**

Science and technology have expanded the limits of human potential and enabled radical transformations in the quality of our lives. Research in science, and the acquisition, adaptation and application of new technologies have a key role to play in the development of society and economy.

Utilising science and technology, Kerala is marching forward with an aspiration for sustainable and inclusive growth. We aim to create an eco system that nurtures research, innovation and industrialisation in the State. The foundations of that effort is rooted in Kerala's scientific breakthroughs pioneered by our academic and research institutions. They have been thriving over the last 50 years, ever since the setting up of the Kerala State Council for Science, Technology and Environment.

KSCSTE is one of the largest and well-structured State level Science and Technology Councils in the country. It coordinates and implements scientific activities throughout the State. It has the most comprehensive science and technology promotion and popularisation programmes in the country, which help to foster a scientific temper and promote research and development at all levels.

Scientific knowledge and interventions can never be fully understood or appreciated unless they are disseminated widely amidst the society at large. I am glad to note that in its Golden Jubilee year, the KSCSTE is bringing out a quarterly newsletter with that goal in mind. I wish it all success and congratulate all those behind it.

**Pinarayi Vijayan**

**The President**  
KSCSTE  
E-mail : mskscste@gmail.com



# Golden Jubilee Celebrations of Science & Technology in the Kerala State



The Kerala State Council for Science, Technology and Environment (KSCSTE) is an autonomous institution of S & T Department, Kerala, constituted in November 2002 to be an agency for change and development through science and technology. Formerly it was the Science, Technology and Environment Committee (STEC), established in 1972 in concurrence with the Science Policy of Government of India. The Council promotes and activates programs for increasing the stock of knowledge in science, and fine tunes policies which are significant and for the sustained development of humanity. The Council prepares the road map for development through scientific research and innovation in technologies.

KSCSTE has celebrated the Golden Jubilee year of the State Science & Technology in a befitting manner with series of programmes including Open House at its R & D Centres, 50 lecture series and inauguration by the Hon'ble Chief Minister at Thiruvananthapuram.

On 29<sup>th</sup> May, 2022, Shri. Pinarayi Vijayan, the Hon'ble Chief Minister, Kerala & President, Kerala State Council for Science, Technology and Environment, inaugurated the Golden Jubilee year of the State Science & Technology at the Kerala Arts & Craft Village, Vellar, Thiruvananthapuram. He presented Kerala Sasthra Puraskaram Awards and Best Paper and Best Poster Awards of 34<sup>th</sup> Kerala Science Congress during the inaugural session.

In this connection, a Brainstorming Session on Science, Technology & Environment Vision 2050 was conducted. Dr. A. Sabu, Pro Vice Chancellor, Kannur University introduced the topic. Eminent scientists and the policy makers in Kerala attended the session. Prof. M.S. Valiyathan, Dr. A.E. Muthunayagam, Dr. Suresh Das, Dr. E.P. Yesodharan, Shri. M.C. Dathan, Dr. M. Rajeevan, Prof. R.V.G. Menon, Dr. K.R.S. Krishnan, Dr. Ajayakumar Varma and Dr. K.K. Ramachandran participated and presented their vision. Prof. K. P. Sudheer, Executive Vice President, KSCSTE moderated the session.

A painting competition for school children in two categories (class 7 to 10 and higher secondary students) was conducted on May 27 at Govt. Model Girls' Higher Secondary School, Pattom.





# 34<sup>th</sup> Kerala Science Congress



The Kerala Science Congress is a mega science event of KSCSTE, and it provides a platform for young researchers, academicians, technologists and others across the State to discuss, exchange and share their research findings and technologies developed, relevant to the State of Kerala.

Due to the outbreak of COVID-19, the event was organised in a hybrid programme with inauguration as offline and technical sessions in virtual mode from 10<sup>th</sup> to 12<sup>th</sup> February 2022. On 10<sup>th</sup> February 2022, Hon'ble Chief Minister, Kerala inaugurated the 34<sup>th</sup> KSC at Mar Ivanios College, Thiruvananthapuram. Dr. S. Vasudev Award, Chief Minister's Gold Medal for Young Scientist Awardees of KSCSTE and Science Literature Awards were distributed during the inaugural session. Prof. K.P. Sudheer presided over the function, Dr. Saji Gopinath, Chairman, 34<sup>th</sup> KSC presented a report about the 34<sup>th</sup> KSC. Dr. S. Pradeep Kumar, Member Secretary & General Convener, 34<sup>th</sup> KSC welcomed the session and Dr. K. Vijayakumar, Joint Convener, 34<sup>th</sup> KSC proposed vote of thanks.

Focal theme of 34<sup>th</sup> KSC was *"Science, Technology & Innovation for Transition to a Knowledge Economy"*. A panel discussion chaired by Dr. Saji Gopinath, Vice Chancellor, Kerala University of Digital Sciences, Innovation & Technology, was conducted during the inaugural day. Prof. Konstantin Sergeevich Novoselov, Nobel Laureate in Physics (2010), Tan Chin Tuan

Centennial Professor, Centre for Advanced 2D Materials, National University of Singapore; Shri. S. Somanath, Chairman, Indian Space Research Organisation, Govt of India and Prof. V. K. Ramachandran, Vice Chairperson, Kerala State Planning Board also presented these papers in the focal theme session.

Four memorial lectures were presented on virtual platform in the Science Congress session. Prof. Thanu Padmanabhan Memorial Lecture was delivered by Dr. P. Sreekumar, Former Director, Indian Institute of Astro Physics (IIAP); Dr. P.K. Gopalakrishnan Memorial Lecture was delivered by Dr. K.N. Harilal, Former Member, Kerala State Planning Board; Dr. Janaki Ammal Memorial lecture was delivered by Dr. M. Sanjappa, Former Director, Botanical Survey of India and Dr. G.N. Ramachandran Memorial lecture was delivered by Dr. R. Sankarnarayanan, Group Leader, Structural Biology, CCMB, Hyderabad.

A total of 508 delegates were registered for the 34<sup>th</sup> KSC. Research paper presentation was conducted from 11<sup>th</sup> February 2022 on webex platform. Presentation in each subject area was commenced with a lead lecture by an eminent scientist in the area. 440 delegates submitted



papers in 12 subject areas. After peer reviewing, 140 papers were selected for oral presentation and 162 papers for poster presentation.

The main attraction of the 3<sup>rd</sup> day of 34<sup>th</sup> KSC was the Children's Science Congress and Post Graduate Students Interactive session which were conducted parallelly on virtual platform. Ten child scientists presented their work in the programme. Sixteen child scientists, who were selected for the National Children Science Congress presented their project work in the forenoon session. About 250 students from different schools attended the Children's Science Congress session. In the PG students interaction sessions, a panel of ten experts interacted with the students from different colleges all over Kerala under the Post Graduate Students Interactive session.

A special poster session was arranged for the presentation of differently abled children from Scientia, Different Art Centre, Magic Planet, Thiruvananthapuram.



# HIGHLIGHTS OF IMPORTANT PROGRAMMES

## KERALA SASTHRA PURASKARAM 2021



Kerala Sasthrapuraskaram 2021, an annual award instituted by the Government of Kerala for honouring outstanding scientists of Kerala origin working anywhere in the world, were conferred to Prof. M. S. Swaminathan and Prof. Thanu Padmanabhan. Award carries Cash Prize of Rs. 2,00,000/-, a plaque and a citation. The Hon'ble Chief Minister presented the awards on 29<sup>th</sup> May 2022 at Thiruvananthapuram, during the inauguration of Golden Jubilee Celebrations of Science and Technology in the state.



### Dr. M. S. Swaminathan

A native of Mankombu, Alappuzha, Kerala is a renowned agronomist, agricultural scientist, plant geneticist and administrator. He is well known as the main architect of the green revolution in India for his leadership and role in introducing and further developing high-yielding varieties of wheat and rice. Swaminathan's collaborative scientific efforts with Norman Borlaug, spearheaded a mass movement with farmers and other scientists and backed by public policies, saved India and Pakistan from certain famine-like conditions in the 1960s and was awarded the first World Food Prize in 1987. He has published 254 research papers; authored several books and received 73 Honorary Doctorate Degrees from Universities around the world.



### Prof. Thanu Padmanabhan

A native of Trivandrum, Kerala and a Distinguished Professor at the Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune and also served as Adjunct Faculty of TIFR. His field of research includes gravitation, structure formation in the universe and quantum gravity. He made several contributions related to the analysis and modelling of dark energy in the universe and the interpretation of gravity as an emergent phenomenon. Prof. Padmanabhan received several National and International accolades - M.P. Birla Memorial Award, TWAS Prize in Physics, Infosys Science Foundation Prize for Physical Sciences, J.C. Bose National Fellowship (DST), The Millennium Medal (CSIR), Shanti Swarup Bhatnagar Award, The Birla Science Prize, etc. He breathed his last on 17<sup>th</sup> September 2021.

KSCSTE HQ

## Bioentrepreneurship Certification Programme (BCP)

The Programme offers to understand the entire venture creation process - from ideas generation to build viable innovation driven businesses. Three students were selected based on their performance in the first two levels and were attached to M/s Indriyam Biologics Pvt. Ltd., a biotech startup



### KBC-Indriyam Bioentrepreneurship Certification Programme



company at TIMed-SCTIMST, for first six months industrial training and at Business Innovation and Incubation Centre (BIIC), MG University and KSCSTE-Malabar Botanic Garden and Institute of Plant Sciences (MBGIPS), Calicut for subsequent period for product development. Two out of the three candidates were awarded with the IDEA Day Grant of Kerala Startup Mission, Govt. of Kerala.

## National Technology Day (NTD) 2022 Celebrations

The State level inaugural programme was held at LBS College of Engineering, Kasaragod on 11<sup>th</sup> May 2022. Prof. Prasad Krishna, Director, NIT Calicut, inaugurated the NTD 2022 celebrations and gave the keynote address. Two technical talks were also delivered during the function for the benefit of the engineering students.

**Designathon 2022** - As part of National Technology Day (NTD)



- 2022 celebrations, a designathon contest was announced for the students of engineering colleges in Kerala. The topics for the designathon were "carbon neutral engineering designs and Bio-inspired engineering designs". The applications received were evaluated and 13 applications are shortlisted for the second phase of Designathon.

### Green Skill Development Programme (GSDP)

The Ministry of Environment, Forest & Climate Change (MoEF & CC) has been implementing Green Skill Development Programme (GSDP) for skill development in the environment and forest sector to enable India's youth to get gainful employment and / or self-employment by utilising the vast network and expertise of ENVIS Hubs/ Resource Partners. Since the ENVIS Hub in Kerala is hosted by KSCSTE, KSCSTE decided to implement the GSDP through its R&D centres throughout the state of Kerala.

### EkBharat Shreshta Bharat (EBSB)

The Ministry of Human Resources Development in association with various Ministries, Govt of India has been launching a new programme Ek Bharat Shreshta Bharat (EBSB). The programme aims to enhance interaction and promote mutual understanding between people of different states/ UTs through the concept of state/ UT pairing. The Kerala state has been paired with Himachal Pradesh by the MoEF&CC and ENVIS Hub Kerala jointly with ENVIS Hub, Himachal Pradesh conducted Extension & Outreach Programmes, Awareness/Training Programmes etc. activities in connection with EBSB programme.

### Establishment of Scheduled Caste and Scheduled Tribe Cell

Scheduled Caste (SC) and Scheduled Tribe (ST) cell aims to provide Science and Technology (S & T) based solutions for institution and human resource capacity building for the sustainable development of SC/ST communities.

### Vigyan Sarvatra Pujyate

Department of Science & Technology, Govt. of India organised



Vigyan Sarvatra Pujyate-Science Week Festival at 75 centres all over the country, as a part of 75<sup>th</sup> year of Independence celebrations 'Azadi Ka Amrit Mahotsav'. In this connection, KSCSTE co-ordinated the activities at three locations in the State, Thiruvananthapuram, Thrissur and Kozhikode during 22<sup>nd</sup> to 28<sup>th</sup> February 2022. Specific programmes on thematic areas such as Annals of History of Science, Milestones of Modern S & T, Swadeshi- Paramparik Inventions & Innovations and competitions for school students, Science Literature Festival, S & T next 25 years were



organised.

In connection with the fourth weekly programme of Azadi Ka Amrut Maholsav, National Green Corps- KSCSTE organised a webinar series of 14 online awareness programmes for Eco club students and teachers in all districts from 25<sup>th</sup> February to 3<sup>rd</sup> March 2022 on various topics under Green Good Deeds such as single use plastic pollution, marine water pollution, water conservation, wealth from waste, organic farming, waste management and air pollution and noise pollution. About 3500 students and teachers participated in the webinar. The programme was organised with the association of District Implementation and Monitoring Committee of NGC.

### Programmes on IPR under National Intellectual Property Rights Awareness Mission (NIPAM)

KSCSTE-IPRICK coordinated activities under the National

Intellectual Property Awareness Mission (NIPAM) in Kerala jointly with Patent Office, Chennai. Proposals were invited from Higher Secondary Schools, Colleges and Universities from the State for conducting IPR awareness programmes under the Mission, during January - July, 2022. IPRICK jointly with Patent Office Chennai conducted 104 IPR awareness programmes (online and offline)



under NIPAM during January - June, 2022. Around 20000 students were sensitized on the significance of IPR.

### The KSCSTE Research Fellowship

The KSCSTE Research Fellowship online examination was conducted in 3 centres across Kerala viz., LBS Institute of Technology for Women Poojappura, Thiruvananthapuram, Rajagiri School of Engineering and Technology, Kakkanad, Kochi and National Institute of Electronics and Information Technology, Calicut on 13<sup>th</sup> March 2022. KSCSTE Research Fellowship Examination result was published and 50 candidates were offered the fellowship in seven science streams.

### Sastraposhini Scheme

The programme was launched by KSCSTE in association with the State Education Department in the year 2003 and is intended to address the gap in science learning by giving more importance to learning science by doing, improve teacher-student relationship and promote students to select science as a career. Programme is being implemented by setting up model science laboratories in Physics, Chemistry and Biology for conducting science experiments in selected government schools of the state. So far 184 laboratories were established throughout the State. During the period 6 laboratories are established in the Govt. High Schools of the State.

- Study of Carbon Footprint in Agricultural Land Use System from the Temperate and Tropical Ecosystems of Western Ghats under Climate Change Scenario funded by SERB, DST with the budget outlay of Rs.51.43 Lakhs is initiated. Study aims to address Sustainable Development Goals (SDG) of United Nations- 2, 6 and 13.
- Climate resilience studies in black pepper, ginger and turmeric is recently initiated under ICAR sponsored project on National Innovations in Climate Resilient Agriculture (NICRA) in collaboration with ICAR-Indian Institute of Spices Research. Study aims to investigate on Climate Change impact, mitigation in different crops mentioned above.
- Socio- Economic Vulnerability Assessment of coastal areas to Sea Level Rise (under climate Change scenarios) – a case of Kerala state, India by the funding of ICSSR, Govt. of India is initiated.
- As part of the 'Carbon Neutral Kattakada' initiative, Carbon mapping of Kattakada Legislative Assembly constituency has been completed and report released by Sri. K.N. Balagopal the Hon'ble Finance Minister of Kerala on 8<sup>th</sup> June 2022.



*Sri. K. N. Balagopal, Hon'ble Finance Minister releases the Carbon Neutral Reports prepared by CWRDM*

- KSCSTE-JNTBGRI has forty years of successful experience in conserving the plant wealth including endemic flora of Western Ghats and has been maintaining about 5000 plant species in its field gene bank and conservatories. The Institute is now a part of Indian Initiative on Earth Bio-genome Sequencing (IIEBS) as one of the Biological Knowledge and Resource Centres. The Earth Bio-genome Project (EBP) is an ambitious international project that has been conceptualized to decode genomes of all living organisms. This will essentially lead to generation of genetic blue print of all living forms. National Institute of Plant Genome Research, New Delhi is a coordinating centre of EBP project in India. The Department of Biotechnology and Ministry of Science and Technology, Government of India are funding the Indian initiative of this project. KSCSTE-JNTBGRI is the nodal centre for implementing the project in Kerala.
- The micro-propagation and cultivation of native orchids and hybrids for on-farm conservation and income generation in Kerala through cluster formation is yet another socially committed research initiative

now undergoing in KSCSTE-JNTBGRI. Conservation efforts of orchids are underway by setting up of Orchidarium and Orchid interpretation centre at Eravikulam National Park with the support of UNDP. The Institute has initiated a programme entitled, 'Development of propagation techniques and establishment of nurseries for indigenous RET plants and species notified under biological diversity Act and Promoting Cultivation with the Support of Research organizations, Kudumbashree and MNREGS' by the financial support of Kerala State Biodiversity Board. With the financial support of Kerala Forest and Wild Life Department we are going with the inventory, systematic and conservation of *Ixora L.* of Kerala. JNTBGRI is operating a programme named, 'Livelihood enhancement of Tribals of Njaraneeli through planner resource enrichment buy back and herbal products development'. The funding agency for this programme is DST, Govt. of India.

#### ■ Road Safety Training Programmes

Road safety awareness/training programmes are being conducted regularly by NATPAC for user community including school teachers, ambulance drivers, hazardous drivers, driving school instructors, etc. Competitions are also conducted in road safety for students and the general public to increase road safety awareness.



#### ■ 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





*Traffic Enforcement Training for in-service police officials delivered at Kerala Police Academy (KEPA) by NATPAC team*

Goods'. A certificate for the same is issued to participants on completing the training programme and the 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. A total of 5 programmes were completed from January – June 2022.

#### ■ Road Safety Month 2022

NATPAC observed Road Safety Month 2022 from 18<sup>th</sup> January to 17<sup>th</sup> February 2022. The Centre has conducted various road safety awareness activities and road safety training programmes for different target groups such as students from schools and colleges and general public through online platform. Competitions related to road safety were held and around 830 contestants, from all 14 districts of Kerala as well as from other states participated in various contests. 93 participants won cash prizes and certificates of achievement at various levels and contests.

- Two short films produced by NATPAC on road safety awareness entitled "Hands free is not risk free" and "Distraction is Extraction" were shortlisted in the Global Road Safety Film Festival organized by the Laser International Foundation (LIF), in collaboration with the UN Road Safety Fund (UNRSF) and the United Nations Economic Commission for Europe (UNECE).



KFRI

- Developing organo-lime nanocomposites on graphene microstructures extracted from humic acids.
- Triparty action plan for the reintroduction of RED plants of Kerala
- Micro plastics and phthalate esters in urban water bodies occurrence, distribution and seasonal variation in selected urban areas of Kerala.
- Synthesis, characterization and analysis of activated spherical carbon derived from lignocellulosic biomass
- Diversity and distribution of myxomycetes in a tropical wet evergreen forest ecosystem and their response to climate change
- Development of e-DNA technology for detecting faunal invasion and modelling of biological invasion in aquatic ecosystem of Kerala.
- Kannadipaya (special bamboo weaved mat product) - Studies on physio-chemical and microstructure properties



*Weaving of Kannadipaya by Muthuvan Community*

of special Bamboos used in weaving by tribal communities in Idukki District, Kerala.

- Establishment of a Herbal Garden as a peri-urban green space of Nilambur, Malappuram District, Kerala
- Establishment of Nodal Centre of Alien Invasive Species Research and Management
- Sophisticated analytical instrumentation facility
- Assessing landslide vulnerability of forest systems in Kerala and developing restoration protocols
- Diversity and dynamics of a tropical forest ecosystem in Southern Western Ghats in the context of changing climate
- Developing long term monitoring tools and strategies for mitigating human-wildlife conflicts in Kerala



- Soil carbon pools and its dynamics in the forest systems of Kerala Western Ghats
- Quantification of the bird hazard to aircraft in the Naval Air Station (INS Garuda), Kochi to develop mitigation strategies.
- Medicinal Plants - On Call Help Centre and Farm Library (SMPB, Kerala initiative)
- Production of organic manure from weeds and organic wastes
- Demonstration model for utilizing the Potential of Bamboo and other bio engineering measures for Landslide Risk Reduction and Mitigation and Riverbank stabilization, under IHRML project
- Scoping Study to Develop People-Inclusive Livelihood-Based Governance Strategy for The Long-Term Conservation of Mangrove Forests of Kerala.
- ISRO Geosphere Biosphere Programme (IGBP) - 'Modelling Forest Phenological Parameters from Time Series Remote Sensing Data
- Wildlife-friendly and organic certification for cash crop plantations of KFDC
- Establishment and maintenance of the Centre for Citizen Science & Biodiversity Informatics

- Integrated conservation of *Hopea erosa* and *Vateria indica*, two threatened Dipterocarps endemic to the Western Ghats / South and Central Sahyadris, India funded by Botanic Gardens Conservation International, UK for the period 2022-2025. The project aims at establishing comprehensive knowledge of the species distribution of *Hopea erosa* and *Vateria* in the Western Ghats such as population structure, diversity, dynamics including environmental factors and major threats.
- **Conservation of *Crinum malabaricum* Lekha K. & S.R.Yadav (Amaryllidaceae):** a critically endangered species through biotechnological approaches. The study aims to integrate both *in-situ* and *ex-situ* conservation measures for the successful conservation of *C.malabaricum*. In addition, ecological niche modeling can predict suitable habitats for this species and may help to find new populations. As part of this project surveyed entire populations and collected 60 individuals and conducted ecological niche modelling analysis under different climatic scenarios using Maxent software to predict the current and future distribution pattern of this species.



*Vateria indica* population at Thamarassery Churam



*Hopea erosa* population at Vanaparavom



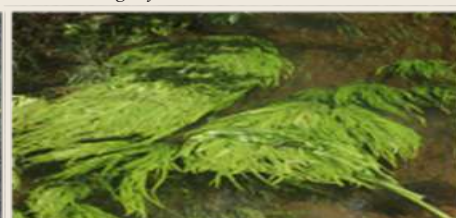
Fruits of *Hopea erosa*



Seedlings of *Vateria indica* raised at MBGIPS



*Crinum malabaricum*



- Organized various international conferences and workshop for researchers across India
- Organized an international conference on Recent Advances in Mathematics and related areas during April 21 to 24, 2022.



Summer Program in Mathematics for 1<sup>st</sup> year MSc and 3<sup>rd</sup> year BSc students across India



- Impact of Climate Change on Periyar, Pamba and Chaliyar River Basins of Kerala – funded by Govt. of Kerala
- The variability in future water availability under climate change in Chaliyar River basin was evaluated using SWAT model.
- Understanding Climate Dynamics and Climate Change Aspects of Kerala – funded by Govt. of Kerala
- Released climate statement of Kerala for the year 2021, which is the first of such state level report in the country.
- The effectiveness of L-Moment bias correction method and Empirical Quantile Mapping was assessed using IMD gridded rainfall at 0.25° spatial resolution.
- Measurement of Background High Altitude Aerosol Properties for Aerosol – Cloud – Precipitation Interaction – funded by Govt. of Kerala
- Satellite retrieved cloud microphysical processes have been investigated to characterize Extreme Rainfall Events (EREs) over the Indian peninsular region.
- Setting up of State Climate Change Knowledge Cell Under National Mission. – funded by the Department of Science and Technology.
- A web portal which is intended to serve as a platform that brings information regarding the climate change specific to Kerala, together from a diverse source in a uniform way has been launched.
- Integrating Hydrology and Agriculture with livelihood issues: Development of Climate Change Adaptation Approaches for sustainable water management in humid tropical Kerala. – funded by the Science and Engineering Research Board.
- A reconnaissance survey of Bharathapuzha River and extensive site visits for personal interactions with farmers were conducted to understand farming practices and its adaptation possibilities in the basin.
- The study contributes to understanding the extent and character of climate change impacts on the Bharathapuzha river basin in Kerala.
- Shift in Bio-climatic zones over the basin has been identified. This will be instrumental in deriving effective adaptation policies and governance mechanisms in Palakkad district.



*National Aerosol-BioAerosol High Altitude Laboratory - Established by IIT Madras - in Association with ICCS and College of Engineering, Munnar*



Kerala State Council for Science, Technology and Environment (KSCSTE) has recognized the Community Agrobiodiversity Centre of M.S. Swaminathan Research Foundation as one of the Grant-in-Aid institutions in 2019. The support was extended mainly to strengthen the agrobiodiversity initiatives of the centre across Wayanad. This includes research and extension services for building models on the conservation and sustainable utilisation of agro-bioresources of the State.

- As a part of “Azadi ka Amrit Mahotsav” celebration, STIC in association with National Intellectual Property Awareness Mission (NIPAM), Government of India, organized Intellectual Property Rights Awareness Programme, on

March 22, 2022

- Open House and Science Orientation Programmes for school children in connection with the golden jubilee celebrations of Science and Technology in Kerala, during May 23-27, 2022





- **Quarry Mapping Project:** The Centre is currently involved with the 'Mapping spatial distribution of quarries in Thrissur, Palakkad and Kozhikode districts' a project funded by the Directorate on Environment and Climate Change, Kerala. It will help to create a data base on the number of rock quarries and area of quarries in the study region. The study aims to develop strategies for environmental restoration management plan for non-working abandoned quarries.
- **UNICEF Funded Project:** UNICEF granted the project to explore potential of local governments in improving quality of secondary education in Thrissur district, Kerala. The report portrays the interventions of district panchayath in secondary education. Developed improved protocols and practice for planning and implementation in the domain of secondary education. On the basis of the findings of this work, UNICEF proposed studies of this kind in all district panchayaths of Kerala.
- **TDF Funded Project:** The Tribal development project implemented in the eight hamlets of Pudur GP in Attappady Block with 401 tribal beneficiaries got completed. The sustainability plan for this project has been submitted to NABARD for funding and it is under the consideration of NABARD Head Office. The Sustainability plan is envisaged to be implemented through the registered tribal farmer's society "Aranya" floated under the TDF Project.

- **KfW Soil Project:** This is a climate adaptation project implemented in the eight watershed of Palakkad district such as Muttichira - Nadupathy, Pazhaniyarpalayam, Ancham-mile, Pullundassery, Konnakalkkadavu, Poothanakkayam, Chazhiattiri and Nagalassery coming in the different agro climatic units.
- **Mazhavillu Educational Program:** IRTC is one among the five centres in the State selected by K-DISC for implementing the educational programme "Mazhavillu" (Teach Science for Kerala). The programme is meant for integrated science learning using a learner centred, activity-based, process - oriented pedagogy. A total of 50 students in the age group of 8 - 12 in Mundur and Pudurpariyaram gramapanchayaths are beneficiaries of this educational experiment. Started preparatory work to establish a children's science activity centre in the campus.



Active Quarry Site



Nila Tribal women nursery at Attappady as part of the project



Palakkad District Panchayath President Binunol inaugurating the district level activities of Mazhavillu Project

## SIGNIFICANT INNOVATION/INVENTION

### KSCSTE HQ

- A project entitled 'Red Chilli Penducle Remover' of the innovator Shri. Shyju, which was awarded the NABARD's Rural Innovation Award (cash award of Rs. 25,000/-) established a start-up named 'Vivith Food Products' at Thrissur Mini Industrial Estate. The publicity that the project received through Rural Innovators Meet (RIM) had helped him to secure a space at the industrial estate to establish his start up.
- RGCBS study supported by KBC-YIPB sheds light on reducing heart disease among diabetic patients.
- Strengthened the Infrastructure for research at Kuzhur sub-centre of Kerala Forest Research Institute with the financial support from Kerala Biotechnology Commission (KBC)



- CWRDM developed (1) a nutrient recommendation system for sustaining the soil health and crop production which will give the quantity of nutrient to be applied as fertilizers/manures for improving the crop productivity, (2) Capillary action-based irrigation device for field (wick) to improve crop productivity and water use efficiency, (3) Soil moisture sensor based automotive irrigation system which automatically switches on depending the soil moisture level or based on crop water requirement and can be put off based on the prefixed levels, hence enabling use of minimum water for agriculture.
- Rooftop Rainwater Calculator interface helps to compute the volume of water that can be harvested from a rooftop catchment. It will fetch the data regarding the rainfall of the specified location and calculates the volume of water that can be harvested during different seasons of a hydrological year such as South - West Monsoon (June - Sept.), North - East Monsoon (Oct. - Nov.) and Winter & Summer Season (Dec. - May).



Interface of Rooftop Rainwater Calculator

Bioprospecting of *Centella asiatica* for identification superior genotypes: Comparative expression profiling of key genes involved in the triterpenoid biosynthesis pathway of *Centella asiatica* such as *Squalene synthase* (SQS),  $\beta$ -*amyrin synthase* (BAS) and *UDP glucosyl transferase* (UGT) were analyzed. Correlation of secondary metabolite content with phenotypic and genotypic characteristics was observed. The study could identify promising genotypes for cultivar development. Being a pioneer of conservation efforts, Institute is now concentrating on tri party action plan for the reintroduction of Red plants of Kerala. For this purpose, a joint venture of JNTBGRI, KFRI and KFD has begun for developing a conservation strategy for ten RET species. Yet another effort in this regard is habitat destruction modelling and reinforcement of two threatened trees in Kerala region of the Western Ghats for the improvement of their conservation status. Population structure and genetic variability analysis of *Cullenia exrillata* populations in Western Ghats are yet another effort in this regard. The institute also explores Banana diversity of Nagaland as a better conservation effort. With the support of National Medicinal Plant Board a collaborative programme (KSCSTE-JNTBGRI and IIHR, Bangalore) is operating for the development of species distribution model and bio prospecting of wild germplasm of *Salacia* species across the Western Ghats. The taxonomic revision and phylogeny of genus, *Piper* in India with its bio geography are elucidating with the help of DST.

### New Species



*Humboldtia ponnudiana*



*Syzygium caryophyllatum* var. *abrahamianum*



*Ophiorrhiza sasidharaniana*



*Thottea sivarajanii* var. *anamalaiana*



*Eriocaulon sunilii*



Red eared Slider Turtle

- Novel method of preventing the spread of invasive alien species, Red-eared Slider Turtle.
- Developed draft genome of a climbing palm (*Korthalsia laciniosa* (Grff.) Mart.)
- 68 New Gene Sequences were published in Genbank.
- DNA barcode reference database for the commercial timber tree species.
- Isolation protocol for medicinally important compounds, Oroxylin and Baicalien from *Oroxylum indicum*.
- Binding matrix for incense sticks or incense cones. This has been filed for patent.



### New Species

- *Ophiorrhiza medogensis* var. *shiyomiense* Hareesh & M.Sabu
- *Ophiorrhiza medogensis* H. Li Hareesh & M.Sabu (New record for India)
- *Ophiorrhiza recurvipetala* Bhuyan, Baruah & Mehmud reduced to *O. ochroleuca* Hook.f. (New synonym identified)



*Ophiorrhiza medogensis* var. *shiyomiense* Hareesh & M.Sabu  
(New to Science)



*Ophiorrhiza medogensis* H. Li  
(New record for India)

### Developing a solid waste management system in Munnar:

The microbial consortium developed at IRTC along with a polyhouse design to trap available day temperature in Munnar, an experiment was conducted to do effective composting at Munnar. The results showed that composting process was effective and fast in the winter climate during December – January there. The entire composting process took 28 days to complete.

## FACILITIES/INFRASTRUCTURE CREATED

As a part of garden development and income generation an ecotourism initiative at JNTBGRI is coming to force by the financial support of Kerala Tourism Department. In

ic garden and parking ground have been completed. Also established a Bamboo craft centre with the help of State Bamboo Mission. A bamboo tissue culture unit and expansion of Bamboosetum also has come in to



New gate way through Bodhi Vruksha to KSCSTE-JNTBGRI

this programme conservation effort initiated with new venture namely 'Kerala Gramam' – the platform for conserving the traditional agro biodiversity of homestead garden of ancient Kerala by creating a typical heritage village including all the cultural artefacts is being implemented. Trekking path and elevated view point for the visitors experiencing forest and wild life are being developed in JNTBGRI. Under this project, a colossal ornamental gate depicting Bodhi vruksha (*Ficus* tree), seating arrangements in the image of log wood, bio fencing, aesthet-

reality. The Institute is also profiling germplasm conservation through conventional and non-conventional multiplication means which include medicinal, ornamental and crop related Bamboos of Western Ghats and Andaman-Nicobar Islands. The systematic documentation of the traditional knowledge related to plants used for food, AYUSH and indigenous medicine has come into operation with the financial support of Ministry of AYUSH. As part of capacity building, Institute has been newly equipped with HPLC, Bio safety cabinet, Cooling centrifuge and Rotary evaporator. One Buggy - open vehicle facility has been introduced to arrange garden visit.

- Soil moisture sensor based automatic irrigation system.



An Electric Car was flagged off by Ahamed Devarkovil, Minister of Ports of Kerala at CWRDM campus as a green initiative for first time among R&D centres of KSCSTE.

- First National Medicinal Plant Seed Centre cum Seed Museum
- Model Nursery of Medicinal Plants at KFRI Field Research Station, Idukki.
- Bamboo Bazar at FRC Palappilly

- TransCAD Software
- Asphalt Permeameter
- Video V box and accessories
- Inertial Measurement Unit
- Analysis softwares like MATLAB

- Lichen House has been established.
- An electrical buggy serves to assist interested visitors.
- Sprinkler system in various conservatories.





Lichen House



Electric Buggy

ICCS

- Installed a full-fledged Automatic Weather System (AWS) observatory with the help of India Meteorological Department (IMD).

MSSRF

- Community Conservation Plots at tribal hamlets for conservation of traditional germplasm (14 varieties of 5 crops)
- Established micro-enterprises units (11 primary village-level fish processing units, 2 dairy products, 1 Seafood pickle unit and 2 Tailoring units).
- One semi-processing/ value addition unit for medicinal plants was established at Meenangadi Panchayath where in 23 women belonging to Kuruma tribe have initiated the production of value-added products.



Tailoring unit for women group



Bio input production training & Processing Unit



Technology Support

IRTC

- GIS Laboratory: It was considered as a major S&T input in IRTC's activities in the area of Panchayath resource maps and watershed-based master plans as this helped to speed up the process and improve the quality of work. Centre for Geo-informatics developed expertise in Envi & Arc GIS software like GRASS, Quantum GIS, and also expertise in Web GIS and RDBMS.

STIC

#### Established the following facilities:

- FT-IR Spectrometer
- Dry Block Calibrator with IR Sensors calibrator
- CHUB-E4 Thermometer
- Universal Counter
- F1 Class Weight Box
- Bag Mixer
- Flame Photometer
- Bio Safety Cabinet
- Incubator
- Three place Manifold Muffle Furnace
- PV Inverter Test Facility.

## TRAINING PROGRAMMES/WORKSHOPS/INTERNSHIPS

KSCSTE HQ

The ENVIS Hub supported by MoEF&CC, Government of India at KSCSTE conducted a three-day online training programme on "Enactments for Environment Management" as a part of dissemination of environmental information on 12-14<sup>th</sup> January 2022. The training programme was targeted to officers in various departments dealing with environmental management.

#### Workshop on Climate Change and its impacts with special reference to Kerala

ENVIS Hub Kerala in association with College of Agriculture, Padanakkad, Kasaragod conducted one day workshop on Climate Change and its impacts with special reference to Kerala on 25<sup>th</sup> March 2022 at the Agricultural College, Padanakkand. Honorable Vice Chancellor Prof. H. Venkateshwarlu, Central University of Kerala, Kasaragod inaugurated the workshop. Prof. K.P. Sudheer, Principal Secretary, S & T Department & Executive Vice

President, KSCSTE gave the presidential address and Prof. Mini P.K, Dean, College of Agriculture, Padanakkad welcomed the gathering.

- SC & ST Cell Pilot Field Survey- conducted at Manickal Grama Panchayat of Thiruvananthapuram district
- Visited two SC colonies in Manickal grama panchayat to gather information from SC and ST communities.
  - Karikkakam colony
  - Pathekkar colony

#### Training Programme for Science Teachers:

As a part of establishing Sastraposhini laboratories in Govt. High Schools, a 3 days training was conducted from 21<sup>st</sup> March to 23<sup>rd</sup> March 2022 for selected teachers who are in charge of Physics, Chemistry and Biology laboratories from selected Sastraposhini schools at Centre for Science in Society (C-SiS), CUSAT. Eminent scholars/ academicians from different disciplines handled





various sessions. The programme is aimed to provide training and guidelines to teachers from selected schools for setting up of Sastraposhini laboratories and provide hands-on training in mechanical/Electrical/Electronics workshops to make models and class-room demonstration kits which can facilitate class-room exercises easier and interesting to children.

### International Conference Attended

Dr. Sarika A.R., Scientist, KBC, KSCSTE, gave a keynote address in the Microbiome Support conference on "Paving the Microbiome Way for improved Food Systems" held at Brussels, Belgium during June 27-29, 2022.

Microbiome Support is an International project funded by the European Union's Horizon 2020 research and innovation programme. The project intends to provide support to coordinate national and EU funding in microbiome research, create a collaborative network, and enable Knowledge Exchange across the Scientific and Political Community.

### World Wetland Day 2022

The theme for World Wetland Day 2022 was 'Wetlands Action for People and Nature'. ENVIS Hub KSCSTE, Kerala prepared a poster on the focal theme, an online Quiz and puzzle competition were also conducted for school and colleges students.

### International Forest Day 2022

In connection with the EBSB programme, ENVIS Hub Kerala and ENVIS Hub Himachal Pradesh jointly organised a webinar on the focal theme: Forests and sustainable production and consumption on 21<sup>st</sup> March 2022.

### World Water Day 2022

ENVIS Hub Kerala in collaboration with Centre for Water Re-

sources Development and Management (CWRDM) celebrated World Water Day 2022 on the focal theme "Groundwater: Making the Invisible Visible".

### International Day for Biological Diversity 2022

ENVIS Hub Kerala celebrated International Day for Biological Diversity 2022 on 23<sup>rd</sup> May 2022. Dr A Biju Kumar, Professor and Head, Department of Aquatic Biology delivered invited lecture.



### World Environment Day 2022

The ENVIS Hub Kerala, Department of Environment, Government of Kerala, Kerala State Council for Science Technology and Environment (KSCSTE), and Directorate of Environment & Climate Change



(DoECC) jointly organised the World Environment Day programme through online platform on 4<sup>th</sup> June 2022. The programme was inaugurated by Prof. K.P. Sudheer, Principal Secretary, S & T Dept. and Executive Vice President KSCSTE. He reminded that only when man and nature complement each other, sustainable development is possible. Sri. Suneel Pamidi

IFS, Director, Directorate of Environment & Climate Change welcomed the gathering.

### Intellectual Property Day 2022

KSCSTE-IPRICK celebrated the World IP Day 2022 on April 26, 2022 by conducting an Oration (online) on the World IP Day Theme "IP and Youth: Innovating for a Better Future" by Dr. Yashwant Dev Panwar, Director, Patent Facilitating Centre, TIFAC, Dept. of Science & Technology, Govt. of India. More than 100 participants including students, researchers, faculty members, entrepreneurs, etc, attended the session.

The officials of KSCSTE-IPRICK delivered four invited lectures on IPR in the webinars/workshops conducted by other Institutions. KSCSTE-IPRICK also coordinated the conduct of Patent Clinics in association with the Official Patent Attorney of KSCSTE in College of Engineering, Trivandrum and Kerala Digital University, Trivandrum, on 29<sup>th</sup> & 30<sup>th</sup> June, 2022 respectively.





A week-long event at CWRDM Kozhikode, with daily lectures, exhibitions, competitions and other activities, as a part of the Azadi ka Amrit Mahotsav-National Science week under the title Vigyan Sarvatre Pujyate (Science & Technology is Revered All Over), funded by the Principal Scientific Advisor and Ministry of Culture, Govt. of India from 22<sup>nd</sup> to 28<sup>th</sup> Feb 2022.



Poster Exhibition-Students

■ Open house and Science Orientation Programme to the college students as part of the Golden Jubilee Celebrations of Science and Technology in Kerala, were held during 23<sup>rd</sup> - 27<sup>th</sup> May-2022.



Inaugural session of training programme, & Students gathered for the programme



■ Land and Water Management Research Group, CWRDM conducted Science & Engineering Research Board (SERB) DST sponsored Karyashala - High-End Workshop on Novel Concepts and Innovative Technologies in Agriculture Water Management for Climate Smart Agriculture (Under the ABHYAAS Scheme) during March 14<sup>th</sup> - 26<sup>th</sup> 2022.

Researchers of the Institute participated in various awareness creating programmes like seminars, workshops, radio programmes, television programmes and delivered talks. As a part of skill development and knowledge



Participants of two day's Biodiversity Awareness Programme for School Children to set up Butterfly Garden

expansion, the researchers underwent twenty two various trainings/workshops/internships. Meanwhile the Institute has conducted six training/ skill development/ awareness/ commemorate programmes including Prof. A. Abraham Memorial Award Contest.



Scientific Social Responsibility Programme group with Dr. R. Prakashkumar, Director and Dr. Sabulal Baby



Prof. V. K. Damodaran, Mrs. Susan Mani, Director Dr. R. Prakashkumar and the delegates in the Prof. A. Abraham Memorial Lecture.



- Imparted training to Kudumbashree team on the use of GPS for the task of preparing family level micro plans and hamlet level plans for Edamalakudi, the only exclusive tribal Grama panchayat in the state, Munnar on 18<sup>th</sup> May 2022.
- Open house and lecture series as part of the celebration of the Golden Jubilee Year of the State Science and Technology, from 23<sup>rd</sup> – 27<sup>th</sup> May 2022. The open house event included interactive sessions, live demonstrations and Engineering Laboratory visit. In the lecture series eminent experts from diverse domain delivered sessions on relevant topics in research.
- Dr.Kuncheria P Isaac, Founder Vice Chancellor, A.P.J.Abdul Kalam Technological University talked on 'Urban Planning', on 23<sup>rd</sup> May 2022.
- Dr.K.P.Vijayakumar, Former Associate Professor and Head, Dept.of Library and Information Science, University of Kerala talked on 'How to get published in scholarly journals', on 24<sup>th</sup> May 2022.
- Dr.S,Velmurugan, Chief Scientist and Champion, Indo-HCM Project, CSIR-Central Road Research Institute- 'Integration of artificial intelligence with road engineering to enhance road safety: an overview, on 25<sup>th</sup> May 2022.
- Sri.Suresh Kumar, Chief Engineer, Kerala Waterways and Infrastructures Limited (KWIL) - 'Inland navigation in Kerala- an overview', on 26<sup>th</sup> May 2022.
- Dr.Ramachandra V, Technical Advisor, UltraTech Cement - 'Distress-free rigid pavements', on 27<sup>th</sup> May 2022.



Talk by Dr.Kuncheria P Isaac on 'Urban Planning'



Talk by Dr.K.P.Vijayakumar on 'How to get published in scholarly journals'

- GSDP-Certificate Course on Propagation & Management of Bamboo (MoEF & CC)
- GSDP-Certificate Course on Value addition & Marketing of NTFPs (Plant Origin)-Bamboo Craft (MoEF & CC)
- Medicinal Plants: Cultivation and Harvesting (SMPB)
- Conservation and Management of Mangrove (Kerala Forest Department)
- National Workshop on Herpetology
- A week Open House and Science Orientation Programme were organized as part of Golden Jubilee Celebrations of Science and Technology in Kerala
- Organized Vigyan Sarvatra Pujyate, Science Week Festival in association with Vigyan Prasar, Government of India during National Science Week.
- The consultative meeting on the GI registration of Kannadippaya was organized.



Prof. K.P.Sudheer, Executive Vice President, KSCSTE addressing consultative meeting on the GI registration of Kannadippaya



Bamboo Craft making by GSDP Trainees



- Awareness programme on intellectual property rights by National Intellectual Property Awareness Mission (NIPAM) was conducted online on 19<sup>th</sup> February 2022 with the participation of nearly 100 candidates. Ms. Anjana Haridas, Examiner of patents and designs, Indian Patent Office, Chennai was the Resource Person for this online programme.
- Parataxonomy including Peoples' Biodiversity Register. An initiative taken up by the Ministry of Environment, Forest and Climate Change (MoEF&CC), under Environmental Information System (ENVIS Hub) for skill development in the environment and forest sector named Green Skill Development Programme (GSDP). Thirtysix students underwent training through these two programmes which started on 10<sup>th</sup> March 2022 and ended on 26<sup>th</sup> May 2022.



- Biodiversity Conservation - Field Activities of trainees during the course

Summer Program in Mathematics for 1<sup>st</sup> year M.Sc. and 3<sup>rd</sup> year B.Sc. students across India

- SRIBS in association with Mahatma Gandhi University organised a national webinar on the topic "Catalysis: Concepts, Developments and Applications" during 14<sup>th</sup> - 16<sup>th</sup> Jan 2022. Catalysis is the process by which the rate of a chemical reaction is increased by the addition of a small amount of substance called catalyst, which itself is not used up in the reaction and can continue to act repetitively. Catalysis has found immense applications in various chemical as well as biological fields. The biological catalysis is called enzymes which play a major role in the whole biological activities of a living organism. The colloquium covered various aspects of catalysis such as the history, developments, various theories and mechanism of homogeneous, heterogeneous and enzyme catalysis, applications of catalysis in industry especially in pharmaceuticals and green chem-

### KASE - Pottery Training

To revive the traditional pottery making a 15 days of training in pottery making was organized under IRTC Pottery Division. As part of the 'Sangalp' project of Kerala Academy for Skills Excellence (KASE), IRTC organized the training in collaboration with Periya Pottery Workers Cottage Industries Co-operative Society Limited, Kasaragod Periya. Twentyfive traditional pottery workers from Kasaragod participated in the training. Smt. Mrunmayi Joshi, Palakkad District Collector, was the chief guest and distributed certificates at the valedictory function.

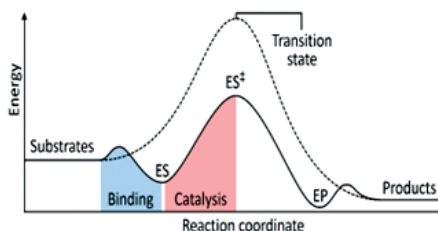
### DST - Geo-innovation Challenge

A three-day Geo Innovation Challenge on 'Applications of Geospatial Science and Technology in Rural Development' under National Geospatial Programme, Department of Science and Technology (DST), Govt. of India commenced on wednesday, at IRTC campus, Mundur, Palakkad. The program was organized by the Centre for Geoinformatics of IRTC. Prof. (Dr.) Rob Roggema, inaugurated the three day Geo-innovation Challenging programme online. Smt. Chandni Chandran IAS, The Director of School Education and Project Director at Sarva Shiksha Abhiyan in Tripura distributed certificates to participants.



Prof. (Dr.) Rob Roggema, the founding Director of the Inholland University of Applied Sciences in the Netherlands, inaugurated the programme online.

istry with an emphasis on the curriculum of post-graduate chemistry. The following experts handled various sessions: Prof. Suman De Sarkar (IISER Kolkata), Prof. Sabuj Kundu (IIT Kanpur), Prof. Rajarshi Samanta (IIT Kharagpur), Prof. Manmohan Kapur (IISER Bhopal) Dr. Joyram Guin, (IACS, Kolkata), Dr. E. Balaraman (IISER Tirupati) Prof. G. Anilkumar (MG University, Kottayam).



- As part of Golden Jubilee Celebrations of Science and Technology in the State SRIBS organised 5 Lectures in Physics, Chemistry and Life Sciences during 24<sup>th</sup> - 27<sup>th</sup> May 2022.



- International Consultation on 'Biodiversity, Climate Change and Adaptation', CAB-C-MSSRF, Wayanad, 5<sup>th</sup> - 6<sup>th</sup> June, 2022.
- Two-days Wayanad Seed Fest, 18<sup>th</sup>-19<sup>th</sup> March 2022 with panel discussions on the theme 'Mainstreaming Agrobiodiversity in the context of Changing Climatic Conditions - Role of grassroots institutions'.
- One-week course on Biodiversity for 20 graduate students from 21<sup>st</sup> - 26<sup>th</sup> February 2022.
- Two lecture sessions on biodiversity conservation and sustainable nutrition for school students and one lecture session on Climate Change for ITI students at Wayanad.
- Training for tribal youth drop outs on electronics, carpentry, and 3D printing at Bangalore.
- 10 Plant Clinics organized for diagnosis and management of insect and pests in major crops
- Training sessions on climate-resilient agricultural practices, Human-Wildlife Conflict, Mushroom production and bio input production
- Two skill training sessions on the preparation of primary healthcare products using medicinal plants at Wayanad.
- Certificate of completion for Module 1, 2 & 3 on Gender and Inclusion in Forest Landscape Res-



*Bio diversity one-week short course*



*Wayanad Seed Fest*

toration, e-learning course organized by CGIAR, CIFOR, CIAT and Bioversity International 2022.

- Officials attended webinar on Carbon Finance for Agriculture towards Climate Risk Mitigation organized by MANAGE, Hyderabad on 20<sup>th</sup> January 2022.

- STIC organized a webinar on "Fundamentals of Single Crystal diffraction and structure solutions" on March 16, 2022. Dr. Prathap S.J., Applications Specialist, Bruker AXS India was the speaker.
- Two internship programmes conducted for analytical instruments

## RESEARCH/ACADEMIC PROGRAMMES

- Water for Change-Integrative and fit for purpose water sensitive design framework for fast growing livable cities funded by DST
- Geophysical study of Post monsoon Pre-monsoon ERTT freshwater lens dynamics of islands of the Lakshadweep archipelago, Southwest India funded by DST
- Baseline studies on water use Efficiency of selected irrigation projects of Kerala funded by MoWR.
- Hydrological investigation in the High Range Mountain Landscape, Kerala funded by UNDP India
- Integrated Wetland Inventory, Assessment and Monitoring System (WIAMS) of Three Ramsar Sites of Kerala
- Soil discrimination and parameter estimation using hyper-spectral data in humid tropical and tropical regions funded by NRSC/ISRO
- National Wetland Inventory and Assessment (NWIA)Phase-II(Kerala and Lakshadweep), SAC/ISRO, Government of India.
- Mangrove Community zonation and biophysical characterisation for the coast of Kerala, funded by SAC/ISRO, Government of India.
- Acquisition of spectral signatures and biophysical parameters for forest species identification funded by SAC/ISRO, Government of India.
- Integrating Hydrology and Agriculture with Livelihood Issues: Development of Climate Change Adaptation Approaches for Sustainable Water Management in Humid Tropical Kerala funded by DST
- Scoping study to assess the hydrological services provisioned by the forest ecosystems of Kerala funded by Kerala Forest Department.
- Investigation on the role of cloud water in tropical forests Using Isotope technique funded DST.
- CWRDM is approved research centre for PhD programs by University of Calicut and CUSAT and a few students are currently registered for PhD in this Universities.
- Eleven PhDs and two PDFs are currently pursuing.



- A project under YIPB programme, 'the effect of selected nanoparticles synthesized from plant secondary metabolites on seizures induced by kainic acid in mice' is under progress. Comparative expression profiling of key genes involved in the triterpenoid biosynthesis pathway of *Centella asiatica* such as *Squalene synthase* (SQS), *β-amyrin synthase* (BAS) and *UDP glucosyl transferase* (UGT) were analyzed. The correlation of secondary metabolite content with phenotypic and genotypic characteristics was observed. The study could identify promising genotypes for cultivar development. The chemical profile of the leaf essential oil of *Clausena austroindica* and its insecticidal potential against two stored products pests, *Sitophilus oryzae* and *Tribolium castaneum* were investigated. The molecular and chemical evaluation of diverse germplasm of *Acorus calamus* were confirmed. Pre-requisite procedures for commercial utilization are in progress as to fulfil the mission of KSCSTE-JNTBGRI how to sustainably utilise the plant wealth of Kerala. One PhD and 17 PG dissertations were completed and 25 PhD programmes are in progress.

- Popularisation of weed composting technology for soil carbon sequestration and livelihood improvement of rural poor.
- Regeneration dynamics propagation and restoration of selected rare and threatened rattans in the Kerala parts of Western Ghats.
- Impact of flood on floral elements and soil biota in Pamba, Periyar, Bharathapuzha and Chalakkudy Rivers in Kerala.



KFRI entered an MoU with the Forest College & Research Institute of Tamil Nadu Agricultural University

- Introducing biochar for enhancing the quality of degraded soils of plantation forestry sector in Kerala.
- Exploration of medicinal plant resources of Lakshadweep Islands with special reference to indigenous knowledge.
- Resolving species complexes using molecular systematics: a case study of few taxa in the Western Ghats.
- Detection and eradication of the giant African snail (*Achatina fulica*) in Kerala.
- Preparation of protocols for availing carbon finances for forests of Kerala.
- Development of a farming system based cyber extension model for the state of Kerala.
- Spatial distribution and invasion dynamics of invasive alien weed *Mimosa diplotricha* in the Kerala part of Western Ghats.

- PhD Students: 31 (Forest Research Institute Deemed University Dehradun (FRIDU), CU-SAT and Calicut University)

- Integrated conservation of *Hopea erosa* and *Vateria indica*, two threatened Dipterocarps endemic to the Western Ghats / South and Central Sahyadris, India, Botanic Gardens Conservation International, United Kingdom.
- Taxonomic Revision, Molecular Phylogeny and Conservation of the family Marantaceae in India-Emeritus Scientist Scheme, Council of Scientific and Industrial Research, Govt. of India.
- Establishment of Model Nursery of Medicinal Plants at MBGIPS, State Medicinal Plant Board, Kerala.
- Potential applications of naturally isolated bacterial strains for the production of biodegradable plastics, Dept. of Science & Technology Govt. of India, KIRAN.
- Certificate courses on the following subjects were conducted.
  - Parataxonomy including Peoples' Biodiversity Register
  - Biodiversity Conservation

- Generate weather and climate data base of the state to monitor observed climate variability and trends to identify climate change hotspots in every district of the state.
- Development of a robust framework for assessing multi-hazard risk (considering all aspects like physical, social, economic, environment etc.).
- Generate climate projections, policy-relevant assessments of climate variability and change specific to the state regularly with the help of concerned national and international agencies.
- Development of tools for downscaling climate projections at local levels (coastal, urban, rural areas etc.) (climate change is global but impact is local).
- Development of curriculum related to climate change at the university level to make all future professionals familiar with strategies for its mitigation and adaptation. (Strategies to promote mitigation and adaptation demand multidisciplinary approaches).
- Development of improved strategies for communicating climate information (like variability, prediction, impact) to public and policy makers for better response and risk reduction.
- Study the impact of climate change on the important economic sectors (Agriculture, disaster management, tourism, water, health etc) and bring out suitable adaptation strategies.
- Extracting Climate Change Signatures from Land Surface Temperature.
- Assessment of Impacts of Climate Change on Surface Water Availability in Chaliyar river basin.
- Predicting future water supply-demand gap under changing climate using Water Evaluation and Planning model for Chaliyar river basin, Kerala.



IRTC offers short-term certificate courses in various fields of expertise to promote start-ups with environmental and social relevance. Prof. (Dr.) K.N. Madhusudan, Vice Chancellor, CUSAT, inaugurated the course. Prof. (Dr.) K.P. Sudheer Executive Vice President, KSCSTE delivered the keynote address.

Prof. (Dr.) K.P. Sudheer delivering the keynote address



## AWARDS

### Awards instituted by KSCSTE

*congratulations to the achievers!  
we are proud of you!*

- **Dr. S. Vasudev Award** - 2021 for the best Science Research Scheme (SRS) project was awarded to **Dr. M. K. Ravi Varma**, Professor, Dept of Physics, NIT Calicut. Project - A multi-wavelength Integrating Nephelometer for Characterizing Tropospheric Aerosol.
- **Kerala State Young Scientist Awards (KSYSA)** to four talented Young Scientists in recognition of their outstanding contribution in Science & Technology. **Dr. Niladri Sekhar Chatterjee**, Scientist, Biochemistry & Nutrition Division, ICAR- Central Institute of Fisheries Technology, Kochi. **Dr. Anoop C. S.**, Associate Professor, Dept. of Avionics, Indian Institute of Space Science & Technology Valiamala, Thiruvananthapuram. **Dr. Jayanarayanan C. R.**, Assistant Professor, Dept. of Mathematics, Indian Institute of Technology, Ahalia Integrated Campus, Palakkad. **Dr. A. M. Ramiya**, Assistant Professor, Dept. of Earth & Space Sciences, Indian Institute of Space Science & Technology, Valiamala, Thiruvananthapuram

**Dr. Ashish K. Chaturvedi**, Scientist, American Society of Plant Biologists (ASPB) Recognized for work on "Carbon dioxide responsiveness mitigates rice yield loss under high night temperature" in Plant Physiology.



### Best Poster presentation Awards, 34<sup>th</sup> Kerala Science Congress



**Dr. Sruthi K V**  
Junior Scientist  
(Environmental  
Sciences, Forest-  
ry and Wildlife)



**Dr. Anila Alex**  
Junior Scientist  
(Earth and  
Planetary  
Sciences)



**Dr. Anurag Dhyani**, Scientist, JNTBGRI (Visiting Scientist Award-Indian National Science Academy)



**Mr. S.M. Shareef**  
(Certificate of  
Fellow of Linnean  
Society of London)



**Dr. Raju Antony**  
(Merit Certificate  
award - Indian  
Fern Society)

The KSCSTE Best Performing Institute Award & Best Emerging Institute Award for the year 2021 was awarded to KFRI Thrissur and MBGIPS, Kozhikkode respectively. The award was distributed by the Hon. Chief Minister during the Golden Jubilee Celebrations of S & T in Kerala on 29<sup>th</sup> May 2022 at the Kerala Arts and Crafts Village, Kovalam.





**Dr Syam Viswanath** (Director, KFRI) has received the Prestigious Dr. J. K. G. Tejwani National Award of Excellence for Outstanding Research in Agroforestry Research and Development for the year 2021. This award is instituted by ICAR-CAFRI Indian Society of Agroforestry.

**Dr. V B Sreekumar** (Principal Scientist) got elected as Fellow of Linnean Society (FLS), London.



## APPOINTMENTS

*Welcome to the KSCSTE family!*

CWRDM



**Dr. Sarathjith M C**  
Jr. Scientist



**Dr. J. Beslin Joshi**  
Jr. Scientist



**Dr. Thangamani S**  
Jr. Scientist



**Dr. Raicy M C**  
Jr. Scientist



**Dr. Chithra V S**  
Jr. Scientist



**Ms. Sharannya T M**  
Jr. Scientist



**Dr. Magesh N S**  
Jr. Scientist



**Dr. Santosh Onte**  
Jr. Scientist



**Dr. Rishma C**  
Jr. Scientist

KFRI



**Dr. Wable Pawan Shyamrao**  
Scientist



**Dr. Donald James**  
Jr. Scientist



**Dr. Deepu Sivadas**  
Jr. Scientist



**Dr. Mahadeva-kumar S**  
Jr. Scientist



**Dr. Jithu U Krishnan**  
Jr. Scientist



**Mr. Arun V R**  
Jr. Scientist



**Dr. Siljo Joseph**  
Jr. Scientist



**Ms. Soorya S**  
Jr. Scientist



**Dr. Badole Srikanth Purushottam**  
Jr. Scientist



**Dr. Shweta B Kukreti**  
Jr. Scientist



**Dr. Adarsh C K**  
Jr. Scientist



**Dr. Ayate Dipika Purushottam**  
Jr. Scientist



**Dr. Madiga Bheemalingappa**  
Jr. Scientist



**Dr. R Suganthasakthivel**  
Jr. Scientist

ICCS



**Dr. D. Sivananda Pai**  
Scientist-G,  
Joined as the Director of ICCS, Kottayam

## ADIEU

*Wish you a happy and healthy retired life*



**Dr. P S Harikumar**  
Chief Scientist  
CWRDM



**Smt. J. Ushakumari**  
Technical Officer,  
KSCSTE - HQ



**Smt. Vasanthakumari P**  
Office Assistant  
KSCSTE - HQ



**Smt. A M Lalitha**  
Office Attendant  
KFRI



**Sri. Prakash T S**  
Helper  
KFRI



**Smt. S Padmavathy**  
Nursery Women  
KFRI



**Dr. Sam P. Mathew**  
Principal Scientist  
JNTBGRI



**Mrs. Shyladevi P.S.**  
Typist  
JNTBGRI



**Mr. Ashokkumar**  
Security Guard  
JNTBGRI



**Mr. L. Thulaseedharan**  
Gardener  
JNTBGRI



**Shri. E P Surendran Pillai**  
Technical Officer-III,  
NATPAC

## OBITUARY

*our deep condolence*



**K. Vijayan**  
(Section Officer)  
JNTBGRI



**Jayakumar S.**  
(Helper Gr.V)  
NATPAC





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

**കേരള ശാസ്ത്ര സാങ്കേതിക പരിസ്ഥിതി കാൺസിൽ**

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<https://www.youtube.com/c/KSCSTEofficial>

Your valuable impressions and comments may be forwarded to :  
[sasthraneews2022@gmail.com](mailto:sasthraneews2022@gmail.com)

