



KALPA

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ICAR-CENTRAL PLANTATION CROPS RESEARCH INSTITUTE
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From the Director's Desk



Wiser brain gains for future plantation sector

Plantation crops are grown in 37 lakhs hectares and contribute Rs. 25,000 crores to GDP in India. The sector is facing acute shortage in skilled labour force. ICAR-CPCRI has been in the forefront of tackling issues related to development of the plantation crops sector. The emergence of information technology during 1990s has resulted in an ever-increasing demand to use computers for the efficient management and dissemination of information. Keeping in view the strong need of farmers to collect important and updated information for interactive, flexible and quick decision-making, the 'e-Kalpa' app, developed at ICAR-CPCRI, offers an easy and interactive and flexible Decision Support System (DSS) for farm management. With the advent of powerful computation and efficient database management system, Geographical Information System (GIS) and Remote Sensing (RS) techniques, DSSs are being extensively used world-wide using state of art technologies, integrating multiple models for sustainable agriculture development.

Yield increase and enhancement of quality of harvest are the main objectives of ICAR-CPCRI for

doubling farmers' income. Geographic information system (GIS) and un-manned aerial vehicles (UAVs/ Drones) provide a spatial and temporal dimension to information, complementary to cognitive action by the farmers and scientists. Recent advances in artificial intelligence (AI) offer great promises in the development of decision support systems. Utilizing AI tools, automation of farm operations viz., cultivation, input delivery (auto irrigation), management controls, pollinating drones (like honeybees), conducting engineering and harvest operations, harvesting, spraying and post-harvest processing, intelligently controlled storage, food processing and packaging as well as value chain management, is now possible. On the one hand, sense-analyse-predict-inform and on the other, inform-enact-produce, under the umbrella of AI, would revolutionize plantation sector in the ensuing decade. AI driven technologies are emerging to help improve efficiency and to address challenges faced by the industry including, sowing the seeds, surveillance, yield boosting algorithms, chatbots for bringing the farmers to a closer interface to assess the benefits and losses. AI chatbots can perform as a farmer's friend, advising him of the right thing to be done at right time, thereby getting the maximum out of his farmyard. Added to that, the plantation crops value chain will be transformed by robotics and AI systems. For achieving this, scientists, engineers, entrepreneurs and the end-to-end stakeholders have to work together to harness the enormous potential of AI.

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Rare Arecanut Palms

Rare arecanut palms, viz., arecanut with inflorescences directly converting into seedlings, arecanut with two crowns, two arecanut palms grown from single seedling, and arecanut palms with four crowns were identified among South Kanara Local population from farmer's gardens in Puttur taluk, Dakshina Kannada, Karnataka.

Arecanut inflorescences directly growing into seedlings, was identified from Mr. Shashidhar Rai Kuthyala's garden at Hosamane, Padavannur Village, among the population of South Kanara Local variety. In 4-5 years old palm, four seedlings were formed.

Another arecanut palm in the above garden bears two crowns and both the crowns were bearing inflorescences. This garden also has two arecanut palms growing from a single bole.

In the areca garden of Sri C. K. Ummer of the same village, there is a South Kanara Local palm with four crowns. This tree aged about 15 years, until last 3-4 years it was normal with single crown. Later, the palm was infected by bud rot disease, subsequent to infection



Arecanut palm with nodal inflorescences directly converting into seedlings

two new crowns were formed in one side of the main crown, out of these two crowns normal inflorescence were seen in one crown and the main crown died



Seedlings collected from the arecanut palm node with inflorescences directly converting into seedlings

and after that two more new crowns formed on the other side of the main crown. From the recently formed crowns, seedlings were formed in the crown itself.



Arecanut palm with four crowns



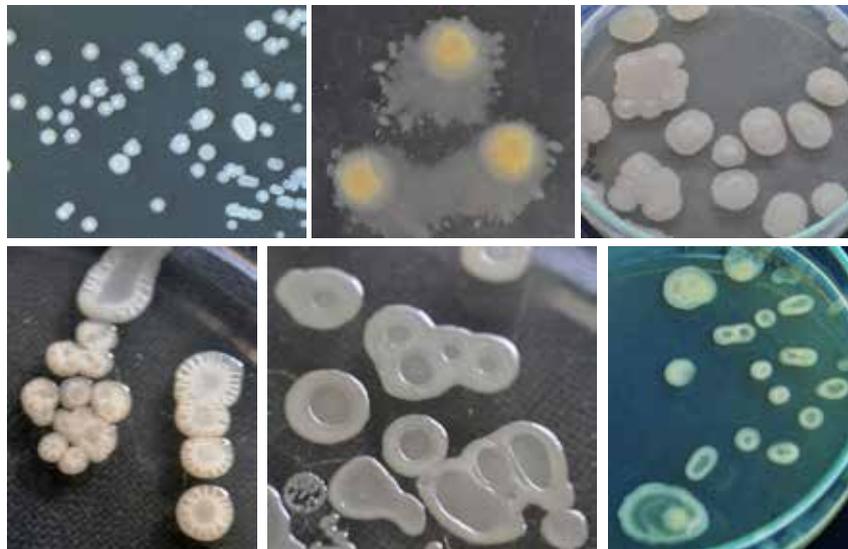
Seedlings collected from the arecanut palm with four crowns



Arecanut tree with two crowns
Nagaraja N. R. and Chowdappa P.

Heterotrophic zinc metal solubilization by *Burkholderia* spp.

For increasing zinc phytoavailability, heterotrophic zinc solubilization potential of β -Proteobacteria - *Burkholderia* spp., isolated from soil-plant interface in the root region of arecanut palms, was studied quantitatively in liquid medium supplemented with scarcely soluble ZnO. Free unbound zinc was analysed in liquid medium supernatants by Atomic Absorption Spectrometry, at regular intervals, after inoculation of the actively growing log-phase culture. *Burkholderia* spp. were found to solubilize this divalent metal with values ranging from 441 mg/L to 582 mg/L, after 30 days of incubation. During solubilization, bacterial proliferation occurred with concomitant acidification of the zinc oxide-supplemented culture broths, eventually reaching a pH as low as 2.79 from the initial value of 6.9. The titrable acidity of the medium reached upto 3.3 g/L.



Burkholderia spp. from arecanut capable of increasing phytoavailability of essential micronutrient zinc

Proton extrusion via production of a host of organic acids coupled with siderophore production with zincophore property appeared to be the Zn mobilization processes used by these bacteria. Further

studies are in progress to determine the H⁺ - based mechanisms in this heterotrophic metal solubilization.

Alka Gupta, Selvamani, V. and
Murali Gopal

Tractor mounted air blast sprayer

Timely application of plant protection measures, especially spraying fungicides, against fruit rot remains the single most important problem among arecanut farmers. Traditionally spraying is done manually by climbing the palm. However, arecanut palm

climbers are becoming rare. Prototype of an air blast sprayer to spray insecticides/ fungicides in atomised form from the ground itself to arecanut palms has been developed in collaboration with ASPEE, Mumbai. The machine has an impeller in the air blower, which rotates at a speed of 2200 to 3000 rpm. Evaluation of the blower revealed that it could reach a height of 30m. A centrifugal pump is the main part of the chemical injection unit. Power is taken from the power take-off shaft of the tractor through a set

of gear system, power transmission unit, to the blower and the chemical injection pump. When connected to the mini tractor, a powerful air flow would be created by the blower which comes out through the lance. Chemical injection pump also gets operated and the liquid chemical kept in the chemical tank is pumped to the nozzle. The atomization unit rotates by the force of the air blow and the liquid chemical coming out through a wire mesh surrounding the nozzle get atomized due to the centrifugal force. The liquid chemical thus coming out of the lance in an atomized form could reach up to a height of 30m.

Mathew, A.C. and P. Chowdappa



Demonstration of air blast sprayer at ICAR-CPCRI, RS, Vittal, Karnataka

Natural re-emergence of sooty mould feeding beetle, *Leiochrinus nilgirianus*

First occurrence of sooty mould feeding Leiochrinid beetle, *Leiochrinus nilgirianus* Kaszab (Tenebrionidae: Coleoptera) was reported from Kayamkulam on rugose spiralling whitefly (*Aleurodicus rugioperculatus*) infested coconut palm during June-July, 2017. The scavenger beetle could not be observed after withdrawal of monsoon during November, 2017 to May, 2018. With the onset of South-West monsoon showers in June, 2018 at Kayamkulam, there was



Gut of sooty mould feeding *Leiochrinus nilgirianus* beetle

re-emergence of the beetle with the active presence of immature stages, widely feeding on the sooty

mould deposits and cleansing the palm leaflets. An effective bio-cleansing mechanism has been further re-initiated with favourable weather parameters and pesticide-free management strategies envisaged for the suppression of whitefly. Dissection of field collected *L. nilgirianus* revealed sooty mould laden food bolus, thus, confirming its feeding on sooty moulds in moist environment.

Josephraj Kumar, A., Merin Babu and Chandrika Mohan



IMPORTANT EVENTS

Workshop on 'Breeding Strategies in Plantation Crops'

Workshop on 'Breeding Strategies in Plantation Crops' was organised at ICAR-CPCRI, Regional Station, Vittal on 27th April, 2018. The workshop was presided over by Dr. P. Chowdappa, Director, ICAR-CPCRI, Kasaragod and inaugurated by Dr. R. Chandrababu, Vice-Chancellor, Kerala Agricultural University. Dr. P. Chowdappa, in his presidential

address pointed out researchable issues in plantation crops like, developing mapping populations, tagging genes for traits of interest using molecular markers, identification of biotic and abiotic stress tolerant genotypes and development of climate resilient varieties. Dr. R. Chandrababu, Vice-Chancellor of KAU, during his inaugural address, highlighted

the possibility of utilizing meta QTLs for MAS and mapping of genomic regions linked to phenology and plant production traits under drought conditions. Dr. R.K. Mathur, Director, ICAR-Indian Institute of Oil Palm Research, Pedavegi, Dr. M. Gangadhara Nayak, Acting Director, ICAR-Directorate of Cashew Research, Puttur, and Dr. A.K. Singh, Head, Department of



Inauguration of the Workshop on 'Breeding Strategies in Plantation Crops' at ICAR-CPCRI, Regional Station, Vittal by Dr. R. Chandrababu, Vice-Chancellor of Kerala Agricultural University, in presence of Dr. P. Chowdappa, Director, ICAR-CPCRI.



Release of publication on 'Arecanut cultivation practices'

Genetics, ICAR-Indian Agricultural Research Institute, New Delhi, graced the occasion. A total of 55 participants, including researchers and students from ICAR institutes, SAUs, Krishi Vigyan Kendra's and other institute/university have participated in the workshop. Two publications from ICAR-CPCRI viz., a Technical Bulletin on 'Arecanut cultivation practices (in Kannada)' and an Interactive DVD on 'Hybridization techniques

and production of hybrid seedlings in coconut (in Malayalam)' were released by Dr. R. Chandrababu.

Dr. K.S. Ananda, Acting Head, ICAR-CPCRI, Regional Station, Vittal, made a presentation on 'Six decades of arecanut breeding' Dr. Ananda having nearly 32 years of experience in arecanut breeding was also felicitated on this occasion. Dr. A.K. Singh, Head, Department of Genetics, ICAR-IARI, New Delhi, delivered a

special lecture on 'Development and use of mapping populations in crops: Genetic considerations'. In his lecture he briefed about the strategies for developing mapping populations, types of mapping populations, applications of mapping populations etc. Recommendations for breeding in plantation and perennial fruit crops were made based on the interactions and discussions, during the workshop.

Demonstration of arecanut spraying machines

To demonstrate efficacy of the tractor mounted air blast sprayer, and the un-manned aerial vehicle/ drone (UAV) developed by General Aeronautics Pvt. Ltd., Bengaluru, at ICAR- CPCRI, Regional Station, Vittal a field demonstration was conducted on 30th May, 2018. About 250 farmers and other stakeholders from CAMPCO, Mangalore; MAMCOs, Shivamogga, TUMCos, Chennagiri; TSS and All India Arecanut Grower Association, Puttur attended the event. Dr. P. Chowdappa, Director, ICAR-CPCRI, Kasaragod addressed the farmers in the field and explained advantage of spraying using the machine. Spraying could be done from ground itself thereby avoiding a person



UAV (drone) developed by General Aeronautics Pvt. Ltd., Bengaluru

climbing the tree, which would be difficult during rainy season. This would make spraying much easier and faster even during monsoon when fruit rot disease occurs.

This machine has been found suitable for well laid out garden of arecanut mono-cropping system. About 300 stakeholders attended the demonstration.



Dr. P. Chowdappa, Director, ICAR-CPCRI, Kasaragod interacting with stakeholders during demonstration



Dr. P. Chowdappa, Director, ICAR-CPCRI, Kasaragod interacting with media persons at ICAR-CPCRI, RS, Vittal

Annual Group Meeting of AICRP on Palms

The 27th Annual group meeting of AICRP on Palms was held during 24th to 26th May 2018 at IOPR, Pedavagi. Dr. W.S. Dhillon, ADG (Hort. Sci.-I), ICAR, New Delhi presided over the inaugural session. Dr. J. Dilip Babu, Director of Research, Dr.YSRHU, Venkataramnagudem, AP was the Chief Guest. Dr. P. Chowdappa, Director, ICAR-CPCRI, Kasargod Dr. K.U.K. Nampoothiri, Former Director of ICAR-CPCRI, Kasaragod, and Dr. D. Damodar Reddy, Director, ICAR-CTRI, Rajahmundry were the guests of honour. In the presidential remarks, Dr. W. S. Dillon, ADG (Hort. Sci.- I), gave overall picture of horticulture sector in the country and also status of plantation crops in the nation. Further, he emphasised doubling of profitability and not income of farmers. He, also called upon for time bound, need based research under AICRP systems. Dr. K.U.K. Nampoothiri, Former Director of ICAR-CPCRI, Kasaragod addressed the gathering and emphasised on importance of group meetings under AICRP system and need for multifoculation research. Dr.



Release of Publications during 27th AGM of ICAR-AICRP on Palms at Pedavegi

P. Chowdappa, Director, ICAR-CPCRI, Kasaragod addressed the participants and in his speech, he focussed on doubling of farmers income and also emphasised the efforts of CPCRI in doubling farmers income and also in managing new and emerging pest and diseases in plantation crop. The Director, ICAR-CTRI, also gave a formal speech in the session and he narrated the role of AICRPs in national research programmes. The chief guest of the function, Dr. J. Dilip Babu, Director of Research, DR.YSRHU, Venkataramnagudem, highlighted the status of Horticulture sector in Andhra

Pradesh and its contribution to the economy of state. Based on performance, AICRP Centre, Bhubaneswar was adjudged as the Best AICRP centre for the year 2017-18. The publications brought by various centres in different regional languages were released during the session by chief guest and guests of honour. During the inaugural function eight extension folders were released from different AICRP on Palms centres in local languages on various aspects of the mandate crops. The sessions concluded with plenary session on 26th May 2018.



PUBLICATIONS

- Diwakar, Y., Harisha, C.B., Singh, B., Kakani, R.K. and Saxena, S.N., 2018. Floral biology and reproductive behaviour of *Nigella sativa* L. var. Ajmer Nigella-1. *Journal of Pharmacognosy and Phytochemistry* **SP3**: 53-58.
- Hebbar, K.B., Helan M. Rose, Anusree R. Nair, Kannan, S., Niral, V., Arivalagan, M., Alka Gupta, Samsudeen, K., Chandran, K.P., Chowdappa, P. and Varac P.V. 2018. Differences in *in vitro* pollen germination and pollen tube growth of coconut (*Cocos nucifera* L.) cultivars in response to high temperature stress. *Environmental and Experimental Botany*. doi.org/10.1016/j.envexpbot.2018.04.014.
- Priya George, Alka Gupta, Murali Gopal, Litty Thomas and George V. Thomas. 2018. Systematic screening strategies for identifying elite plant growth promoting rhizobacteria for coconut (*Cocos nucifera* L.). *Int. J. Curr. Microbiol. App. Sci.* **7**(05): 1051-1074.
- Rajkumar and Kaushal, K. K. 2018. Virulence studies of Indian populations of sorghum cyst nematode, *Heterodera sorghi* in Maize. *Indian Journal of Plant Protection*. **44**(4):1-6..
- Srinivasan, T., Rajamanickam, K., Chandrika Mohan, and Maheswarappa H.P. 2018. Validation of integrated pest management strategy against coconut rhinoceros beetle, *Oryctes rhinoceros* L. *Journal of Plantation Crops* **46** (1): 8-11.

Nihad, K., Anes, K.M., Josephraj Kumar, A. and Krishnakumar, V. 2018. Countering Plastic Pollution through Coconut. *Proceedings of Seminar on Boost-up Coconut to Beat-out Plastics*. ICAR-CPCRI, Regional Station, Kayamkulam, 44p.

Shareefa, M., Thomas, R.J. and Josephraj Kumar, A. 2018. Tales of coconut counties and islands around the world. *Indian Coconut Journal* **61** (2): 20-23.

Shareefa, M., Josephraj Kumar, A. and Thomas, R. J. 2018. Nursery management of dwarf varieties of coconut *Agriculture World* **4** (4): 52-55.

Thomas, R. J., Haris, A.A. and Shareefa, M. 2018. Scientific management of young coconut palms (In Tamil). *Krishi Jagaran* **2** (6): 50-23.

Josephraj Kumar, A., Chandrika Mohan and Krishnakumar, V. 2018. Taming coconut pests by Green Warriors (*Biological Crop Management Issue*). *LEISA* **20** (2): 6-9.

Muralidharan, P., Ravi, S., Rajeev, M.S. and Sajnanath, K. 2018. Integrated Farming System models. *Kerala Karshakan* **63** (9): 10-12.

Sivakuamr, T. 2018. Stem fly management in cowpea. *Kerala Karshakan* **63** (9): 64-65.

Ravi, S., Rajeev, M.S. and Muralidharan, P. 2018. Cultivation of CO FS 29 fodder crop. *Karshakasree* **24**(4): 50.

Jissy George 2018. Active jack value addition enterprises. *Karshakasree*. **24** (4): 96-97.

Jissy George 2018. Healthy diet café. *Karshakasree* **24** (5): 105.

Jissy George 2018. Jack fruit powder. *Karshakasree* **24** (6): 104-106.

Jissy George, Muralidharan, P. and Anju, K.A. 2018. Marketable value added products from vegetables. *Krishiyanakanam* **1** (3): 31-32.

Rajkumar and Sujithra, M. 2018. Biosuppression of coconut pests with entomopathogenic nematodes. *In: Training manual on Integrated Pest and Disease management in coconut* (Eds. Rajkumar, Pratibha V. H. and Sujithra M.). ICAR - CPCRI, Kasaragod. p. 46 - 55.

Sujithra, M. and Rajkumar 2018. Mass production of Entomophaga and entomopathogens invading coconut pests. *In: Training manual on Integrated Pest and Disease management in coconut* (Eds. Rajkumar, Pratibha V. H. and Sujithra M.). ICAR - CPCRI, Kasaragod. p. 76 – 81.

Sujithra, M. and Rajkumar 2018. Climate change and pest outbreaks in Palms. *In, Training manual on Integrated Pest and Disease management in coconut* (Eds. Rajkumar, Pratibha, V. H. and Sujithra, M.). ICAR - CPCRI, Kasaragod. p. 105 - 108.

Chowdappa, P., Chandrika Mohan and Josephraj Kumar, A. 2018. *Pests of Plantation Crops*, Daya Publishing House, New Delhi, 256 p.

Chandrika Mohan, Josephraj Kumar, A. and Chowdappa, P. 2018. Coconut *In: Pests of Plantation Crops*, (Eds.) P. Chowdappa, Chandrika Mohan and A. Josephraj Kumar, Daya Publishing House, New Delhi, pp 1-54.

Josephraj Kumar, A., Rajesh, M.K. and Chowdappa, P. 2018. Insect neuropeptides and applications in pest management. *In: Pests of Plantation Crops*, (Eds.) P. Chowdappa, Chandrika Mohan and A. Josephraj Kumar, Daya Publishing House, New Delhi, pp 221-231.

Rajkumar and Josephraj Kumar, A. 2018. Entomopathogenic nematodes in pest management *In: Pests of Plantation Crops*, (Eds.) P. Chowdappa, Chandrika Mohan and A. Josephraj Kumar, Daya Publishing House, New Delhi, pp 233-250.

Books

Nagaraja, N. R., Niral, V. and Chowdappa, P. 2018. Compendium of abstracts. Workshop on Breeding Strategies in Plantation Crops. ICAR-CPCRI, Regional Station, Vittal. 27th April 2018. 19 pp.

Chandrika Mohan, Josephraj Kumar, A. and Anes, K.M. 2018. Biological Pest Suppression and Good Agricultural Practices in Coconut. In: *MANAGE Off-campus Training Manual on Integrated Pest and Disease Management in Coconut*. (Eds.) Rajkumar, Prathibha, V.H. and Sujithra, M., 24-28th April, 2018 pp 29-39.

Josephraj Kumar, A., Chandrika Mohan and Anes, K.M. 2018. Innovative Approaches in Pest Management. In: *MANAGE Off-campus Training Manual on Integrated Pest and Disease Management in Coconut*. (Eds.) Rajkumar, Prathibha, V.H. and Sujithra, M., 24-28th April, 2018, pp 56-61.

Merin Babu, Daliyamol, Josephraj Kumar, A. and Vinayaka Hegde. 2018. Overview of Phytoplasmal Diseases of Coconut: Diagnosis and Management. In: *MANAGE Off-campus Training Manual on Integrated Pest and Disease Management in Coconut*. (Eds.) Rajkumar, Prathibha, V.H. and Sujithra, M., April 24-28, 2018, 24-28th April, 2018, pp 62-66.

Josephraj Kumar, A., Chandrika Mohan, Merin Babu and Anes, K.M. 2018. Biodiversity and Biosecurity Risks in Coconut. In: *MANAGE Off-campus Training Manual on Integrated Pest and Disease Management in Coconut*. (Eds.) Rajkumar, Prathibha, V.H. and Sujithra, M., 24-28th April, 2018, pp 67-75.

Josephraj Kumar, A., Chandrika Mohan, Merin Babu, Anes, K.M. and Thomas, R.J. 2018. Pest and Disease Management in Coconut Nursery. In: *MANAGE Off-campus Training Manual on Integrated Pest and Disease Management in Coconut*. (Eds.) Rajkumar, Prathibha, V.H. and Sujithra, M., 24-28th April, 2018, pp 82-91.

Rajkumar, Prathibha, V. H. and Sujithra, M. 2018. Integrated Pest and Disease Management in Coconut. Five days Off-campus training programme of National Institute of Agricultural Extension management (MANAGE), Hyderabad. ICAR - CPCRI, Kasaragod, Kerala, p108.

Thomas, R.J. and Shareefa, M. 2018. Containing palm pests and diseases through host plant resistance In: *MANAGE Off-campus Training Manual on Integrated Pest and Disease Management in Coconut*. (Eds.) Rajkumar, Prathibha, V.H. and Sujithra, M., 24-28th April, 2018, pp 92-101

Training Manual

Kirshnakumar, V., Anithakumari, P., Josephraj Kumar, A., Shareefa, M. and Indhuja S. 2018. *Amma Thengu programme*, a farmer participatory intervention of Mera Gaon Mera Gaurav.

Shareefa, M., Indhuja, S., Josephraj Kumar, A. and Anithakumari, P. 2018. Mother palm and best coconut seedlings (*Amma thengum Thaikalum*). Extension Folder.

Extension folders

Interactive DVD

Regi J. Thomas and M. Shareefa 2018. Selection of dwarf parental palms and hybridization techniques in coconut. Chief Executive Producer: P. Chowdappa, Concept, Programme Design: Programme co-ordination: Krishnakumar, V., Kalavathi, S., Merin Babu, Udayabhanu, K.P., Sunikumar, P.K., Mohammed, H., Anandha Narayanan, Rajesh, K.S., Manoj, K. ICAR-CPCRI, Kasaragod.



HUMAN RESOURCES DEVELOPMENT

Deputation Abroad

Dr. Regi Jacob Thomas, Principal Scientist (Hort.) visited The Netherlands to attend the short course on 'Integrated Seed Sector Development 2018' conducted at Wageningen University & Research, The Netherlands during 14th May, 2018 to 1st June, 2018.

All expenses for attending the training were covered under Netherlands Fellowship Programme funded by Dutch Ministry of Foreign Affairs. The training was conducted by Wageningen Centre for Development Innovation (under Wageningen University & Research).

Training Attended

Name & designation	Title	Place and date
K. Devaraj, Sr. Technical Assistant (Jr. Engineer)	Basic approach to transmission system (operation and maintenance of substation and transmission lines) for graduate engineers	Power Engineers Training and Research Centre, Idukki 2 nd – 6 th April, 2018
K. Kunhiraman Nair and Girija Chandran Private Secretaries	Enhancing efficiency and behavioral skills for Stenographers Grade III, PA, PS and Sr. PPs of ICAR	ICAR-NAARM, Hyderabad 21 st – 26 th June, 2018
Dr. C.G. Narayanan Namboothiri ACTO and Sri V.K. Gopalakrishnan Technical Officer	Motivation, positive thinking and communication skills for technical officers	ICAR-NAARM, Hyderabad 21 st -27 th June, 2018

Awards/ Recognition

Dr. A. Joseph Rajkumar, Principal Scientist received a certificate of appreciation from Mr. V.S. Sunilkumar, Minister for Agricultural Development and Farmer's Welfare, Govt. of Kerala on 26th May, 2018 in recognition for the approval of two cardamom varieties (PV-3 and PV-5) by Kerala State Variety Release Committee. He was associated with the development of the varieties as Associate Breeder

during his tenure (1999-2007) at Cardamom Research Station (under KAU), Pampadumpara, Idukki District.

Mr. Diwakar, Y., Scientist was conferred with Best Oral Presentation award during the National Conference on Conservation, Cultivation and Utilization of Medicinal and Aromatic Crops held at College of Horticulture, Mudigere during 25th – 26th April, 2018.

Ph. D. Awarded

Shri S. Jaysekhar, Scientist (Sr. Scale) was awarded Ph.D. from Centre for Development Studies, Jawaharlal Nehru University, New Delhi for his thesis on 'Impact of food safety standards on exports of agricultural products from India-The case of Kerala' under the guidance of Prof. K.N. Harilal and Prof. M. Parameswaran on 10th April, 2018.



TRANSFER OF TECHNOLOGY

Training programmes

Training programme on the final year B. Sc. (Ag.) students 'Biopesticides, bio-control agents and their mass production techniques' was organized to from College of Agriculture, Padannakkad under Experiential Learning Programme (RAWE) at

Crop Protection Division, ICAR-CPCRI, Kasaragod during 5-6th April, 2018.



A training programme on 'Coconut cultivation and its value addition' was organized to the farmers from Madurai district farmer's producer company, Madurai, Tamil Nadu at ICAR-CPCRI, Kasaragod on 16th April, 2018.

Training Programme on 'Value addition in coconut' was conducted for 25 Extension Officials in collaboration with MANAGE, Hyderabad at ICAR-CPCRI, Kasaragod during 22nd – 26th April, 2018. A training on 'Integrated pest and disease management in coconut' under off-campus training programmes conducted in collaboration with National Institute of Agricultural Extension Management (MANAGE), Hyderabad at ICAR-CPCRI, Kasaragod from 24th - 28th April, 2018. Twenty one trainee from various Krishi Vigyan Kendra (KVK), SAU and different state agricultural and horticultural departments officials participated in the training.

A training programme on 'Skill development in agro based food processing' was conducted at ICAR-CPCRI, Kasaragod during 5th -16th May, 2018 conducted in collaboration with District Industries Centre, Kasaragod.

A training programme on 'Integrated crop management in coconut cultivation' was organized to the farmers of Madurai District, Tamil Nadu under ATMA at ICAR-



Dr. P. Chowdappa, Director, ICAR-CPCRI addressing trainees at Kasaragod



Bhutanese trainees discussing with Dr. P. Chowdappa, Director

CPCRI, Kasaragod during 9th – 11th May, 2018.

Training Programme on 'Coconut based integrated farming system' for 16 Extension Officials was

organized at CPCRI, Kasaragod in collaboration with MANAGE, Hyderabad during 22nd – 26th May, 2018.

Exposure visit cum training programme was organized at ICAR-CPCRI, Kasaragod and ICAR-CPCRI (RS), Vittal for five officials from Bhutan during 31st May, 2018 to 2nd June, 2018.

Exposure visit cum training programme on 'Crop management in coconut' was organized at ICAR-CPCRI, Kasaragod for farmers from Kontotty, Malappuram on 27th June, 2018.



Value addition training on coconut at Kasaragod

District level seminar on cocoa

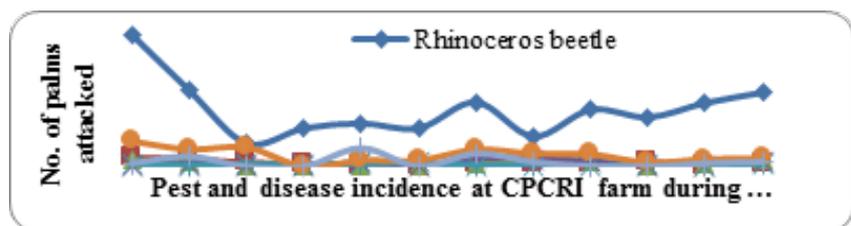


Participants of the seminar at CPCRI, RS, Vittal

District level one day seminar on 'Cocoa – An ideal component crop in palm based cropping system' was organised at ICAR-CPCRI, Vittal sponsored by Directorate of Cashewnut and Cocoa Development (DCCD), Cochin for women farmers and students on 24th April, 2018. A total of 49 participants attended the programme.

Refresher course for the surveillance squad

A training cum refresher course on 'Early detection and surveillance of pest and disease in palms and cocoa with special emphasis on practical approaches for management' was conducted on 7th June, 2018. A total of 25 surveillance team members from ICAR- CPCRI, Kasaragod and ICAR- CPCRI, RS, Vittal attended the programme. Dr. P. Chowdappa, Director, ICAR- CPCRI, Kasaragod, presided over the programme



Incidence of various pests and diseases in the CPCRI farm during the period May 2017 –April 2018

and appraised the surveillance team members for their active

participation in the previous year activities.

Off campus programme

Training on 'Mother palm selection and nursery raising in coconut' at Municipal Town Hall, Harippad, Alappuzha on 3rd April, 2018. The seminar was inaugurated by Smt. Elizabeth Daniel, Assistant Director

of Agriculture and attended by 75 farmers from Harippad Block.

Kisan Kalyan Karyashala was conducted on 2nd May, 2018 at Panchami Auditorium, Kaikamba,

Kasaragod, Kerala and at Rani Block along with KVK, Kamrup, AAU, Kahikuchi, Assam.

Training on health management in palms was imparted for more



Training programme on 'Cocoa production and processing technology' at Bantwal, D.K., Karnataka

than 200 'Deepika' Farmer's Club members from different parishes around Kuttanad held at Mar Sleeva Church, Ponga on 15th May, 2018.

One day interaction on scientific cultivation practices and management of arecanut and field visit programme was conducted with the Royal Government of Bhutan, Mr. Ngawang, Programme Director, Agriculture Research and Development with Scientists of CPCRI, RC, Kahikuchi on 28th May, 2018.

A training programme from 17th - 19th May 2018 on 'Cocoa production and processing technology' sponsored by Directorate of Cashewnut and Cocoa Development (DCCD), Cochin was organized at Manchi village in Bantwal Taluk in the garden of Mr. Ishwara Naik who is a CPCRI, FLD beneficiary and at ICAR-CPCRI, RS, Vittal. A total of 65 participants were benefited by the programme.

A capacity building initiative by ICAR-CPCRI scientists on Scientific Management of Coconut was organized on 2nd June, 2018 at Piravanthoor, Kollam district by the Sasthampadickal Residents Association. Sixty farmers participated in the programme.

Under the FFP, a three day training



Dr. Meena Kumari (Professor, KAU), delivering lecture at Pathiyoor, Alappuzha, Kerala

programme was conducted from 12th to 14th June, 2018, at Pathiyoor panchayat. Dr. Meena Kumari (Professor, KAU) handled theory and practical session on 'Bioinoculants'. The second day session was handled by Dr. Deepak on 'Organic inputs' and the third day session on 'Entrepreneurship in Agro residual management' was taken by Dr. Kamalasanan Pillai. Dr. Chandra Gowda, Director i/c and Dr. D. Srinivasa Reddy, Principal Scientist, ATARI, Bengaluru visited intervention areas and participating farmers of fodder sesamum, and finger millet cultivation, coconut value addition units on 11th April, 2018 in various wards of Pathiyoor Panchayath, FFP area. A training programme for coconut farmers was conducted

during 4th - 6th April, 2018 at PHC hall, Pathiyoor on 'Integrated crop management for coconut in root (wilt) affected area' including a session on 'Scientific management of coconut based farming system for sustainable farm' and 42 FFP farmers participated. Another training programme for turmeric growers were conducted during 19th - 20th April, 2018 for women self help groups and farmers at Pathiyoor panchayath hall. The training covered cultivation practices, quality planting material production and processing. Another training programme on 'Cultivation practices of bush jasmine in coconut plantations' conducted on 11th May, 2018 at Pathiyoor which was attended by 26 beneficiaries.

Exhibitions attended

Sl. No.	Name of exhibition	Place	Date
1	Mathrubhumi Karshika mela 2018	Perumbavur, Kerala	4 th - 10 th April, 2018
2	Technology Awareness camp	Amalapuram, Andhra Pradesh	6 th May, 2018
3	Mango Fest 2018	Padannakad, Agricultural collage	5 th - 6 th May, 2018
4	Rural Innovators meet and expo	M S Swaminathan Research Foundation , Wayanad, Kerala	14 th -16 th May, 2018
5	Karshika mela 2018	Organized by MSME and M S Swaminathan Research Foundation, Calicut , Kerala	17 th - 18 th May, 2018
6	Technology fest	Organized by MSME and DIC	12 th June, 2018

Mass media interface and participatory reach out programme



Sri R.Vimalasenan Nair, Director, AIR, Thiruvananthapuram, inaugurating AIR farmers interface programme in presence of Dr. P. Chowdappa, Director, ICAR-CPCRI

A culmination programme and Farmers Meet of the ICAR-CPCRI (FFP) and All India Radio, Thiruvananthapuram Farm and home programme was organized on June 5, 2018 at ICAR- CPCRI (RS), Kayamkulam and 159 persons participated. A total of 160 farmer

representatives attended the events actively. The programmes included Farm quiz program for coconut farmers, livestock farmers and women farmers which served as an interactive technology dissemination mode and these programs were relayed

in AIR, Thiruvananthapuram subsequently for three days. Environmental day pledge and tree saplings distribution marked the environmental day message to the gathering. Best groups of FFP area were awarded for their involvement and achievement of potential yield in sesamum and finger millet cultivation. Five farmers from various districts were selected from among the listeners of the ICAR-CPCRI (FFP) program episodes and quiz team winners were felicitated with radio sets and certificates. Dr. P. Chowdappa (Director, ICAR CPCRI), Sri R.Vimalasenan Nair (Director, AIR, Thiruvananthapuram), Sri R. Hali (Retired Director, Department of Agriculture), Sri V. Prabhakaran (President, Pathiyoor Grama panchayath), District panchayath member and Block panchayath members attended the programme.

Radio talks/TV programme telecast

Dr. T. Sivakumar delivered a talk on 'Mango fruit fly management' broadcasted on 21st and 23rd April 2018 in Karshika Deepam of Global Radio- FM, Ambalappuzha.

Dr. S. Ravi delivered a talk on 'backyard poultry' broadcasted on 24th -26th April, 2018 in Karshika Deepam of Global Radio-FM, Ambalappuzha.

Smt. Jissy George delivered a talk on 'Prospect of jackfruit processing' broadcasted on 3rd May, 2018 in Alleppey mail of Global Radio- FM, Ambalappuzha.

Dr. P. Muralidharan and Smt. G. Lekha delivered a Radio documentary on 'Interventions

Sl. No.	Name of scientists	Doordarshan programme topic	Date of telecast
1	Dr.V. Krishnakumar, Head	Live-Phone-in programme on 'Coconut planting and management'	4 th May,2018
2	Dr. P. Anithakumari, Principal Scientist	Live phone-in-programme on 'Planning farming activities before rainy season'	21 st June, 2018

of KVK - Alappuzha to promote mushroom cultivation' broadcasted on 17th June, 2018.

Dr. P. Muralidharan delivered an AIR documentary on 'Prime Minister's vision on Doubling Farmers Income' – broadcasted on 28th June, 2018.

ICAR-CPCRI YouTube channel

comprising of 32 video clippings of technologies on value addition and farming practices on coconut farming (English, Hindi, Tamil, Malayalam, Kannada) was launched as part of the ICT initiative for reaching out of farmers. It is accessible in the URL <https://www.youtube.com/channel/UCWcuAg6DZVT7O9IM6luVTdg/videos>

KVK, Kasaragod

Training programmes

Programme	No. of trainings	Participants		
		Male	Female	Total
On campus	18	179	194	373
Off campus	06	127	122	249
Total	24	306	316	622

During the period, two on farm trials and six frontline demonstrations were initiated.

On farm trials on yard long bean

The performance of Yard Long Bean varieties, Vellayani, Jyothika and Geethika (released by KAU) and Arka Mangala (released by ICAR-IIHR) were assessed against the variety Lola in an area of three hectares belonging to ten farmers of Manjeswar, Mogral Puthur, Chemnad and Pallikkere. The result showed that Geethika recorded highest yield (21.59 t/ha.) followed by Arka Mangala (21.10 t/ha.) and Vellayani Jyothika (18.72 t/ha.). The check variety Lola yielded 17.52 t/ha. Arka Mangala performed better in terms of average length and appearance of pods.

Other major events

Grama Swaraj Abhiyan Programme

KVK associated with ATMA for the conduct of Grama Swaraj Abhiyan Programme in all blocks of Kasaragod district on 2nd May 2018. A total of 707 farmers attended this programme wherein technologies released by ICAR-CPCRI for doubling farmers' income was

showcased. Many dignitaries including Shri K. Kunhiraman, MLA of Udma, Panchayath Presidents, Vice Presidents, Standing Committee Chairmen, Panchayath members and ATMA officials also participated in the programme. Animal Health camps were organized in three blocks as part of the programme.

Hon'ble Prime Ministers' farmer interaction programme

This programme was conducted on 20th June, 2018 wherein Prime Ministers' live interaction with farmers telecasted by Doordarshan was live streamed in KVK. In this connection, a training programme on Recent Advances in Rice Cultivation was also organized. Around 50 farmers attended this programme at KVK.

Success Story - Year round vegetable cultivation for sustainable livelihood

Sri Balakrishnan, an innovative farmer belonging to Pallikkere Panchayath, carrying out integrated farming is a role model for the youngsters who wish to take up organic vegetable cultivation as a sustainable livelihood. He

cultivates vegetables round the year in around 1.5 acres of land owned by him and two acres leased by him. The main vegetable crops commercially cultivated are bitter gourd, salad cucumber, snake gourd, ridge gourd, yard long bean varieties, brinjal, chilli and amaranthus. He is fully engaged in farming activities from early morning to dark night irrigating plants, applying manure, weeding, harvesting, feeding cows, cleaning animal sheds, marketing farm produces and so on.

He is an associate farmer of the KVK and through demonstrations and other mandatory activities conducted in his farm, KVK could reach the unreached farmers of the area facilitating speedy dissemination of recent agricultural technologies. His main innovations include mixing of different organic manures in such a way to ensure balanced nutrition and water retention capacity of soil, using gypsum, dolomite and lime in various proportions for soil acidity management, use of yellow plastic boards smeared with castor oil to function as sticky traps for trapping insect pests, usage of scaring devices to scare away birds, preparation and usage of pest repellants such as cows urine, neem oil, ash etc. He gives much emphasis to enrich soil with beneficial microorganisms by applying *Trichoderma*, *Pseudomonas*, *Beauveria*, *Verticillium* etc. as and when required and also to enhance biodiversity by planting flowering plants like marigold, ocimum, chrysanthemum etc. along the borders of cropped plants.

The total income from the vegetable plot during the year 2017-18 was Rs. 3,72,000/-. He had spent around Rs. 1,65,000/- only



Hon'ble Prime Minister's interaction with women SHG's and farmers



Cowpea yard of Shri Balakrishnan and Smt. Bhanumathi at Pallikkere, Kasaragod

towards cost of cultivation and maintenance of plots. His wife, Smt. Bhanumathi extends full support to his farming activities.

The success story of this farmer was broadcasted by Kairali TV Channel on 21st March, 2018 and since then many farmers contacted him for necessary guidance and support for organic cultivation of vegetables. His success in organic vegetable cultivation revealed that the benefits of organic farming practices are low capital investment, healthy soil and environment, rich biodiversity and ultimately safe to eat farm produces.

KVK, Alappuzha

Live webcasting of PM's interaction with farmers

Live webcasting of Honorable Prime Minister Shri.Narendra Modi's interaction with selected farmers at different parts of the country was arranged in KVK-Alappuzha. Farmers and farm women from different panchayaths in the district listened to the motivational words by the PM. Farmers opined that they had an opportunity to learn about the new schemes of the Union Govt. to double their income.



Live webcasting of Honorable Prime Minister Shri Narendra Modiji's interaction at KVK, Alappuzha

Training programmes

During the period, 39 training programmes were organized benefitting a total number of 883 farmers/rural youths. The details of the training programmes were as follows:

Field Days conducted: Field days of the frontline demonstrations were conducted as mentioned below:

Farmer Field School

Concluding session of the FFS on pest management on juvenile coconut was conducted on 11th April, 2018 at Thalavady. Dr. P.



Farmer field school organized by KVK, Alappuzha

Training	No. of Programmes	Participants		
		Men	Women	Total
On campus	11	204	125	329
Off campus	27	345	198	543
Vocational	1	1	10	11
Total	39	550	333	883

Date	FLD	Place	Guests & officials attended
26.04.2018	Enhancing productivity of coconut based cropping system through moisture conservation in coastal sandy soils	Mararikulam	Sri. A.S. Jayamohan, Chairman, Standing Committee, Mararikulam South Grama Panchayath, Dr. P. Muralidharan, Head KVK, Dr. K. Sajnanath
04.05.2018	Production of Organic manure from trash fish	Arattupuzha	Dr. P. Muralidharan, Head KVK, Jissy George and Dr. K.Sajnanath, SMS
04.05.2018	Fish silage feeding for backyard poultry rearing	Arattupuzha	Smt. Lali, 4 th Ward member, Dr. P. Muralidharan, Head KVK and Dr. S. Ravi, SMS
04.05.2018	Multi-nutrient mix 'sampoorna' in vegetable cowpea	Arattupuzha	Sri. H. Niyas, President, Chingoli Grama Panchayath, Dr. P. Muralidharan, Head, KVK and Dr. K. Sajnanath, SMS, Smt. Bindu Sara, Agrl. Officer
08.05.2018	Cultivation of Milky mushroom ' <i>Calocyba gambosa</i> '	Kayamkulam	Dr. P. Muralidharan, Head, KVK and Lekha G, SMS, Smt. Dhanalakshmi, Agrl. Officer
08.05.2018	Rhizome rot management in ginger using PGPR capsule	Bharanikavu	Dr. P. Muralidharan, Head, KVK and Lekha G, SMS

Muralidharan (Head, KVK), Mr. Rajeev M.S. (SMS-Agronomy) and Dr. K. Sajnanath (SMS-Soil Science) presented brief notes on the technologies learnt by the farmers. Partner farmers shared their experience and requested to spread this programme to nearby areas also.

KVK-ATMA linkages

As per the GOI instruction Kissan Kalyan Karyasala was organized by ATMA on 2nd May, 2018. Officials from KVK, Alappuzha delivered lecture on different topics as detailed below:

NICRA Demonstration units visit by Director, ATARI

Dr. Chandre Gowda, Director-ATARI (Zone XI) and Dr. D.V.S. Reddy, PS and Co-ordinator, NICRA visited Technology Demonstration units at Muttar

Name of official attended	Topic	Place & no. of farmers
Dr. S. Ravi, SMS (AH)	Coconut based Integrated farming system	Ambalappuzha block -150 farmers
Dr. K. Sajnanath, SMS (Soil Science)	Soil health management for doubling farmers' income	Muthukulam block -60 farmers
Dr. T. Sivakumar, SMS (Agrl.Entomology)	Modern techniques in crop health management	Aryad block -60 farmers



NICRA – Technology demonstration programmes by KVK Alappuzha

and Thalavady villages on 11th April, 2018. They were apprised of the project activities and impact. Detailed interactions were made

with the partner farmers. The KVK team lead by Dr.P.Muralidharan, PS & Head accompanied the dignitaries.

COMMERCIALIZATION OF TECHNOLOGY

During the period from April to June, 2018, three technologies were commercialised by the Institute to entrepreneurs through MoA as per the details given below, an amount of Rs. 95,000 have been collected as technology transfer fees.

Technology	Date of licensing	Transfer fees Rs.	Entrepreneurs details
Technical knowhow of production of virgin coconut oil (VCO)	19-04-2018	40,000	Mr. Earl Francis Gracias, Salcete, South Goa - 403715
	24-04-2018	40,000	M/s Delta Virgin Coconut Oil Plant, Moolad Post, Calicut Dist. – 673614
Mature coconut water based value added products	24-04-2018	15000	-do-
	Total	95,000	

New Initiatives

Managing coconut and arecanut palms inevitably involves climbing for carrying out various interventions at the top of the palms. In order to facilitate the operations, without manually climbing the risky heights, a new initiative has been planned by ICAR-CPCRI in collaboration with M/s General Aeronautics, C/o IISc, Bangalore. A MoA on 'Spraying technology using unmanned aerial vehicle (UAV) for arecanut, coconut and cocoa was executed between the two institutions at Bangalore on 11th June, 2108.



Exchange of MoA with General Aeronautics, Bangalore by Padma Shri Dr. Kota Harinarayana, Founder Chairman and Dr. P. Chowdappa, Director, ICAR-CPCRI



Participation in national seminars/symposia/conferences/workshops

Name and designation	Programme	Place & Date
Dr. P. Chowdappa, Director, Dr. Vinayaka Hegde, Dr. K.B. Hebbar, Dr. (Mrs.) Anitha Karun, Heads of Div., Dr. (Mrs) V. Niral, Dr. M. K. Rajesh, Dr. Samsudeen K. Dr. C.T. Jose Dr. S. Elain Apshara Regi Jacob Thomas, Pr. Scientists, Dr. (Mrs.) R. Sudha Dr. (Mrs.) Neema M. Ms. Ranjini T.N. Dr. Senthil Amudhan, Sr. Scientists, Dr. Nagaraja, N.R. Dr. Thava Prakasa Pandian Mr. Najeeb Naduthody Ms. Suchithra, M. Ms. Saneera E.K., Scientists	Workshop on 'Breeding strategies in plantation crops'	ICAR-CPCRI, Regional Station, Vittal 27 th April, 2018
Dr. P. Chowdappa, Dr. Ravi Bhat, Dr. Vinayaka Hegde, Dr. K. Muralidharan, Heads of Divs., Dr. V. Krishnakumar, Dr. (Mrs.) Chandrika Mohan, Dr. (Mrs.) V. Niral, Dr. P. Subramanian, and Dr. Elain Apshara, Dr. Josephraj Kumar, Pr. Scientists, Dr. Merin Babu, Dr. Rajkumar, Scientists	Annual Group Meeting of AICRP on Palms	ICAR-IIOPR, Pedavegi 24 th - 27 th May, 2018
Dr. Ravi Bhat, Principal Scientist & Head, Div. of Crop Production	National dialogue on artificial intelligence and internet of things application in agriculture	ICAR-NAARM, Hyderabad 1 st - 2 nd June, 2018
Dr. Vinayaka Hegde, Head and Dr. A. Joseph Rajkumar, Dr. Bhanuprakash, Pr. Scientists	Awareness workshop on rugose spiralling whitefly	ICAR-CTRI, Rajmundhry 7 th May, 2018

Dr. V. Krishnakumar, Head, ICAR-CPCRI, RS, Kayamkulam	Annual Group Meeting of AICRP on Tuber Crops	ICAR-CTCRI, Thiruvananthapuram on 26 th April, 2018
Mr. Diwakar, Y. Scientist	National Conference on Conservation, Cultivation and Utilization of Medicinal and Aromatic Crops	College of Horticulture, Mudigere 25 th – 26 th April, 2018
Dr. Chandrika Mohan, Pr. Scientist	Annual Group Meeting of AICRP on Biological control of crop pests	Kerala Agricultural University, Thrissur 17 th -18 th May 2018
Dr. A. Joseph Rajkumar, Pr. Scientist	Technology Awareness Camp on Mechanization in Coconut Sector	Dr. Ambedkar Auditorium, Amalapuram, Andhra Pradesh on 6 th May, 2018
Dr. A. Joseph Rajkumar, Pr. Scientist	Demonstration Workshop on Arecanut Sprayers	ICAR-CPCRI, Regional Station, Vittal on 30 th May, 2018
Dr. Regi Jacob Thomas, Pr. Scientist	Programme Committee Meeting to finalize the list of sessions and speakers for the 'International Coconut Exposition 2018'	Kerala State Planning Board, Thiruvananthapuram 9 th May, 2018
Dr. S. Elain Apshara, Pr. Scientist	13 th Steering committee meeting on cocoa	DCCD, Kera Bhavan, Kochi 12 th June, 2018
Dr. S. Jaysekhar, Sr. Scientist	National workshop on 'International agricultural trade and free trade agreements'	Trivandrum 26 th – 27 th June, 2018



CELEBRATION

Environment Day celebration

Environment day was celebrated at ICAR-CPCRI on 6th June, 2018. Dr. P. Chowdappa, Director, ICAR-CPCRI, delivered a speech on the hazards caused by plastics, particularly single use plastics to the environment. Kokum and nutmeg seedlings were planted in the campus by the staff. An institute wide initiative was taken to make the campus a 'plastic free zone'. Different types of cloth bags were displayed by Dr. Anitha Karun, Head, Division of Crop Improvement and the staff were motivated to use cloth bags instead of plastic carry bags. Kits with plantlets of curry leaf, annual moringa, tomato saplings, annona and ginger grass from the KVK, ICAR-CPCRI, Kasaragod were distributed to the staff.

A seminar on 'Boost up coconut to beat out plastics' was held at



Dr. P. Chowdappa, Director, ICAR-CPCRI planting seedlings at Kasaragod



Dr. P. Chowdappa, Director, ICAR-CPCRI distributing seedlings at Kasaragod



Participants of World Environment Day programme at ICAR-CPCRI, RS, Kayamkulam

Kayamkulam on 20th June, 2018 with the aim of creating awareness among college students on the scope of utilizing coconut and its byproducts for replacing plastics. The seminar was conducted with the financial support of KSCSTE, Thiruvananthapuram. Thematic technical sessions on 'Safeguarding Ecology for Sustaining Mankind', 'Replacing plastics through coconut byproducts', 'Boon and bane of plasticulture' and 'Motivation through social intelligence' were handled by experts. Competitions were conducted for college students on project presentation, quiz and exhibition. In the valedictory function, Dr. T.P.D.

Rajan, Pr. Scientist, CSIR-NIIST, Thiruvananthapuram delivered a key note address on 'Reinforced composite materials in day to day life that are ecologically safe'. Dr. V. Krishnakumar, Head, ICAR-CPCRI, Kayamkulam inaugurated the programme and urged the students to be a part of the plastic free campaign and save the environment. The proceedings of the seminar on 'Boost-up Coconut to Beat out Plastics' and an E-manual on 'Countering plastic pollution through coconut' were released during the function.

An awareness talk on 'Conservation of environment through agriculture' conducted

by KVK, Alappuzha, highlighting the relevance of conserving natural resources through different agricultural practices and reduce-reuse-recycle the plastics was made by Dr. K. Sajnanath, SMS for the members of Agri club at Chathiyara VHSS, Thamarakulam as part of the world environment day celebration on 5th June, 2018. School Manager Smt. K.A. Rugmini Amma inaugurated the programme by planting a Jackfruit plant in the school campus. 'Organic vegetable garden' in the campus was initiated by sowing vegetable seedlings. In this programme vegetable seeds were distributed to the students.

International Yoga Day

International Day of Yoga was observed in ICAR-Central Plantation Crops Research Institute on 21st June, 2018 at its headquarters (Kasaragod), Regional Stations (Kayamkulam and Vittal) and Research Centers (Kidu, Mohitnagar and Kahikuchi). At Kasaragod, demonstration-cum-practice of Yoga was organized for the staff. Dr. Ravi Bhat, Director

i/c and Head (Crop Production) presided over the function. At Regional Station, Kayamkulam, a 'Mass Demonstration Programme' was organized. Sri K.N. Sajeev of the Regional Station functioned as the master demonstrator, wherein he executed the masterly art and imparted the yogic techniques among the participants. The programme organized at Regional

Station, Vittal training session was conducted by three official instructors from Sahaja Yoga, Vittal.

At ICAR-CPCRI Research Centre, Mohitnagar, a demonstration class on Yoga was organized for the staff members. International day of Yoga was also observed in the Research centres at Kidu and Kahikuchi.





Staff members at headquarters participating in the Yoga-performance



Staff members at Kayamkulam participating in the Yoga-performance



Staff members participating in the Yoga training programme at Vittal



Staff members participating in the Yoga Day celebrations at Mohitnagar



OTHER INFORMATION

Infrastructure development

A new sales counter and a green house structure for storing planting materials have been established in the farm of KVK, Alappuzha.



PERSONALIA

APPOINTMENTS

Name of the staff	Designation	Place	w.e.f.
Sri Praveen Raj P.R.	Skilled Support Staff	ICAR-CPCRI, Kasaragod	02-06-2018
Sri Sarath Kumar	Skilled Support Staff	ICAR-CPCRI, Kasaragod	07-06-2018
Sri Ashok Kumar R.	Skilled Support Staff	ICAR-CPCRI, Kasaragod	02-06-2018
Smt. Meenakshi K.	Skilled Support Staff	ICAR-CPCRI RC, Kidu	04-06-2018

TRANSFER

Name of the staff	From (Place)	To (Place)	w.e.f.
Mr. Arivalagan, Scientist	ICAR-CPCRI, Kasaragod	ICAR-IIHR, Bengaluru	30-06-2018
Mrs. Keerthana Umapathy, Scientist	ICAR-CPCRI, Kasaragod	ICAR-NRRI, Cuttack	30-06-2018

RETIREMENT

Name of the staff	Designation	Place	Date
Dr. K.S. Ananda	Principal Scientist & Head i/c	ICAR-CPCRI, RS, Vittal	30-04-2018
Sri Ramanna Gowda,	Sr. Tech. Asst. (Vehicles)	ICAR-CPCRI, RS, Vittal	30-06-2018



OBITUARY

Sri N.C. Das, Technical Officer (Field/ Farm), ICAR-CPCRI, RC, Kahikuchi breathed his last on 7th April, 2018. The Director and staff of ICAR-CPCRI pray the Almighty for the peace and tranquility to the departed soul.



Mera Gaon - Mera Gaurav

ICAR-CPCRI has adopted 70 villages in various states, viz. Kerala, Karnataka, West Bengal and Assam as part of Mera Gaon - Mera Gaurav (MGMG) programme. During April- June, 2018, training programmes, demonstration on improved practices, farm advisory visits, mobile advisory services were organized. A summary of activities undertaken for the overall development of the villages is given below.

Meetings were organized on various subjects like, health benefits of mushroom, jack fruit processing, cocoa production and processing, planting of seedlings

Activities	No. of farmers benefitted
Field visits/Gosthis	281
Facilitation of Technologies	336
Mobile advisories	510
Literature support	459
General Awareness	225
Linkages	1155

and maintenance of juvenile palms, pest surveillance, etc. mobile based advisory was given on the different topics.

In addition, facilitation for technology for making virgin coconut oil, technology for the management of red palm weevil and rhinoceros beetle in coconut, quality planting materials of coconut, cocoa and turmeric, mass multiplication of Trichoderma, and leaf rot management benefitting 336 farmers were also carried out. Literature support was also provided for 495 beneficiaries. Linkages with agencies, viz. Department of agriculture and Horticulture in different states, ATMA and grama panchayaths were also carried out during the period benefitting around 1190 farmers.



Launching of coconut seedling distribution of Amma Thengu mission under MGMG programme and honouring Smt. Mami Oomman, Community Nursery In-charge at Alappuzha



Trainees of Jackfruit processing with resource persons and finished products



Processing of raw materials



Participants of mushroom cultivation with the prepared mushroom beds



Session on mushroom cultivation



Hands-on training



Success Story

Bio-suppression of Rugose Spiralling Whitefly of Coconut

Rugose spiralling whitefly (RSW), *Aleurodicus rugioperculatus* Martin has recently emerged as an invasive pest on coconut palm, introduced from Florida, USA during 2016. In India, RSW was first reported from Pollachi, Tamil Nadu and Palakkad, Kerala. Within a period of eight months, *A. rugioperculatus* could rapidly spread across the Peninsular India triggering a sense of panic among coconut farmers. Feeding from the under surface of palm leaflets, RSW excretes a higher amount of honey dew which gets deposited on the upper surface of leaflets just beneath and/or under storey crops, attracting tremendous growth of black sooty moulds (*Leptoxhyphium* sp.) impairing photosynthetic efficiency of palms. Appearance of black coating on the palm leaflets is the characteristic symptom of pest

attack which is explicitly visible from a long distance, aiding in identification of pest damage.



RSW colony on infested palm leaf



Microscopic view of RSW

ICAR-CPCRI could identify natural parasitism of RSW by an aphelinid parasitoid, *Encarsia guadeloupe* Viggiani about three-four months after pest invasion. With an initial parasitism of 15%, the percentage parasitism rose as high as 85% in about seven to eight months. Leaflets containing the parasitized pupae of RSW are found ideal for augmentative biological control to distant places with new pest emergence.

Furthermore, ICAR-CPCRI has discovered a sooty mould-feeding Leiochrinid beetle (*Leiochrinus nilgiranus* Kaszab) and its immature stages from Kayamkulam, Kerala that could feed on the sooty mould deposits on palm leaflets during early hours before sunrise. These bio-scavengers are involved in the bio-cleansing process, making

palms revitalize from black sooty mould deposits improving the photosynthetic efficiency of palms.

ICAR-CPCRI advised farmers a pesticide free alternative, in synergy with conservatory biological control of the aphelinid parasitoid, *E. guadeloupa* and *in situ* habitat preservation of the Leiochrinid beetle, *L. nilgiranus* turned to be one of the classical conservatory approaches in bio-suppression and bio-scavenging programmes in coconut sector to tackle the pest. This natural suppression strategy advocated by ICAR-CPCRI could pay enormous dividends to the farming community.

Pesticide holiday at tandem with conservatory biological control using *E. guadeloupa* as well as bio-scavenging by Leiochrinid beetles, *L. nilgiranus* adopted, could reduce the pest incidence (*A. rugioperculatus*) to more than 90% and bio-cleansing of palms



Parasitized RSW pupa



Exit holes of emergent *E. guadeloupa*



Adult *E. guadeloupa*



Leaf bit containing *E. guadeloupa* parasitized RSW pupae used in augmentative biological control



Scavenging action by *L. nilgiranus*; (Inset) *L. nilgiranus* Adult tenebrionid beetle

to the tune of 95% in a period of six to eight months without using any insecticide in the system. Approximating 300 million coconut palms in the country were saved from spray of chemicals averaging

Rs 15/- per palm, a total of 4.5 billion Indian rupees were saved.

Joseph Rajkumar, Chandrika Mohan, and Prathibha P.S.



Introductory release of scavenger beetle in Assam



RSW infested palm



RSW-infestation recovered palm



एर कसम, एर कसम
किसानों का हमसफर
आज की नयी अग्रिमता यंत्रणा

AgriSearch with a human touch



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ICAR-Central Plantation Crops Research Institute, Kudlu P.O., Kasaragod, Kerala - 671 124

Phone: 04994 232893, 232894, 232895, 233090, 232333 (Director); Fax: 04994 232322

E-mail: chowdappa.p@icar.gov.in, cpcrinews@gmail.com

Website: www.cpcri.gov.in; Facebook: cpcrikasaragod.kerala

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