



# ICAR - IIHR NEWSLETTER

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## DIRECTOR'S DESK

### RECENT INITIATIVES ON PRECISION HORTICULTURE



India's horticulture crop production is estimated to be 350.87 million tonnes in the year 2022-23, mainly fruits and vegetables are the major contributors. About 30-40 % of cost of cultivation is spent for the inputs like fertilizer and protection chemicals in horticultural crop production. The water, the major input for irrigation is becoming scarce day by day. In order to decrease the cost of cultivation and increase the input efficiency to enhance the productivity, all the inputs are to be precisely managed through precision horticulture methods, which is an information-based management strategy that relies on collecting site-specific and plant-specific data and helps growers to make management decisions. Site specific data are collected through unmanned drone multispectral image capturing of land topography and used for land development and management. These multispectral images can also be used to estimate the soil nutrient, crop estimation and disease spread through image processing methods. Crop specific data of biotic and abiotic stress, canopy size, density, yield, and crop quality are used to manage the variable rate of application of water, fertilizers and protection chemicals. Site and Crop specific data are collected through various types of sensor, namely Optical, Electrochemical, mechanical, Dielectric, biological and

chemical sensors. These sensors are used to sense and collect information on temperature, moisture, fertility, pH, EC, nutrients etc. All the sensors available in the country are mostly imported, expensive and their sensitivity and durability are not satisfactory. Under these circumstances, there is an urgent need for developing indigenous sensors and standardized precision systems for horticulture.

In this direction, ICAR-IIHR has initiated a collaborative research programme with Navratna Defense PSU Bharat Electronics Limited (BEL), Bengaluru to promote innovation and research in the field of precision horticulture, with the exchange of Memorandum of Understanding (MoU) on June 9, 2023. A research programme of worth Rs. 2 crores were formulated with the following major theme areas in precision horticulture in which team of scientists from ICAR-IIHR and research engineers from BEL will be involved.

- Validation, standardization and development of sensors
- Evaluation, standardization and demonstration of precision horticulture systems
- Dash-boarding for Smart Horticulture: Integration of Automatic Weather Station and GIS based Soil Fertility Maps
- Integration of Agricultural sensor data and Domain expertise with BEL Equinox Platform
- Mobile App for Farmers and Officers
- Image Analytics (Drone and Satellite Images)



It is planned to demonstrate and evaluate the standardized sensors and precision horticulture systems in an open and polyhouse cultivation of selected horticultural crops at ICAR-IIHR.

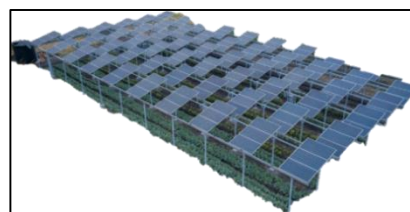
Centre for Development of Advanced Computing (C-DAC) is the premier R&D organization of the Ministry of Electronics and Information Technology (MeitY), Government of India for carrying out R&D in IT, Electronics and associated areas. C-DAC approached ICAR-IIHR to have collaborative research programmes. Discussions were held with the scientists of these two institutions on 12<sup>th</sup> June, 2023 at ICAR-IIHR, Bengaluru.

The following Researchable issues were identified for collaboration with C-DAC.

- Data analysis for long term breeding trials and germplasm
- Sensor / AI based Target sprayer for the tree canopy to avoid wastage of chemicals
- Seed quality upgradation and seed quality testing
- Automation of nutrient management in vertical system of cultivation
- AI based E- nose for quality determination fresh produce and processed products
- Forewarning of sucking insect pests and diseases using abiotic factors and crop phenology
- Sensor based soil fertility, irrigation and pesticide management
- Non-destructive determination of internal damages, quality in processed products
- Robotics, automation and autonomous machinery for sowing and harvesting
- Traceability in horticulture value chain using IoT and technology disseminated
- Data analytics of integrated agricultural resource information systems



All the precision horticulture systems require electric power for operation. Availability of continuous electricity in rural areas is still a problem in most part of our country. Use of solar power in agriculture operations is becoming popular mainly for running irrigation pump sets. A new emerging area *i.e.* Photovoltaics Agriculture (Agri PV) is being introduced by MNRE through German collaboration throughout the country. Agri PV is a system of growing selected and suitable crops under the Solar Photo Voltaic panels in the field while producing free electricity through solar power for running precision horticulture system. It is planned to study the system in terms its effectiveness in growing suitable horticultural crops in terms of panel's shade effect, plant growth, yield and other parameters.



It is anticipated that the outcomes of these initiatives in precision horticulture at this institute would greatly benefit farmers, enhance horticulture production through better and efficient management of inputs, saving electricity and contribute to the sustainable development by reducing the production cost and further increasing the farmer's income in future.

**Dr. Sanjay Kumar Singh**  
**Director**



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## 1. RESEARCH HIGHLIGHTS

### Identification of promising tamarind accessions

Based on *in situ* evaluation of twenty-eight sweet tamarind accessions collected from Bastar, Chhattisgarh, the sweetness index (total sugar/tartaric acid content) was found to range from 4.65 to 13.69. Three accessions B13, B19 and B21 with pulp recovery 40.04, 46.24 and 37.5% and sweetness index 11.86, 12.65 and 13.69 respectively were found to be superior and comparable to sweet tamarind from Thailand (pulp recovery 18-24%, sweetness index 13-19). Biochemical evaluation of ten elite accessions collected from Mizoram, Karnataka, Odisha, Chhattisgarh and Jharkhand, revealed wide variability for minerals and antioxidants.



B-13

B-19

B-21

Promising sweet tamarind accessions B13, B19 and B21 collected from Bastar, Chhattisgarh

### Velvet bean (*Mucuna pruriens* var. *utilis*) as a rotational crop in polyhouses reduces nematode population

Growing Velvet bean (*Mucuna pruriens* var. *utilis*) in polyhouses and incorporating its residues in soil was found to reduce the population of root knot nematode, *Meloidogyne* spp. in soil upto 61.9%. Hence, *Mucuna* was evaluated as a rotational crop in polyhouses and integrated with other management strategies for

tackling root knot nematodes in cucumber (cv. Chitra) under polyhouse conditions. The results revealed that pre-planting of *Mucuna*, application of bioagent (*Bacillus subtilis* IIHR Bs-2) enriched FYM @ 5t/ha before planting, Fluopyram @ 500 ml/acre at 15 DAS followed by soil drenching of bioagents at monthly intervals (5 ml/lit) recorded significantly lower nematode population in soil (- 83.35%) and gall index (- 84.91%) and higher yield (+ 25.05%) compared to control. Hence, velvet bean would be a promising component in integrated nematode management packages to suppress the initial population of nematodes for the succeeding susceptible crop like cucumber.



Growing velvet bean as a rotational crop in polyhouse reduces root knot nematodes in cucumber (cv. Chitra)

### Development of Biphasic spawn technology

ICAR-IIHR has successfully developed biphasic mother spawn and cultivation spawn production technology. Through this advancement, the production of mother spawn has soared from 5 bottles in the traditional grain spawn method to 100 bottles per tissue cultured petri dish. Similarly, the cultivation spawn production has experienced a substantial boost, raising from 4500 kg in the traditional grain spawn method to 90,000 kg per tissue cultured petri dish using the biphasic spawn production technology. This represents an outstanding increase of 1900%.



Mother spawn production



Cultivation spawn production

### Development of Calcium fortified elm oyster mushroom

ICAR-IIHR has achieved a successful development of a technology that boosts the calcium levels in elm oyster (*Hypsizygus ulmarius*) mushrooms. By subjecting fresh

mushrooms to vacuum impregnation at a pressure of 100 bar for 10 minutes, the resulting fortified mushrooms exhibited a calcium concentration of 1.01%, whereas the control mushrooms had a concentration of 0.38%. This represents a remarkable increase of 202.27% in calcium content compared to normal mushrooms.

#### **Development of Vitamin D enriched elm oyster mushroom**

ICAR-IIHR has successfully developed a technology to enhance the vitamin D levels in elm oyster (*Hypsizygus ulmarius*) mushrooms. An indigenous, low cost UVB exposure device was designed and fabricated specifically for vitamin D enrichment and commercially available UV pulse generator was also used in the studies. Fresh mushrooms, when subjected to 5 minutes of UVB light (100W), had a ergocalciferol content of 1.74 µg/g, in comparison to the control with a ergocalciferol content of 0.06 µg/g and consumption of 50-70 g of freshly exposed elm oyster mushrooms can provide 100% recommended daily allowance of vitamin D. Fresh mushrooms exposed to 5 second under UV pulse generator contained ergocalciferol content of 4.44 µg/g, in comparison to the control with 0.044 µg/g and consumption of 20-28 g of freshly exposed elm oyster mushrooms can provide 100% recommended daily allowance of vitamin D.



Low cost UVB exposure device

Commercially available UV pulse generator

#### **Propagation of *Draceana deremensis* and *Crossandra infundibuliformis* in Arka Vertical Farming Module**

In *Draceana deremensis*, the growbags were kept vertically in tiers which are about 6' long and 1' wide. Prior to planting of unrooted cuttings, the propagation substrate was irrigated thoroughly to supply the moisture required by the cutting to remain turgid once roots emerge. The unrooted cuttings were then directly planted on the soilless media in the growbags of the vertical structures. 98% rooting was observed in cuttings of *Draceana* placed in all vertical tiers in a period of 30 days. In *crossandra*, terminal cuttings of 10-15 cm length of released varieties viz., Arka

Chenna, Arka Amabara, Arka Kanaka, Arka Shreeya and Arka Shravya were planted in seedling pro trays filled with sterilized cocopeat with 50 cells. Three portrays (50 celled) could be accommodated in 1 vertical tier thereby propagating 150 cuttings in each growbag and a total of 1500 numbers of unrooted cuttings could be easily accommodated in 1 vertical structure for rooting. 99 % rooting could be observed in *crossandra* cuttings irrespective of the varieties kept in all vertical tiers in a period of 45 days.



#### **Evaluation of hydroponic and aeroponic based growing systems**

Various techniques of hydroponic production, aeroponic production systems and conventional soil-based cultivation method under protected conditions were evaluated for production of lettuce. Vertical NFT system showed a significantly higher growth rate and yield and performed better than the soil-based systems and evolved as the most water-efficient cultivation technique. Amongst the various aeroponic production systems evaluated, Economical aeroponic system showed a significantly higher growth rate and yield.



#### **Standardization of orientation of vertical farming system for quality flower production of Gerbera**

Vertical farming models with vertically stacked pots placed in different orientations were tested for commercial cultivation of Gerbera. Maximum plant height, no. of leaves per plant, petiole length, leaf length and leaf breadth was observed in Vertical system Facing East which was on par with Vertical system Facing West. Utilization of Vertically stacked pots for vertical farming has increased the utilization of unit area available in polyhouse to an extent of 5 folds.



### Screening for YVMV resistance

Four wild species namely *Abelmoschus enbeepeegeerenses*, *A. angulosus* var. *Grandiflorus*, *A. caillei* and *A. ficunious*, 81 Amphidiploids along with YVMV susceptible check 1685 were screened during summer 2023. Among them wild species *Abelmoschus enbeepeegeerenses* (Acc.No.IC-417446) showed susceptible YVMV. Rest of the wild species were resistant to YVMV. Among the amphidiploids, amphidiploids-76 showed highly susceptible to YVMV and rest of the lines were free from YVMV.



*Abelmoschus enbeepeegeerenses* (Acc No. IC-417446) Amphidiploids -76 ( YVMV susceptible)



### Shelf life of fresh cut fruits

Standardized protocols for enhancement of shelf life of fresh cut fruits (jackfruit, papaya, muskmelon and pineapple). The fresh cut fruits prepared through the optimized protocol possessed 11-13 days' shelf life at 8°C storage.

### Long-term conservation agriculture practices in mango orchard

A 35-year old Alphonso mango orchard on Alfisol was converted into conservation mango orchard by following the basic principle of conservation practices viz., i) Planting without seedbed preparation through the soil cover to minimize disturbance of soil, ii) A permanent vegetative soil cover or mulch to protect the soil surface, iii) Management of crop residues and control of weeds without application of hazardous herbicides, iv) Improving soil fertility and encourage soil structure formation and v) Adhering to Integrated Pest Management technologies.

### Soil organic carbon fractions

Upon completion of the 12 years of conservation agriculture practices, soil samples were analysed for soil carbon loss on ignition (LOI), oxidizable organic carbon (OC), active carbon (AC) and soil microbial biomass C (SMBC). The loss on ignition and organic carbon content were considerably higher in plots with

conservation agriculture practices as compared with plots following conventional practices. The CCVF had 7.56 and 4.25 g kg<sup>-1</sup> LOI and OC as against 15.98 and 11.23 g kg<sup>-1</sup>, respectively, in CHP with *mucuna* (Table 1). The mango orchards under clean cultivation and intensive management (CCIM) recorded lower values of LOI and OC. Intercrops and cover crops in mango orchard recorded higher LOI and OC than weed infested mango plots (12.36 and 6.79 g kg<sup>-1</sup>). Intensive cultivation resulted in lower LOI and OC than CHP and WCIM plots.



Conservation agriculture management practices in mango orchard - *Mucuna puriens* as cover crop

### Soilless production technology

Colour lettuce (Lollo Rosso and Red Oak), green lettuce (Batavia), butterhead lettuce, bok choy and celery were evaluated with four different levels of N, P and K nutrient solutions. Irrespective of lettuce types, supplying of 166 ppm of N-NO<sub>3</sub>, 33 ppm of P and 207 ppm of K recorded highest yield of 4.50 kg/m<sup>2</sup> and 18.0 t/acre. Among the lettuce types grown under soilless culture, green lettuce recorded significantly highest yield (5.82 kg/m<sup>2</sup> and 23.3 t/acre). Best nutrient scheduling found in lettuce under open-field conditions recorded better growth and yield in bok choy (6.19 kg/m<sup>2</sup> and 24.8 t/acre). However, in celery, supplying of 125 ppm of N-NO<sub>3</sub>, 25 ppm of P and 156 ppm of K recorded highest yield (2.23 kg/m<sup>2</sup> and 8.9 t/acre). With respect to substrates, lettuce, bok choy and celery grown on Arka Fermented Cocopeat recorded vigorous growth and highest yield compared to soil.



## 2. VTIC IDENTIFIED VARIETIES AND TECHNOLOGIES

### 1. Arka Nihira

Chilli F<sub>1</sub> hybrid suitable for dual thick segment with high fresh yield (35.98t/ha) and dry yield (10.91t/ha). Thick green to red fruits (Fruit length- 10.11cm and Fruit width- 1.70cm) with high dry recovery (30.37%). And highly attractive red color (118.2 ASTA value). It is medium pungent (36240 SHU) and Resistant to *Phytophthora* root rot (87.45 to 89.12%) as well as to chilli leaf curl virus (95.30%).

### 2. Arka Dhriti

Chilli F<sub>1</sub> hybrid suitable for dual medium segment, with high fresh yield (33.79t/ha) and dry yield (10.63t/ha). Medium green to red fruits (Fruit length- 7.57cm and Fruit width- 1.02cm) having high dry recovery (31.51%). Highly attractive red color (94.1 ASTA value). Medium pungent (84450.4 SHU) and resistant to *Phytophthora* root rot (90.58 to 93.91%) as well as to chilli leaf curl virus (95.79%).



Arka Nihira



Arka Dhriti

### 3. Arka Vertical Farming Module



The technology Arka Vertical Farming Module relates to increased planting density and thereby increased productivity in crops through utilisation of vertical space. Arka Vertical Farming Module comprises of A-shaped main frame with 11 vertically stacked support frames for vertically stacking HDPE 500micron black coloured grow bags-6'X1'X1' in 5 tiers on both sides and 1 top tier (5+5+1=11tiers) designed in a manner

for uniform harvest of natural light in all tiers for vertical farming of crops. There is effective utilization of 12' vertical space of the naturally ventilated polyhouse with an increase in planting density and yield of *Lilium* by 6 times. Complete protocol along with optimum nutrient, water and light weight soilless substrate was developed for vertical farming of *Lilium*. The Vertical farming module was cost effective with a B:C ratio of 2.18.

## NEW INITIATIVES

### 1. Integrated accreditation to the Food Safety Referral Laboratory

ICAR-IIHR has upgraded its accreditation status to FSSAI-NABL integrated accreditation for the period 15/02/2023 to 14/02/2025. It is the first laboratory in NARS system to have got this accreditation for chemical and biological testing of fruit and vegetable products.

### 2. Mushroom cropping structures

Fabricated and distributed 80 low cost cropping structures for mushroom growing under ICAR-IIHR SCSP and TSP funds



### 3. Multi location trials for Avocado varieties under AICRP Fruits:

A new crop Avocado has been included in the list of mandatory crops of AICRP on Fruits. During the X Group Discussion held in 28<sup>th</sup> Feb. – 3<sup>rd</sup> March 2023, a new MLT programme has been initiated to study



the performance of three Avocado varieties, viz., Arka Supreme, Arka Coorg Ravi and Thadiyankudisai-1 in ten locations of the country.

**4. Artificial Intelligence powered decision support system in banana for leaf spot disease:** In this programme, initiated in nine locations under AICRP on Fruits, it has been planned to record leaf spot disease development (including images) and real time weather parameters at different banana growth stages. It has been envisaged to develop precise advisory for timely management of leaf spot disease through AI.

### 3. NEWS & EVENTS

#### **Memorandum of Agreement with M/s Geeyes Organic Manures (OPC) Pvt. Limited, BESST-HORT, ICAR-IIHR and ICAR-KVK, Hirehalli**

A Memorandum of Agreement was signed on 9<sup>th</sup> January 2023 between M/s Geeyes Organic Manures (OPC) Pvt. Limited (an incubatee of BESST-HORT, IIHR) with KVK, Hirehalli for collaborative work in the field of Organic/Natural Farming at KVK farm.



#### **Entrepreneurship Training on Mushroom Spawn Production and Mushroom Cultivation**

An entrepreneurial training program on Mushroom spawn production and Mushroom cultivation was organized by Mushroom Lab, Division of Crop Protection from 04<sup>th</sup> to 06<sup>th</sup> January 2023 and 9<sup>th</sup> to 13<sup>th</sup> January 2023. A total of 40 people from the states of Karnataka, Andhra Pradesh, Telangana, Goa, Himachal Pradesh and Chhattisgarh attended the training. Advanced end to end hands on training on various aspects of Mushroom spawn production, Mushroom cultivation, Mushroom processing and value addition, Mechanization and energy management in mushroom farms, ancillary activities associated with mushroom

industry and utilization of mushroom technology as a social enterprise were imparted.



#### **Field day on “Arka Neelachal Gourav” high yielding Teasel Gourd variety in Puri, Odisha**

ICAR-IIHR-Central Horticultural Experiment Station, Bhubaneswar organized field day on “Arka Neelachal Gourav” high yielding Teasel Gourd variety” on 12-01-2023 at Parekana village, Satyabadi Block, in Puri District of Odisha. About more than 60 farmers gathered appreciated the heavy fruiting, low pest and disease incidence, high plant vigour, and excellent quality of the fruits. Interacting with the farmers, Sri Ramesh Chandra Swain expressed that Arka Neelachal Gourav had not only showed high resistance against diseases but there is regular heavy fruiting fetching as high as ₹120 per kg of fruits with a high market demand from the local traders and more and more farmers of the region need to take up this crop.



#### **CHES (ICAR-IIHR), Bhubaneswar beneficiary initiated mango export**

Sh. Subrat Dash, a CHES (ICAR-IIHR), Bhubaneswar beneficiary from Dhenkanal, Odisha became the first mango grower of the state to export mango to Dubai. The export was facilitated by APEDA. CHES, Bhubaneswar extended technical guidance on canopy management, nutrient and pest management and harvest technique in order to ensure quality fruit of Amrapali.

### **QRT Team Visited CHES (ICAR-IIHR), Chettalli on 17 January 2023**



QRT Team (2017-2022) visited the experimental fields, laboratories, nursery unit and other facilities of CHES, Chettalli on 17 January 2023 and interacted with progressive farmers and stakeholders. They expressed the benefits obtained from the varieties and technologies developed by the station. Members appreciated the efforts of CHES, Chettalli for planting material production and supply to the farmers.



### **Delegation of Agriculture Ministers and Officials from Uttar Pradesh visited ICAR-Indian Institute of Horticultural Research**

Shri Surya Pratap Shahi, Hon'ble Minister for Agriculture, Agriculture Education and Research, Government of Uttar Pradesh along with a delegation of State Ministers and higher officials visited ICAR-IIHR on 21 January 2023.

Dr Anand Kumar Singh, Hon'ble, Deputy Director General (Hort. Sci.), ICAR, New Delhi briefed the delegation about the scenario of horticulture production in the country, important technologies developed by various ICAR institutes of the Horticulture Division of Indian Council of Agricultural Research (ICAR) which are suitable for Uttar Pradesh and possible areas in which the ICAR institutes including ICAR-IIHR can play a major role in promoting horticulture production in Uttar Pradesh. Prof. Sanjay Kumar Singh, Director, ICAR-IIHR presented briefly about the technologies developed by ICAR-IIHR that have potential for demonstration, commercialization and promoting entrepreneurship.

The delegation also visited facilities of ICAR-IIHR such as BESST-HORT, Mushroom Lab, Centre of Excellence on Protected Cultivation and nursery. The delegation expressed satisfaction about the visit and appreciated the ICAR-IIHR technologies. They also urged to have immediate initiative to demonstrate and transfer ICAR-IIHR technologies in Uttar Pradesh.



### **Training on Sustainable Fruit-based Production System organized by CHES (ICAR-IIHR), Bhubaneswar**

CHES (ICAR-IIHR), Bhubaneswar organised a training programme about "Sustainable Fruit-based Production System", on 20 January, 2023 at Pathara, Nayagarh,



Odisha, with the aim to highlight the significance of crop diversification, intercropping, organic inputs, and apiculture in sustaining Fruit-based Production System, which was attended by 50 fruit growers of Nayagarh and Ganjam districts.



#### **Workshop on “IPR and Commercialization Issues in Horticulture” conducted on 07<sup>th</sup> February 2023**

A workshop was organised to sensitize scientists on different aspects of Intellectual Property Management and Commercialization and to have an interaction on various issues associated with the commercialization. The invited experts Dr. Yashwant Dev Panwar, Head IPR, TIFAC and Dr. Ashwini Siwal, Assistant Professor, Faculty of Law, University of Delhi joined the workshop online and delivered enlightening talks on “IPR and Technology Commercialization” and “Copyright and Technology Commercialization” respectively. Each session was followed by interactions with the experts. Dr. Vikram Singh, Senior Scientist, IP&TM Unit, ICAR Headquarters remarked that ICAR-IIHR contribution alone earmarks to 25% of the total technology commercialization done by all the ICAR institutes.



#### **Special Training on “Advances in Production Technology of Floriculture” for the officials of Government of Assam**

A special training programme was organized on “Advances in Production Technology of Floriculture” for 20 officials of Directorate of Horticulture, Department of Agriculture, Government of Assam during March 25-28, 2022, to impart the officials towards knowledge and skills on production technology of important floriculture crops of Assam such as gerbera, rose, anthurium, tuberose, marigold, Gladiolus, etc., in order to facilitate them in effectively implement the newly introduced ‘Floriculture Mission’ in the state Assam.



#### **CHES, ICAR-IIHR Bhubaneswar organized Skill Training Programme on “Commercial nursery raising of horticultural crops”**

Central Horticultural Experimental Station (CHES), ICAR-Indian Institute Horticultural Research (IIHR), Bhubaneswar organized one-day Skill Training programme on ‘Commercial nursery raising of horticultural crops’ for the farmers of Koraput and Nabarangpur district of Odisha on 24<sup>th</sup> March 2023 under DBT funded Biotech-Kisan project.



**Capacity building program on ICAR-IIHR technologies and MOU for Arka Tomato Crush organised for the farmers of Krishnagiri district on 10 April 2023 under SCSP, TSP and TNRP**

A training program, to create awareness on “ICAR-IIHR technologies” for the farmers of Krishnagiri district of Tamil Nadu was organised under SCSP, TSP and TNRP at Krishnagiri District Collectorate, Krishnagiri, Tamil Nadu on 10 April 2023. Memorandum of Understanding (MOU) was also signed between Yetram Farmer Producer Company limited, promoted by VaazhndhuKaattuvom Project, Krishnagiri, and ICAR-IIHR, Bengaluru. ICAR-IIHR developed products comprising micronutrients (Arka mango special) and biofertilizer (AMC) vegetable seed (Tomato) and Arka tomato crush were distributed to the all the identified beneficiaries. This programme was attended by 160 farmers and officials from KVK, Krishnagiri, Department of Horticulture and Plantation crops, Government of Tamil Nadu, Krishnagiri. The entire programme was coordinated by Dr R Senthil Kumar, Dr V Sankar, Division of Social Sciences and Training, and Dr S Bhuvaneshwari, Division of Post-Harvest Technology and Agricultural Engineering, ICAR-IIHR, Bengaluru.



**One-day interface meeting on “*Flourishing Together: Innovation and Industry*”**

One-day interface meeting among stakeholders of flower crops on “*Flourishing Together: Innovation and Industry*”, was organised on 12 April 2022 (hybrid mode), aimed to exchange ideas, share knowledge and to collaborate on research to enhance the visibility of floriculture at the national and global level. In the series of panel discussions, major issues related to floriculture

were deliberated including ‘Flowers for Domestic and Export Market’, ‘Seed and Planting Material’, ‘Production Technology’, ‘Aromatic, Therapeutic and Pharmaceutical Industry’, ‘Landscape and Environment’ and ‘Postharvest and Value Addition’. Performance of the rose variety Arka Savi was appreciated by the industry and expressed the need of similar varieties for cut flower sector to substitute import of varieties. The utility of tuberose variety ‘ArkaPrajwal’ for extracting aromatic oil was also discussed with the need for high oil content varieties along with high yield. Furthermore, advantage of the rose variety ‘ArkaParimala’ in therapy was highlighted and the possibility of involving health sector for future studies was realised. The program ended with the decision to take the points forward and take action in consultation with ICAR and multiple national organisations that can support Floriculture Industry.



**Off-campus SCSP capacity building program on “*ICAR-IIHR technologies*”**

Awareness training program on “ICAR-IIHR technologies” for the farmers of Chengalpattu district of Tamil Nadu was organised under SCSP at Thirukalukundram, Chengalpattu District, Tamil Nadu on 21.04.2023. ICAR-IIHR developed vegetable variety seeds such as ArkaBahar in Bottle gourd, ArkaGarima in vegetable cowpea, ArkaVistar in Dolichos bean and Arka Nikita in Bhendi were also distributed to the beneficiaries. This programme was attended by 50 farmers and officials from Department of Horticulture and Plantation crops, Government of Tamil Nadu, Chengalpattu.



## World Intellectual Property Day

To commemorate the World Intellectual Property Day, with the theme “*Women and IP: Accelerating Innovation and Creativity*”, the World IP Day celebration was organised on 26<sup>th</sup> April 2023. Dr Sudha Mysore, Former CEO Agrinnovate India Ltd. & Retired Principal Scientist, ICAR-IIHR as the resource person elaborated about World Intellectual Property Organization (WIPO), its significance, genesis, journey so far of IPR and trade mark policies in the developing world to the audience. She also stressed on the requirement for creating awareness among women scientists and entrepreneurs for bridging the gender inequality in IP by revealing the statistics and global scenario.



## ICAR-IIHR organised Off-Campus Capacity building program under SCSP and TSP

One day training program on “*ICAR-IIHR technologies*” for the farmers of Etah district of Uttar Pradesh was organised under SCSP 1 May 2023 and Leh, Union Territory of Ladak under TSP on 4 May 2023, to create awareness among the farmers about ICAR-IIHR technologies suitable for their region. Dr. R. Senthil Kumar, Nodal Officer (SCSP) explained about various technologies suitable for these regions and ICAR-IIHR developed vegetable seed (Tomato) and Arka tomato crush were distributed to the identified beneficiaries, which was attended by 90 farmers, officials from KVK, Awagarh and Leh.



## Celebration of World Bee Day and inauguration of Regional Honey Testing Laboratory

“World Bee Day” was celebrated on 20<sup>th</sup> May, 2023, to facilitate needed scientific technology adoption for increasing production and testing of honey by maintaining quality standards for national and international markets and promoting the production of other beehive products, viz., bee pollen, bees wax, royal jelly, propolis, and bee venom. The celebration included joining the Ministry of Agriculture and Farmers Welfare (MoA&FW), Government of India’s World Bee Day celebration at Raja Bhoj Agriculture College, Waraseoni, Balaghat, Madhya Pradesh, which was graced by Hon’ble Union Minister of Agriculture & Farmers Welfare Shri Narendra Singh Tomar, in the august presence of Agriculture Minister, Govt. of Madhya Pradesh, Chairman, OBC Welfare Commission, Govt. of Madhya Pradesh, Chairman, Dr.Prabhat Kumar, Horticulture Commissioner, GOI, Dr. Naveen Patel, Deputy Commissioner and other dignitaries.

A live demonstration was set up by Dr. P.V.R. Reddy, to showcase the apiculture fundamentals and commercial rearing of honey bees. The benefits of practicing apiculture production and its importance in terms of both financial and ecological aspects were discussed during an interactive session. The farmer visit to IIHR was co-ordinated by Mr. Jagadeesha, Subject Matter Specialist, KVK, Hirehalli and Dr. Abhishek Mandal, Scientist, FSRL. Farmers were also shown the significant achievements in honey production through short video film played in the auditorium of IIHR.

During this celebration, Shri Narendra Singh Tomar, Hon’ble Union minister of Agriculture & Farmers Welfare, GoI, inaugurated the Regional Honey Testing Laboratory, in virtual mode, which has been established under the National Beekeeping and Honey Mission by the Government of India as a part of the AtmaNirbhar Bharat package by the National Bee Board. It is one of the five world-class state-of-the-art laboratories set up all over India by National Bee Board and is now the only accredited laboratory in the southern part of India that

can test honey samples as per FSSAI's latest regulation. This facility envisions to be the facilitator for the South Indian beekeepers to increase their income, guaranteeing quality and increasing demand of honey and beehive products both in the domestic and international markets.



**Review Meeting of DUS test centre of Southern Zone**  
19<sup>th</sup> Review Meeting of DUS test centre of Southern Zone was conducted on 22<sup>nd</sup> & 23<sup>rd</sup> May, 2023 by ICAR-IIHR on collaboration with Protection of Plant Varieties and Farmer's Rights Authority.

#### **Training Programme of Tribal Farmers of Javvadu Hills, Tamil Nadu**

A training cum input distribution programme was conducted for the tribal farmers of Beemakulam and Naickanur villages of Javvadu Hills in Tirupattur district of Tamil Nadi, in association with Department of Horticulture and Plantation Crops, Tamil Nadu on 1.6.2023, to create awareness among the tribal farmers about advances in vegetable and fruits production technologies and to distribute vital inputs. More than 75 farmers, farm women and rural youth participated in the programme and benefitted.



#### **Celebration of "World Environment Day"**

World Environment Day was celebrated on 5<sup>th</sup> June 2023 with a tree planting programme in the Biodiversity

Block of ICAR-IIHR. Dr. S. K. Singh, Director, ICAR-IIHR graced the occasion and highlighted about the importance of celebrating the World Environment Day. He also urged that making all effort to free the earth from polythene is very important activity. Director and Scientists of the institute planted saplings of jamun, tamarind, lakshmanphal, Malayan apple, guava, mango and jack. Dr. P.C. Tripathi, Principal Scientist and Nodal Officer, PME Cell, ICAR-IIHR thanked all the scientist for their active participation and contributing for conserving the environment. The programme was coordinated Dr. Carolina



Rathinakumari, Dr. M.R. Rohini, Farm Management Committee, ICAR-IIHR, Bengaluru.

#### **Entrepreneurship training on "Mushroom spawn production and mushroom cultivation"**

An entrepreneurial training program was organized by Mushroom Lab, Division of Crop Protection, ICAR-IIHR, Bengaluru during 17<sup>th</sup> to 19<sup>th</sup> January 2023 and 22<sup>nd</sup> to 26<sup>th</sup> May 2023. A total of 36 participants including 9 women entrepreneurs, from the states of Karnataka, Andhra Pradesh, Telangana, Tamil Nadu, Kerala, Goa, Puducherry and Himachal Pradesh. Advance end to end Hands on training on various aspects of Mushroom spawn production, Mushroom cultivation, Mushroom processing and value addition, Mechanization and energy management in mushroom farms, ancillary activities associated with mushroom industry and utilization of mushroom technology as a social enterprise ere imparted to the participants.





### **ICAR-IIHR, Bengaluru organized an awareness programme on underutilized fruits**

One-day awareness programme on underutilized fruits was conducted on 6<sup>th</sup> June 2023 at ICAR-IIHR, Bengaluru. Dr. S. K. Singh, Director, ICAR-IIHR, during his inaugural address highlighted the nutritional importance of underutilized fruits and stressed the merit of underutilized fruits in our daily diet to improve health and quality life. He also urged the need for diversification of fruit crops by growing more underutilized crops. A publication on '*Guide on underutilized fruits*' was released during the programme, which was attended by 177 persons including 102 farmers from Karnataka, Tamil Nadu and Kerala. Inputs such as Arka Microbial Consortium (AMC) and Mucuna seeds were distributed to the farmers. The programme was organized by Dr P. C. Tripathi, Dr Anuradha Sane, Dr Kanupriya, Scientists, Division of Fruit Crops in collaboration with Dr R. Senthil Kumar and Dr V. Sankar under SCSP programme.



### **ICAR-IIHR Organized SCSP programme in Allipura Village of Chikkabapur District, Karnataka**

In collaboration with the Karnataka State Department of Horticulture, the ICAR-Indian Institute of Horticultural Research (IIHR) organized a one-day awareness programme on tuberose cultivation, tube rose bulb

(ArkaPrajwal) distribution, and the Arka Microbial Consortium at ALLIPURA, Gauribidanur Taluk, Chikkaballapura District on 14 June 2023. Dr. R. Senthil Kumar, Principal Scientist and Nodal Officer (SCSP), and Dr. Sumangala H.P., Principal Scientist and member of SCSP, explained about various ICAR-IIHR technologies suitable for tuberose cultivation during the technical session and briefed the farmers about the Mucuna and Arka microbial consortium. The chosen beneficiaries received bulbs of the ICAR-IIHR developed ArkaPrajwal tuberose bulbs, Arka Microbial Consortium, Arka Supreme (Avocado). The program was attended by 60 farmers and state department officials.

### **Jack & Fruit fest- 2023 in collaboration with JCI & Navateja, Puttur**



The Jack & Fruit fest was organized in joint collaboration with JCI and Navateja at JainaBhavana, Puttur during 17<sup>th</sup>-18<sup>th</sup> June, 2023. In the inaugural speech, Dr. S K. Singh, Director, ICAR-IIHR, Bengaluru opined that there is a need for farmers to identify and get their unique jackfruit variety register with PPVFRA, since lot of diversity is observed in western ghats which helps the farmer to get more revenue in the form of royalty and also helps in conservation and commercialization of local/desi type of Jackfruit. Dr. Prakash Patil highlighted that the farmers should not only concentrate on identifying unique types but they should also look it in business angle in collaboration with stakeholders for value addition and commercial nursery raising etc. The fest was attended by nearly 15,000 farmers, stakeholders and 50 outlets/ stalls were displayed with different

jackfruit products and IIHR displayed jackfruit varieties. Specially Siddu and Shankara jack flakes attracted consumers. The feast was organised and coordinated by Dr. G. Karunakaran, Principal Scientist, ICAR-IIHR, Bengaluru.

#### **Capacity building program organized at Botanical Garden, Puducherry UT under SCSP Project**



ICAR-IIHR, Bengaluru organised an off-campus capacity building training programme on “*Advances in ICAR-IIHR Technologies*” for the beneficiaries of SCSP Project at Botanical Garden, Puducherry UT on 30<sup>th</sup> June, 2023 to create awareness about recent ICAR-IIHR technologies and also ICAR-IIHR input distribution to the beneficiaries of SCSP project. Dr. V. Sankar and Dr. R. Senthil Kumar, Principal Scientists of ICAR-IIHR, Bengaluru explained about various ICAR-IIHR technologies in fruits, vegetables and flowers crops and interacted with farmers and cleared their doubts. At the end of technical session, ICAR-IIHR developed fruit plants (Mango, Guava, Avocado, Custard apple,) flower crops (Crossandra, tube rose and gladiolus) and cover crops mucuna seeds were distributed to all the SC beneficiaries of Puducherry state. The participants expressed their satisfaction about conduct of the training and opined that the programme was very much useful in updating their knowledge pertaining to advances in various vegetable, fruit and flower crops technologies developed by ICAR-IIHR which will be useful for their own state. About 90 beneficiaries attended this capacity building program along with 09 officials from Department of Agriculture and Farmers Welfare,

Puducherry, which was coordinated by Dr. V. Sankar and Dr. R. Senthil Kumar.

## **4. HUMAN RESOURCE DEVELOPMENT**

### **A. Training courses organized**

Winter School training programme on “Implications and Impact Assessment of Climate Change on Pests, Natural Enemies and Pollinators in Horticultural Ecosystems (7– 27<sup>th</sup> February, 2023) was conducted at ICAR-IIHR, Bengaluru.

A training program on “Pension and Retirement Benefits & NPS” by Dr. Sunil Kumar Das, Deputy Director (Finance) NIASM, Baramati was conducted at ICAR-IIHR, Bengaluru on 24<sup>th</sup> April 2023.

A training program was organised on “Reservation in Services” by Mr. I.B. Kumar, CAO, ICAR-CSWRI, Avikanagar, Rajasthan (18<sup>th</sup> - 23<sup>th</sup> May 2023) at ICAR-IIHR, Bengaluru.

Central Horticultural Experimental Station (CHES), ICAR- IIHR, The Regional Centre of ICAR-Central Tuber Crops Research Institute (CTCRI), and DBT-Institute of Life Science (ILS), Bhubaneswar jointly organized a five-day ‘Capacity building training programme on production and post-harvest technology in horticultural and tuber crops’ for the farmers of Koraput and Nabarangpur district of Odisha from 16.01.2023 to 20.01.2023 under DBT-Biotech-Kisan project. Technical sessions on various topics of horticultural crops as well as practical training in Techno Incubation Centre (TIC) of RC of ICAR-CTCRI, and Demonstration and training on improved agro-techniques, irrigation system, mixed cropping system, planting material production of root & tuber crops and horticultural crops were also organized for the participants.





### **Training on Sustainable Fruit-based Production System**

Training on “Sustainable Fruit-based Production System” was organized by the CHES (ICAR-IIHR), Bhubaneswar on 20<sup>th</sup> January, 2023 at Pathara, Nayagarh, Odisha. The program was organized with the aim to highlight the significance of crop diversification, intercropping, organic inputs, and apiary in sustaining Fruit-based Production System. The training was conducted at the model farm of a farmer (Sh. Suresh Hota) who has developed a demonstrable Fruit-based sustainable model under the technical guidance of CHES (ICAR-IIHR), Bhubaneswar and with the support of the Horticulture Department. State Horticulture officers, KVK scientists, apiculture expert, and more than 50 fruit growers of Nayagarh and Ganjam districts participated in the training program. The significance of crop diversification including high-value fruit crops like dragon fruit, scope of intercropping and integration of apiculture and organic component for sustainability in the production system was highlighted.



- Three-days training programme on “Tissue Culture Propagation of Banana Plant” from 26/6/23 to 28/6/23 was conducted at ICAR-Indian Institute of Horticultural Research (IIHR), Bangalore.
- Dr. Pushpa Chethankumar and Dr. K. Ranjitha organized one day training programme on ‘Application of food additives in fruits and vegetables processing’ on 16.6.2023 at ICAR-IIHR in collaboration with BESST-HORT
- Dr. Shamina Azeez, Dr M. Arivalagan, Dr Pritee Singh, Dr A.N. Lokesha conducted 2-days training Program on ‘Introductory Course on Basics of Food Analysis & Instrumentation’, sponsored by Business, Entrepreneurship and Start-up Support through Technology in Horticulture (BESST - HORT), organized at Division of Basic Sciences, ICAR-IIHR, 17-18 May 2023.
- Dr. Shamina Azeez delivered lecture on ‘Basics of Nutrition and Prevalence of Malnutrition’, in the online collaborative training program conducted by Division of Social Science & Training, ICAR-IIHR, Bengaluru, with MANAGE, Hyderabad, on ‘Strengthening Nutrition-Sensitive Agriculture Capacities of Mid-Senior Level Officers’, from 06-09 June, 2023.
- Dr T R Usharani conducted three-days training programme on” Tissue Culture Propagation of Banana Plant" from 26/6/23 to 28/6/23 at Division of Basic Sciences, ICAR-Indian Institute of Horticultural Research (IIHR), Bangalore. It was sponsored by Business, Entrepreneurship and Start-up Support through Technology in Horticulture (BESST -HORT).
- Dr. Ramya H R as a course coordinator conducted three days online collaborative training program on “Livelihood Opportunities in Horticulture: Promoting Women Hortipreneurs” from 23<sup>rd</sup> to 25<sup>th</sup> of January, 2023.
- Dr. Ramya H R as a course coordinator organized training programme on “Scientific management practices for fruit crop based production systems” for the farmers and Programme Implementation Agencies (PIA’s) of NABARD TDF Projects of Karnataka state on 7<sup>th</sup> to 9<sup>th</sup> March 2023.
- Dr. Ramya H R as a course coordinator conducted four days online collaborative Training Program on “Strengthening Nutrition-sensitive Agriculture Capacities of Mid-Senior Level Officers” from 06-09 June, 2023.
- Dr. D. Kalaivanan organized training cum demonstration of Arka Sasya Poshak Ras for soilless cultivation/terrace/root top gardening at KVK, Hirehalli, Tumkur on 20<sup>th</sup> January 2023.
- Dr. D. Kalaivanan organized training programme on ‘Soil health management and organic vegetable cultivation’ at Thekkady on 10<sup>th</sup> February 2023 under TSP programme in collaboration with Periyar Tiger Reserve, Kerala Forests and KVK, Shanthanpara, Idukki
- Dr. D. Kalaivanan organized training programme on ‘Cocoponics/Soilless Cultivation of Vegetables and Medicinal Herbs in Terrace or Root top’ on 28<sup>th</sup> April

2023 at ICAR-IIHR, Bengaluru with BESST-HORT collaboration.

- Dr. D. Kalaivanan, as convener organized on campus workshop on 'Hi-tech farming techniques' during National Horticulture Fair 2023, from 22<sup>nd</sup> to 25<sup>th</sup> February 2023 at ICAR-IIHR, Bengaluru.
- Dr. D. Kalaivanan co-ordinated the training program for the students of Sampoorana College of Agriculture, Mandya, Karnataka from 13<sup>th</sup> to 19<sup>th</sup> February 2023.
- Dr. D. Kalaivanan, as course coordinator organized 'Hands on training on fruit propagation techniques and establishment of fruit nursery' during 27<sup>th</sup> to 29<sup>th</sup> March 2023 and served as resource person by delivering a lecture on 'Integrated nutrient management in fruit crops nursery'.
- Dr. Shilpa Shree, K.G. assisted as co-convenor in on campus workshop on 'Hi-tech farming techniques' organized during National Horticulture Fair 2023, from 22<sup>nd</sup> to 25<sup>th</sup> February 2023 at ICAR-IIHR, Bengaluru.
- Dr Safeena, Dr Aswath and Dr Hebbar organized four Days Workshop on Hi-tech Farming Techniques jointly by ICAR-IIHR, Bengaluru, Society for Promotion of Horticulture and Centre of Excellence – Protected Cultivation during National Horticulture Fair-2023 from 22<sup>nd</sup> -25<sup>th</sup> February 2023.
- Dr. G.R. Smitha (Course Director) and Dr. Rohini M.R (Course Co-Director) organized a training program on "Value Addition of Medicinal and Aromatic Plants for Health Security and Entrepreneurial Opportunity" on 14<sup>th</sup> February, 2023 at ICAR-IIHR, Bengaluru in collaboration with BESST-HORT. More than 30 participants attended and benefitted from the programme
- Dr. G.R. Smitha organized a training programme on "Value addition and waste utilization of flowers" through SCSP program on 3<sup>rd</sup> March, 2023 to SC farmers from HD Kote
- Dr. Safeena S.A. coordinated the three months Internship Training Programme to students of final year BSc. (Hons.) Agriculture, Sampoorana International Institute of Agriculture Science & Horticulture Technology, Mandya, Karnataka from 27<sup>th</sup> February – 3<sup>rd</sup> March 2023.
- Dr. T. Usha Bharathi conducted training programme on "Value addition and waste utilization of Flowers"

through Society for Promotion of Horticulture to ST farmers under TSP program on 3<sup>d</sup> March. 2023

- EDP on "IIHR Technologies to promote Women Entrepreneurship and empowerment" two days training program conducted at Agri business Incubation centre ICAR-IIHR , Bengaluru on 27-28th June 2023

## **B. Specialized trainings attended**

- Dr. D. Kalaivanan attended the webinar on Advances and Applications of ICP-MS for Food and Environmental Analysis held on 5<sup>th</sup> April 2023 and organized by Select Science Ltd, Science House, Church Farm Business Park, Corston, Bath, BA2 9AP, UK.
- Dr. D. Kalaivanan attended the stakeholder meeting of floriculture "Flourishing Together: Innovation and Industry Interface" on 12<sup>th</sup> April, 2023 at ICAR-IIHR, Bengaluru
- Dr. S. Bhuvaneswari, Principal Scientist, Division of PHT&AE attended CAFT training on "Artificial Intelligence and Advances in ICAR for Smart Agriculture and Food Processing" from 23<sup>rd</sup> February to 4<sup>th</sup> March 2023 conducted by and held at ICAR-CIAE, Bhopal
- Dr. K. Bhanuprakash, Principal Scientist, Division of Basic Sciences attended the training on "Application of Bioinformatics in Accelerating Agricultural Research" at NAARM, Hyderabad during 13<sup>th</sup> to 17<sup>th</sup> February 2023
- Dr. S. Bhuvaneswari, Principal Scientist, Division of PHT and Agricultural Engineering attended the training on "Artificial Intelligence and Advances in ICAR for Smart Agriculture and Food Processing" at ICAR-Central Institute of Agricultural Engineering, Bhopal, during 23<sup>rd</sup> February to 4<sup>th</sup> March, 2023
- Dr. M. D. Prathibha, Scientist, Division of basic Sciences has attended training on "Metabolomics in Action: A Hands - On Workshop for Experimental Designs and Analysis" at Centre for Cellular and Molecular Platforms (C-CAMP), Bangalore during 18<sup>th</sup> to 20<sup>th</sup> April, 2023
- Dr. T. R. Usharani, Senior Scientist, Division of Basic Sciences attended Hands-on training program on CRISPR/Cas9-base Gene Editing Technologies in Plants at ICRISAT, Patancheru, Hyderabad during 12<sup>th</sup> to 16<sup>th</sup> June, 2023.
- Sri. C. Sridhar, Technical Assistant, Division of Vegetable Crops attended the training on "Training



on Principles and Production Techniques of Hybrid Seeds in Vegetables” at ICAR-Indian Institute of Vegetable Research, Varanasi during 15<sup>th</sup> to 30<sup>th</sup> January, 2023

- Sri. H.S. Suresh, Senior Technician, Division of Vegetable Crops attended the training on “Principles and Production Techniques of Hybrid Seeds in Vegetables” at ICAR-Indian Institute of Vegetable Research, Varanasi during 15<sup>th</sup> to 30<sup>th</sup> January, 2023
- Sri T. Viswanathan, Administrative officer, attended the Training on “Government e-Market (Gem – 02) at ISTM, New Delhi during 16<sup>th</sup> and 17<sup>th</sup> January 2023.
- Sri V. Raghuraman, Senior Administrative officer attended the Training on “Government e-Market (Gem – 02)” at ISTM, New Delhi during 16<sup>th</sup> to 17<sup>th</sup> January 2023.
- Dr. C. Chandrashekara attended 2-day training-cum-Workshop on Mushroom Taxonomy on 22- 23 March 2023.
- Four Days Workshop on Hi-tech Farming Techniques was jointly organized by ICAR-IIHR, Bengaluru, Society for Promotion of Horticulture and Centre of Excellence – Protected Cultivation during National Horticulture Fair-2023 from 22<sup>nd</sup>-25<sup>th</sup> February 2023.
- Dr Ramya H R attended specialized Training Programme on “Multivariate Data Analysis” from 20-27 March, 2023 organized by ICAR-NAARM, Hyderabad

### C. Any other

- Dr. M.R. Rohini presented the research proposal titled "Collection, conservation, characterization and documenting traditional knowledge of land races of Betel vrne (*Piper betel* L) from Karnataka" before the Technical Expert Committee meeting on 20th February, 2023 at Karnataka Biodiversity Board, Malleshwaram.
- Dr G.R.Smitha gave a guest lecture on “Utilization of waste flowers to agarbathi and other products” in celebration of “World Intellectual Property Day” on 26-04-2023 from ICAR-CIARI, Port Blair.
- Dr. Safeena S.A. was nominated to attend the interaction meeting with officials from Centre for Development of Advanced Computing (C-DAC), R&D organization of the Ministry of Electronics and Information Technology (MeitY) to discuss on collaboration with IIHR to apply their knowledge in Horticulture on 12<sup>th</sup> June 2023, ICAR-IIHR, Bengaluru

- Dr. Rohini M.R and Dr. Safeena.S.A were nominated to Visit Central Research Institute of Yoga and Naturopathy (*CRIYN*) for meeting with Dr Raghavendra Rao. M ,Director, Central Council for Research in Yoga & Naturopathy(Ministry of AYUSH, Govt. of India) for Consultancy on Landscaping for developing the landscape and medicinal plants garden in CRIYN Campus in nagamangala on 24<sup>th</sup> May 2023
- Dr. Safeena S.A attended the meeting for Exchange of Memorandum of Understanding (MoU) between ICAR-IIHR and Navratna Defence PSU Bharat Electronics Limited (BEL) on June 9, 2023, at ICAR-IIHR, Bengaluru, to promote innovation and research in the field of Smart Agriculture followed by presentation of BEL projects to foster the design, development and standardisation of sensor-based systems for precision horticulture.
- Dr. Safeena S.A. was nominated to attend the meeting with Dr Nisha Rakesh, Senior Advisor (Research Strategy), Western Sydney University, Australia and Team to discuss and finalize the work plan and explore potential future research initiatives on 30<sup>th</sup> June, 2023
- Dr G. R. Smitha served as resource person and gave hands on training on “Waste utilization of flower crops in Entrepreneurship Development Programme on 27th and 28th of June 2023 Organized by BPD Unit of ICAR-IIHR, Bengaluru.
- Dr G. R. Smitha delivered a guest lecture on "Value Addition in Flower crops for Entrepreneurial Opportunities" on 07.06.2023 (Wednesday) from 10:00-11:00am organized by PAMETI PAU Campus, Ludhiana (Punjab) and MANAGE, Hyderabad
- Dr. Rupa, delivered a talk on Integrated nutrient and water management techniques in fruit, vegetable, flower crops and Role of micronutrients and their management in horticultural crops on 10.2.2023 in the Special Training Programme on “Improved Horticulture Technologies” for the farmers of Bihar during 6-10 February, 2023.
- Dr. Rupa, delivered a talk on Role of biofertilizers in cashew on 15<sup>th</sup> February, 2023 through online mode in the ICAR Sponsored Short Course Training on “Improved Crop Production Technologies in Cashew with major emphasis on Integrated Pest

Management” during 13-20 February, 2023 held at ICAR-DCR, Puttur, Karnataka

- Dr. Rupa, served as an External Examiner to conduct the Viva-Voce of Comprehensive Examination for the II year Ph.D students (11 Members) of the Department of Soil Science & Agricultural Chemistry, TNAU, Coimbatore, ADAC & RI, Trichirapalli and AC & RI, Madurai at TNAU, Coimbatore during 27-29 June, 2023.
- Dr. Kalaivanan, D presented oral paper (through online) on ‘Soilless French Bean Cultivation: A Way to Sustain Next Generation Farming in Urban and Peri-Urban Spaces’ in the International Seminar on 'Urban & Peri Urban Agriculture: Good Practices & Innovation held from 14 to 15th March 2023 at MANAGE, Hyderabad
- Dr. Kalaivanan, D delivered lecture on ‘Soil health and nutrient management for horticultural crops’ to the farmers from Villupuram district of Tamil Nadu at ICAR-IIHR on 31<sup>st</sup> January 2023.
- Dr. Kalaivanan, D delivered lecture on ‘Soilless Cultivation’ on 14<sup>th</sup> February 2023 in Entrepreneurship Orientation Program on Medicinal and Aromatic Plants-VI (EOPMAP-VI)” held from 1-21st February, 2023 (21-days) at ICAR-DMAPR, Anand, Gujarat
- Dr. Kalaivanan, D delivered lecture on ‘Sustainable Soil Health Management in Horticulture Systems’ at Christ University, Bengaluru during the programme organized to commemorate KisanDiwas on 4<sup>th</sup> March, 2023.
- Dr. Kalaivanan, D delivered a lecture on ‘Nutrient Management in Fruit Crops Nursery’ on 28<sup>th</sup> March, 2023 in the training programme organized by ABI of ICAR-IIHR, Bengaluru.
- Dr. Kalaivanan, D delivered a guest lecture on ‘Next Generation Farming: Soilless Culture System’ in the ICAR-NAHEDP sponsored training programme conducted at Horticultural College & Research Institute (HC & RI), TNAU, Trichy on 22<sup>nd</sup> June, 2023. Totally 68 participants were attended in the training programme
- Dr. Kalaivanan, D delivered invited lecture on 'Vegetable Cultivation in Cocoponics' in training programme on " Cocoponics /Soilless culture - A new method of growing vegetables and medicinal herbs in terrace/ roof top" held at ICAR-IIHR and organized by BESST-HORT on 28<sup>th</sup> April, 2023

- Dr. Kalaivanan, D delivered lecture on ‘Roof top Gardening’ at Coimbatore, Tamil Nadu in collaboration with TANCOIR, Government of Tamil Nadu on 28<sup>th</sup> February, 2023.
- Dr. Kalaivanan, D delivered lecture on ‘Soilless Terrace Gardening’ at Trichy, Tamil Nadu in collaboration with TANCOIR, Government of Tamil Nadu on 12<sup>th</sup> March, 2023.
- Dr. Kalaivanan, D delivered lecture on soilless cultivation and terrace gardening in Hi-tech farming training during NHF 2023 held from 22<sup>nd</sup> to 25<sup>th</sup> February 2023 at ICAR-IIHR, Bengaluru.
- Dr. Shilpa Shree, K.G delivered lecture on “Growing media/substrates used in hydroponics and vertical farming” in on campus workshop on ‘Hi-tech farming techniques’ organized during National Horticulture Fair 2023, from 22<sup>nd</sup> to 25<sup>th</sup> February 2023 at ICAR-IIHR, Bengaluru.
- Dr. Shilpa Shree, K.G delivered lecture on “Nutrient deficiency symptoms and their correction measures” in on campus workshop on ‘Hi-tech farming techniques’ organized during National Horticulture Fair 2023, from 22<sup>nd</sup> to 25<sup>th</sup> February 2023 at ICAR-IIHR, Bengaluru.

## 5. POST GRADUATE & EDUCATION

- **New Admissions:** Fifteen (15 nos.) new students have been admitted for the 65<sup>th</sup> Academic Session at IARI PG Outreach Campus of IIHR, Bengaluru (Fruit Science -5 nos., Vegetable Science- 4 nos., Floriculture and Landscape Architecture – 4nos. and Post Harvest Management- 2 nos.). Students reported to the Institute physically in the month of February, 2023.
- **New Faculty/ Guides recognized:** Following five (5 Nos.) recognized IARI PG Faculty and Research Guides were transferred to ICAR-IIHR, Bengaluru.

Dr. Sanjay Kumar Singh (Fruit Science), Director & *Ex-Officio* Professor

Dr. Anjani Kumar Jha (Fruit Science), Pr. Scientist, Division of Fruit Crops

Dr. Abishek Mandal (Agricultural Chemicals), Scientist, Division of Basic Sciences

Dr. Bhagyashree S.N (Entomology), Scientist, Division of Crop Protection

Dr. Chandrasekhara (Ag. Biotechnology) Scientist, Division of Basic Sciences



- **Degrees Awarded:** Twelve (12 Nos.) Ph.D. students (Fruits Science - 4 nos.; Vegetable Science- 2 nos.; Floriculture & Landscape Architecture – 3 nos. and Post Harvest Management- 3 nos.) received their Degree during 61<sup>st</sup> Convocation of IARI, New Delhi on 24<sup>th</sup> February 2023.



- **Awards/ Honours:** Dr. G.S. Randhawa Best Thesis Award by Society for Promotion of Horticulture (SPH), ICAR-IIHR Bengaluru was awarded to Dr. Nusrat Perveen (Fruit Science), Dr. Pradeep Kumar Vishwakarma (Fruit Science), Dr. Siddharood Margal (Vegetable Science), Dr. Manisha (Vegetable Science), Dr. Parvathi Bennurmah (Floriculture & Landscape Architecture), Dr. Anamika Gurung (Floriculture & Landscape Architecture ) and Dr. Manpreet Kaur (Vegetable Science).



- **New Memorandum of Understanding (MoU) signed:** The Institute signed MoU on Students' Research Guidance, Collaborative Teaching and Allied academic activities with Odisha University of Agriculture & Technology, Bhubaneshwar, Odisha (27<sup>th</sup>

February, 2023) and Acharya Narendra Deva University of Agriculture & Technology, Kumarganj, Ayodhya, Uttar Pradesh (17<sup>th</sup> March, 2023)



- **Courses offered:** During I<sup>st</sup> Semester, twenty two (22 nos.) courses were offered to students in different disciplines while students have registered foreighteen (18 nos.) courses in II<sup>nd</sup> Semester.
- **30<sup>th</sup> Board of Studies (BOS)** was held on 18<sup>th</sup> May, 2023 for allocation of Research Guides to 1<sup>st</sup> year Ph.D. students and identification of Course leaders for the II Semester. Being the lead centre for Bengaluru Academic Hub of IARI Mega University, IIHR Bengaluru has screened the applications received from Scientists of the collaborative Institutes viz. ICAR-IIHR (Faculty-12 nos. and Research Guide -28 nos.) ICAR-CPCRI, Kasargod (Faculty- 45 nos. and Research Guide - 42 nos.); ICAR-CTCRI, Thiruvananthapuram (Faculty-24 nos. and Research Guide-13 nos.) and ICAR-NBAIR, Bengaluru (Faculty- 24 nos. and Research Guide- 26 nos.). Recommendations have been forwarded to IARI for further needful.
- **PG Education Study tour**

The PG students of the IARI outreach campus ICAR-IIHR visited Kerala during 2<sup>nd</sup> to 7<sup>th</sup> January 2023. They have visited various ICAR institutes namely ICAR-IISR, Calicut; ICAR-CTCRI, Thiruvananthapuram, and State Agricultural Universities as well as their Research stations.

## 6. TRANSFER OF TECHNOLOGY

### A. Training Programs Organized

#### On-Campus Trainings

#### ICAR-IIHR, Bengaluru

Particulars	Date	No of participants
Dr P. C. Tripathi, Dr Anuradha Sane, Dr Kanupriya, Dr R. Senthil Kumar and Dr V. Sankar organized One-day awareness programme on underutilized fruits under SCSP project.	06.06.2023	177
Dr.V.Sankar organized special training program on ICAR-IIHR technologies for Thuriayur block of Trichy District of Tamil Nadu Under National Horticulture Mission (NHM)	14.02.2023 to 16.02.2013	25
Dr.V.Sankar and Dr.R.Senthil kumar organized special training program on ICAR-IIHR technologies for KVK officials of ATARI Zone XI, Bengaluru	21.06.2023	50
Dr.V.Sankar and Dr.R.Senthil kumar organized farmers scientists interaction meetings at Kavaratti and Agatti Island in collaboration with KVK Kavaratti, Lakshadweep UT.	03.02.2023 to 07.02.2013	70
Dr.V.Sankar organized one day exposure cum training program on Protected Cultivation of Vegetables and Cut Flowers for Ellapuram block of Thiruvallur District of Tamil Nadu Under SSEPERS – ATMA	21.06.2023	20
Dr.V.Sankar organized one day exposure cum training program on Protected Cultivation of Vegetables and Cut Flowers for Pudur block of Thoothukudi District of Tamil Nadu Under SSEPERS – ATMA	06.06.2023	20
Dr. R Senthil Kumar organized training on Avocado cultivation at Ramnagara district	13.01.2023	02
Dr R Senthil Kumar organized on campus training program on ICAR-IIHR technologies for the farmers of Namakal Dist Tamil Nadu at ICAR-IIHR, Bengaluru.	05.04.2023	220
Dr. R Senthil Kumar organized on campus training program on ICAR-IIHR technologies for farmers of Villipuram Dist. Tamil Nadu at ICAR-IIHR, Bengaluru.	06.04.2023	34
Dr. R Senthil Kumar organized on campus training program on ICAR-IIHR technologies on farmers of Tumkuru and Doddaballapura District at ICAR-IIHR.	21.04.2023	100
Dr. R Senthil Kumar organized a on campus training program on fruits and vegetables training for the farmers of Mandapam block of Ramnad District, Tamil Nadu	09.05.2023	25
Dr. R Senthil Kumar organized One day training programme on ICAR-IIHR Under- Utilized fruits on under SCSP programme on Five districts of Tamil Nadu and Karnataka	06.06.2023	220



Dr. R Senthil Kumar organized on campus training programme on ICAR-IIHR technologies at the Krishnagiri District and Namakal	12.06.2023	50
Dr. R Senthil Kumar organized one day Capacity building training program on ICAR-IIHR technologies farmers from ICAR-IIHR	21.06.2023	170
Dr. R Senthil Kumar organized on campus training program on ICAR-IIHR technologies framers from , Tamil Nadu Ariyaluru District at ICAR-IIHR	19.06.2023	25
Dr.C.Vasugi, PS, DFC, acted as resource personnel for the student ready RHWE program of SIASHT, Mandya at ICAR-IIHR	03.04.2023	
Dr. C. Chandrashekara organised Three days Entrepreneurship training on Mushroom spawn production	04.01.2023 to 06.01.2023	13
Dr. C. Chandrashekara organised Five days Entrepreneurship training on Mushroom Cultivation	08.01.2023 to 13.01.2023	27
Dr. C. Chandrashekara organised One day Capacity building program on mushroom cultivation and value addition	10.02.2023	15
Dr. C. Chandrashekara organised One day Capacity building program on mushroom cultivation and value addition	13.02.2023	20
Dr. C. Chandrashekara organised One day Capacity building program on mushroom cultivation and value addition	10.03.2023	15
Dr. C. Chandrashekara organised One day Capacity building program on mushroom cultivation and value addition	14.03.2023	15
Dr. C. Chandrashekara organised Three days Entrepreneurship training on Mushroom spawn production	17.05.2023 to 19.05.2023	14
Dr. C. Chandrashekara organised Five days Entrepreneurship training on Mushroom Cultivation	22.05.2023 to 26.05.2023	16
IIHR Technologies to promote Women Entrepreneurship and empowerment	27.06.2023 to 28.06.2023	05
Training on Secrets of vertical gardening	12.01 2023	31
Training on Value Addition of Medicinal and Aromatic Plants for Health Security and Entrepreneurial Opportunity	14.02. 2023	35
One Day Capacity Building program on –ICAR-IIHR technologies	21.06. 2023	320
Four Days Workshop on Hi tech Farming Techniques	22.02.2023 to 26.02.2013	101
Training programme on New horticultural technologies for farmers and officials from two Krishi Bhavans from Malappuram District Kerala	15.06. 2023	45
Internship Training Programme to students of Sampoorana International Institute of Agriculture Science & Horticulture Technology, Mandya, Karnataka	09.01.2023 to 10.04.2013	13
ICAR - IIHR Technologies to promote Women Entrepreneurship and empowerment"	27.06.2023 to 28.06.2013	05
Training on "Cocoponics /Soilless culture - A new method of growing vegetables and medicinal herbs in terrace/ roof top"	28.04.2023	68

<b>World Intellectual Property Day</b> with the theme “Women and IP: Accelerating Innovation and Creativity”	26.04.2023	ICAR-IIHR staff and students
Horticultural Based Industrial Training organized to 10 final year B.Sc. (Hort.) students of College of Horticulture Munirabad, Koppal at CHES-Chettali	14.04.2023 to 01.05.2023	10

### Off-Campus Trainings

Particulars	Date	No of participants
Dr V Sankar and Dr R. Senthil Kumar organised an off-campus capacity building training programme on “ <i>Advances in ICAR-IIHR Technologies</i> ” for the beneficiaries of SCSP Project at Botanical Garden, Puducherry UT on 30 <sup>th</sup> June, 2023	30.06.2023	90
Dr V Sankar and Dr R. Senthil Kumar organised an off-campus Awareness training program on “ICAR-IIHR technologies” for the farmers of Chengalpattu district of Tamil Nadu was organised under SCSP at Thirukalukundram, Chengalpattu District, Tamil Nadu	21.04.2023	50
Dr R Senthil Kumar, Dr V Sankar and Dr S Bhuvaneswari organized training program, to create awareness on “ICAR-IIHR technologies” for the farmers of Krishnagiri district of Tamil Nadu was organised under SCSP, TSP and TNRP at Krishnagiri District Collectorate, Krishnagiri, Tamil Nadu on 10th April 2023.	10.04.2023	160
Dr. R. Venkattakumar, Dr. V. Sankar and Dr. R. Senthil Kumar organised capacity building program for tribals farmers of Beemakulam and Naickanur villages of Javvadu Hills in Tirupattur district of Tamil Nadu.	01.06.2023	105
Dr V Sankar and Dr R. Senthil Kumar organised an off-campus Awareness training program on “ICAR-IIHR technologies” for the farmers of Mizoram state held at KVK, Aizwal, Mizoram.	03.02.2023	85
Dr V Sankar and Dr R. Senthil Kumar organised scientist-farmer interaction meeting and capacity building programme for SC farmers on ICAR-IIHR technologies held at Udumalpet, Tirupur district of Tamil Nadu.	25.05.2023	40
Dr. Senthil Kumar organized training on ICAR-IIHR technologies in fruit crops at Bekka village, Hassan	20.01.2023	50
Dr. R Senthil Kumar organized an off campus training program on ICAR-IIHR technologies on Tomato free enter post-harvest technologies at Krishnagiri Dist, Tamil Nadu	10.04.2023	110
Dr. R Senthil Kumar organized a capacity building on IIHR technologies for the Avagarh, Etah District, Uttar Pradesh	01.05.2023	60
Dr. R Senthil Kumar organized an off campus training program on ICAR-IIHR technologies on Chengalpattu Tamil Nadu at ICAR-IIHR, Bengaluru.	13.04.2023	40
Dr. R Senthil Kumar organized an off campus training program on ICAR-IIHR technologies at the KVGerberK Papireddy patty, Dharmapuri	10.05.2023	220
Dr. R Senthil Kumar organized an off campus training program on ICAR-IIHR technologies for the farmers of Sivakasi, Tamil Nadu at Spice park, Shivangai	16.05.2023	60
Dr. R Senthil Kumar organized an off campus scientist-farmer interaction meeting and capacity building programme for SC farmers on ICAR-IIHR technologies for the SC farmers held at Udumalpet, TN.	25.05.2023	37
Dr. R Senthil Kumar organized an off campus training program on ICAR-IIHR technologies at the KVK Dharmapuri Millet Mela	29.05.2023	250



Dr. R Senthil Kumar organized an off campus training programme organized on ICAR-IIHR technologies at Allipura village Gowribidanur Taluk Chikkaballapura District	14.06.2023	40
Dr. R Senthil Kumar organized an off campus training programme on ICAR-IIHR technologies framers from Patna Dist. Bihar	16.06.2023	250
Dr. R Senthil Kumar organized an off campus training programme on ICAR-IIHR technologies framers from Koppal District	27.06.2023	5
Dr. R Senthil Kumar organized capacity building on SCSP training programme organized by ICAR-IIHR, Bengaluru in collaboration with the Department of Horticulture, Palnadu & Guntur.	27.06.2023	60
Dr. R Senthil Kumar organized an off-campus capacity building training programme on Advances in ICAR-IIHR Technologies from Puducherry	30.6.2023	60
One day Capacity building program on Mushroom cultivation and value addition	16.03.2023	25
One day Mushroom cultivation awareness training program	06.06.2023	75
<i>One-day awareness programme on tuberos cultivation, tube rose bulb (Arka Prajwal) distribution, and the Arka Microbial Consortium at ALLIPURA, Gauribidanur Taluk, Chikkaballapura District on 14 June 2023.</i>	14.06.2023	60
‘Roof top garden’ training at TANCOIR, Coimbatore in collaboration with TANCOIR, Government of Tamil Nadu and People Forum of India.	19.02.2023	110
One day training on ‘Soilless Terrace Gardening’ at Trichy Tamil Nadu in collaboration with TANCOIR, Government of Tamil Nadu.	12.03.2023	75

#### CHES, Bhubaneswar

Title of the Program	Date From-To	No. of participants
Skill training programme on commercial nursery raising of horticultural crops	14.03.2023	20

#### Field Demonstrations

Description of the trail held	Location
Demonstration of Soilless vegetable cultivation	BBMP parks, schools, colleges, temples and trusts in Bengaluru and TANCOIR
Composting of kitchen and farm wastes	ICAR-IIHR & MGMG villages
Arka Supreme-Avocado and Arka coorg Excel-Black Pepper	Bekka village, Hassan 0.5 acre
Arka Subra- Velvet Bean, Arka Raksak-Tomato, Arka Ananth-Brinjal, Arka mangala- Yard long bean, Arka Haritha- Chilli	Bekka village, Hassan 0.25 acre
Demonstration of Arka crop nursery polybag filling machine	Thiruvannamalai, Tamil Nadu
Demonstration of Arka Onion detopper	Baramati, Maharashtra

#### Exhibitions

Event and Location	Venue and date
Exposition for Agriculturalist EXFA-2K23, Perambalur, Tamil Nadu –621 212	Dhanalakshmi Srinivasan Agriculture College, Perambalur, 12-14, May 2023
ICAR-IIHR Participated in the FARM FEST–2023, Puducherry	Department of Agriculture and Farmers Welfare, Government of Puducherry, Puducherry UT, 10-12 <sup>th</sup> February, 2023



## IIHR evolves new designs to boost vertical farming



## FARM FEST–2023, Puducherry

## MEDIA COVERAGE

Dr. G.R. Smitha has given TV program on the topic “Arka Floral Agarbathi and Dhooop technology”. The programme was telecast in Mannina Makkalu from Doordarshan, Bengaluru on 10<sup>th</sup> May, 2023.

One-day training on ‘Soilless Terrace Gardening’ at Trichy, Tamil Nadu was conducted in collaboration with TANCOIR, Government of Tamil Nadu was covered in Tamil leading news channel Puthiya Thalaimurai on 12<sup>th</sup> March, 2023.

coverage of Mushroom products:



Coverage of Low cost vertical farming structures by different media





## FIELD DAYS/SUCCESS STORIES

### Field Day on Arka Neelachal Kesari organized at CHES, Bhubaneswar

Considering the significance of early mango variety in enhancing profitability of mango growers of the region, a Field Day on “Arka Neelachal Kesari: An Extra Early Mango Variety” was organized by CHES (ICAR-IIHR), Bhubaneswar on March 17, 2023. Scientists, entrepreneurs, mango growers from different districts of Odisha participated in the program. Prospects, production technology, value addition and market potential were major highlights of the program. Dr. V. Pandey, ICAR, New Delhi highlighted the prospects of Arka Neelachal Kesari in the region. Visit of demonstration plots was arranged wherein participants were exposed to scientific production technologies of Arka Neelachal Kesari. Post-harvest aspects such as washing, grading, hot water treatment, ethylene gas mediated ripening and packaging was also demonstrated. Participants realized the potential of early mango in the state and expressed their willingness to allocate significant proportion of land for Arka Neelachal Kesari. Entrepreneurs also showed their enthusiasm for developing efficient marketing channel for Arka Neelachal Kesari. On this occasion, Sh. Pramod Kumar Panda and Sh. Chandan Kumar Khuntia were felicitated for their significant contribution towards adoption and cultivation of Arka Neelachal Kesari mango.



### CHES, Chettalli organized a Field Day cum Diversity Fair on Avocado on 21<sup>st</sup> June, 2023



Central Horticultural Experiment Station (ICAR-IIHR), Chettalli organized Field Day cum Diversity Fair on Avocado on 21<sup>st</sup> June, 2023 at CHES-Chettalli, to showcase the genetic diversity in avocado and to address the problems in cultivation of avocado. Dr. S. K. Singh, Director, ICAR-IIHR, while presiding over the programme suggested to form an Avocado Growers Association for the benefit of avocado growers and inaugurated the exhibition along with other chief guests. Exhibition displayed specimens of more than sixty diverse avocado genotypes, nutrient deficiency, pests, diseases and grafted and budded plants. The chief guest Shri Bose Mandanna, Former Vice Chairman Coffee Board and Planter, Suntikoppa, stressed the problems of growers and requested the Director to strengthen the manpower of the station. The guest of honour. Extension folder on “*Management of pests and diseases of avocado*” was also released during the programme. During the technical session Dr. Muralidhara B.M., Scientist (Fruit Science) presented the genetic diversity and varietal wealth in avocado. Dr. Rajendiran S., presented nutrient and water management in avocado. Mr. Madhu G.S., Scientist (Plant Pathology) and Dr. Rani A.T., Scientist (Agri. Entomology) created awareness on diseases and pests management in avocado, respectively. The field visits were arranged for farmers to showcase results of avocado varieties Arka Supreme and Arka Coorg Ravi. Dr. Nayan Deepak G., Scientist (Fruit Science) explained special traits of avocado varieties to the farmers during the field visit. Sales of planting materials of different fruit crops were arranged for the benefit of farmers. More than 220 farmers from eight districts of Karnataka, farmers from Kerala and Tamil Nadu were also participated in the programme.

## 7. AWARDS & RECOGNITIONS

### a. Awards

- Dr. P. Venkata Rami Reddy, Principal Scientist & Head (I/c), Division of Crop Protection –received Dr. Anand Prakash Award for excellence in Entomological research by the Applied Zoologists Research Association (AZRA), Bhubaneswar.
- Dr Gobinda Acharya-Young scientist Award for research contribution and services to the agriculture & allied sector during of International Conference on Agriculture and Rural development organized by Agri Vision in collaboration with NISER & CUTM during January 27-29, 2023 at Bhubaneswar.
- Dr Gobinda Acharya -Member of the committee for selection of best stall under various categories during Krishi Odisha organized by Govt of Odisha.
- Dr. Safeena S.A. was conferred with Fellow of Society of Promotion of Horticulture, ICAR–Indian Institute of Horticultural Research, Bengaluru for the year 2023 on 30th May, 2023 during Annual General Body Meeting of SPH at ICAR-IIHR, Bengaluru.
- Dr. G.R. Smitha was conferred with ‘Fellow of Society for Promotion of Horticulture’ for the year 2023 on 30th May, 2023 during Annual General Body Meeting of SPH at ICAR-IIHR, Bengaluru.
- Dr. Rupa, delivered a talk on Integrated nutrient and water management techniques in fruit, vegetable, flower crops and Role of micronutrients and their management in horticultural crops on 10.2.2023 in the Special Training Programme on “Improved Horticulture Technologies” for the farmers of Bihar during 6-10 February, 2023.
- Dr. Rupa, delivered a talk on Role of biofertilizers in cashew on 15<sup>th</sup> February, 2023 through online mode in the ICAR Sponsored Short Course Training on “Improved Crop Production Technologies in Cashew with major emphasis on Integrated Pest Management” during 13-20 February, 2023 held at ICAR-DCR, Puttur, Karnataka
- Dr. Rupa, served as an External Examiner to conduct the Viva-Voce of Comprehensive Examination for the II year Ph.D students (11 Members) of the Department of Soil Science & Agricultural Chemistry, TNAU, Coimbatore, ADAC & RI, Trichirapalli and AC & RI, Madurai at TNAU, Coimbatore during 27-29 June, 2023.
- Dr. Kalaivanan, D presented an oral paper (through online) on ‘Soilless French Bean Cultivation: A Way to Sustain Next Generation Farming in Urban and Peri-Urban Spaces’ in the International Seminar on 'Urban & Peri Urban Agriculture: Good Practices & Innovation held from 14 to 15<sup>th</sup> March 2023 at MANAGE, Hyderabad
- Dr. Kalaivanan, D delivered lecture on ‘Soil health and nutrient management for horticultural crops’ to the farmers from Villupuram district of Tamil Nadu at ICAR-IIHR on 31<sup>st</sup> January 2023.
- Dr. Kalaivanan, D. delivered lecture on ‘Soilless Cultivation’ on 14<sup>th</sup> February 2023 in Entrepreneurship Orientation Program on Medicinal and Aromatic Plants-VI (EOPMAP-VI)” held from 1-21st February, 2023 (21-days) at ICAR-DMAPR, Anand, Gujarat
- Dr. Kalaivanan, D delivered lecture on ‘Sustainable Soil Health Management in Horticulture Systems’ at Christ University, Bengaluru during the programme organized to commemorate Kisan Diwas on 4<sup>th</sup> March, 2023.
- Dr. Kalaivanan, D delivered a lecture on ‘Nutrient Management in Fruit Crops Nursery’ on 28<sup>th</sup> March, 2023 in the training programme organized by ABI of ICAR-IIHR, Bengaluru.
- Dr. Kalaivanan, D delivered a guest lecture on ‘Next Generation Farming: Soilless Culture System’ in the ICAR-NAHEDP sponsored training programme conducted at Horticultural College & Research Institute (HC & RI), TNAU, Trichy on 22<sup>nd</sup> June, 2023. Totally 68 participants were attended in the training programme
- Dr. Kalaivanan, D delivered invited lecture on 'Vegetable Cultivation in Cocoponics’ in training programme on "Cocoponics /Soilless culture - A new method of growing vegetables and medicinal herbs in terrace/ roof top" held at ICAR-IIHR and organized by BESST-HORT on 28<sup>th</sup> April, 2023
- Dr. Kalaivanan, D delivered lecture on ‘Roof top Gardening’ at Coimbatore, Tamil Nadu in collaboration with TANCOIR, Government of Tamil Nadu on 28<sup>th</sup> February, 2023.
- Dr. Kalaivanan, D delivered lecture on ‘Soilless Terrace Gardening’ at Trichy, Tamil Nadu in

collaboration with TANCOIR, Government of Tamil Nadu on 12<sup>th</sup> March, 2023.

- Dr. Kalaivanan, D. delivered lecture on soilless cultivation and terrace gardening in Hi-tech farming training during NHF 2023 held from 22<sup>nd</sup> to 25<sup>th</sup> February 2023 at ICAR-IIHR, Bengaluru.
- Dr. Shilpa Shree, K.G delivered lecture on “Growing media/substrates used in hydroponics and vertical farming” in on campus workshop on ‘Hi-tech farming techniques’ organized during National Horticulture Fair 2023, from 22<sup>nd</sup> to 25<sup>th</sup> February 2023 at ICAR-IIHR, Bengaluru.
- Dr. Shilpa Shree, K.G delivered lecture on “Nutrient deficiency symptoms and their correction measures” in on campus workshop on ‘Hi-tech farming techniques’ organized during National Horticulture Fair 2023, from 22<sup>nd</sup> to 25<sup>th</sup> February 2023 at ICAR-IIHR, Bengaluru.
- Dr. T. Usha Bharathi received best oral paper award for the paper” Introgression of flower quality traits and biotic stress resistance in tuberose [Agave amica (Medik.) Thiede & Govaerts] in the international conference on next generation horticulture for prosperity held at OUAT, Bhubaneswar, Odisha.
- Dr Ramya H R, received best oral presentation awards for “*Socio-Economic Analysis of Urban Farming: A Savior of Urban Future*” and for “*An efficient Integrated Farming System (IFS) models enhancing livelihood security of farmers in select Agro Climatic Zones of Karnataka*”, at ISEE National Seminar 2023 on ‘Evolving Extension Science Towards Secondary Agriculture for Sustainable Development’ from 22-24, June 2023, UAS, Bengaluru.
- Dr Ramya H R, received "STATE CHUNCHASHRI BHAIRAVI AWARD" during State Chunchadri Women Convention, 17th January 2023- "State Chunchashri Bhairavi award" in the field of Science among women achievers of Karnataka during State



Chunchadri Mahila Samavesha on 17th January, 2023 at Sri Kshetra Adichunchanigiri, Mandya, Karnataka ICAR-IIHR received overall outstanding research award in 25th AICRP mushroom workshop for the year 2022-23.

- Dr. Kalaivanan, D received ‘Exemplary Community Service Award’ from Kerala Forest and Landscape and Periyar Tiger Reserve, Thekkady, Kerala for the service rendered to tribal community on 10<sup>th</sup> February, 2023 at Thekkady, Idukki, Kerala.
- Dr. P. Venkata Rami Reddy, Principal Scientist & Head I/c, Division of Crop Protection –received Dr. Anand Prakash Award for excellence in Entomological research by the Applied Zoologists Research Association (AZRA), Bhubaneswar.

#### b. Recognition

- Dr V Sankar acted as an external examiner for Thesis evaluation for of MSc (Hort) student from Horticultural College and Research Institute, Tamil Nadu Agricultural University (TNAU), Coimbatore, Tamil Nadu.
- Dr V Sankar acted as an external examiner for Thesis evaluation and also conducted of final viva voce exam of Ph D (Hort) student from Department of vegetable crops, Horticultural College and Research Institute, Periyakulam, Tamil Nadu Agricultural University (TNAU), Coimbatore.
- Dr.V.Sankar delivered lead talk on ICAR-IIHR technologies and Improved curry leaf cultivation practices during District level farmers seminar organised by Department of Horticulture and Plantation crops, Government of Tamil Nadu at Karamadai, Coimbatore District, Tamil Nadu on 24.01.2023.
- Dr. C. Vasugi, acted as Chairperson of the registration committee for the Appemidi Mango Diversity Fair 2023 held during 12<sup>th</sup> and 13<sup>th</sup> April, 2023 at ICAR -IIHR, Bengaluru.
- Dr.C.Vasugi, acted as Chairperson of the registration committee for the 19 th DUS workshop cum review meeting held during 18<sup>th</sup> and 19<sup>th</sup> May, 2023 at ICAR -IIHR, Bengaluru.
- Dr.C.Vasugi, acted as External Examiner for question paper setting for the course HRT 111,



Fundamentals of Horticulture 2(1+1) offered from BEST innovation University, Anantpur, AP.

- Dr.C.Vasugi, acted as External Examiner for question paper setting for the course HRT 222, Production technology for fruit and plantation crops 2(1+1) offered from BEST innovation University, Anantpur, AP.
- Dr.C.Vasugi, acted as resource personnel for the training program on Improved Technologies for early and off-season cultivation of vegetables and fruits for farmers of Deogarh, Jharkhand at ICAR-IIHR held during from 3rd to 7th July, 2023.
- Dr.C.Vasugi, acted as course director for one day training program on 'Advances in production technologies & seed production in papaya' at ICAR-IIHR through BESST HORT.
- Dr.C.Vasugi, acted as resource personnel for the student ready RHWE program of SIASHT, Mandya at ICAR-IIHR.
- Dr.Sumangala H.P acted as Panelist during *National Dialogue on Floriculture (16-17 February 2023)* held at ICAR- IARI, New Delhi
- Dr. Safeena S.A. served as a Key Note speaker on topic "Scope of Floriculture in Wayanad" on 12<sup>th</sup> January, 2023, during "The International Flower Show (Pooppoli 2023)" at Regional Agricultural Research Station (Kerala Agricultural University), Ambalavayal, Wayanad district, Kerala.
- Dr. Rohini M.R served as the Technical Committee member for screening of project proposals submitted for funding to National Medicinal Plant Board on 20<sup>th</sup> March, 2023 at Karnataka Medicinal Plant Authority, Malleshwaram.
- Dr. Safeena S.A. served as Key Note Speaker for the topic "Principles and Significance of Floriculture and Landscaping" during National Level Seminar on Floriculture organized by PG and Research Department of Botany, Kandaswami Kandar's College, Velur, Namakkal, affiliated to Periyar University, Salem, Tamil Nadu during 28<sup>th</sup> February, 2023
- Dr. Safeena S.A. served as Member Secretary of the Committee to select the best stalls under different categories such as ICAR-Institutes, SAUs, private

industry representatives, entrepreneurs, FPOs and development departments during NHF 2023.

- Dr. Safeena S.A. served as Member of the Consultancy Cell for the National Horticulture Fair-2023 held from 22-25 February, 2023
- Dr. M.R. Rohini served as Member of the Consultancy Cell for the National Horticulture Fair-2023 held from 22-25 February, 2023.
- Dr. Safeena S.A. was nominated as Member of Committee to formulate Guidelines for Periurban Horticulture.
- Dr Sumangala H. P. delivered 'Lead Paper' through virtual mode on "Challenges and Opportunities in Urban Landscapes" during International Seminar on "Urban & Peri-urban Agriculture: Good Practices & Innovation" held at Manage Hyderabad on 14- 15 March 2023.
- Dr. K. Ranjitha, Senior Scientist has been nominated as the Member, Scientific Panel-21 (Alcoholic Beverages), FSSAI, India
- Dr. T. R. Rupa, Served as a Member of Standing Committee on Budget and Finance for 2023 of the Indian Society of Soil Science, New Delhi
- Dr. T. R. Rupa, elected as Member in the Council of the Indian Society of Soil Science, New Delhi for the two years 2023 and 2024
- Dr. Kalaivanan, D. served as Executive Member, Bangalore Chapter of Indian Society of Soil Science, UAS, Bangalore
- Dr. Kalaivanan, D. served as Member of Coir and Coir Products Sectional Committee (TXD 25) of Bureau of Indian Standards (BIS), Ministry of Food, Civil Supplies and Consumer Affairs, Government of India
- Dr. Kalaivanan, D elected as treasurer for the BESST-HORT society of ICAR-IIHR, Bengaluru for the year 2023-24 & 2024-25.
- Dr. Shamina Azeez was the external expert in the Screening-cum-Evaluation Committee/ Selection Committee for the promotion of Teachers under CAS-2006 at UAHS, Shivamogga, held on 7th June 2023.
- Dr. K. Ranjitha, Senior Scientist has been nominated as the Member, Scientific Panel-21 (Alcoholic Beverages), FSSAI, India.

### Conferences/Symposia attended

- Dr. P. Venkata Rami Reddy, Principal Scientist & Head I/c, Division of Crop Protection –AZRA International Symposium on “Advances in Applied Zoological research for Food Security” held at Bhubaneswar from 10-11 November 2022.
- Dr. P. Venkata Rami Reddy, Principal Scientist & Head I/c, Division of Crop Protection attended an Indo-Australia International workshop on Mango Pollination organised by the western Sydney university, Australia at Tamil Nadu agricultural university, Coimbatore on 8 November 2022.

## 8. PATENTS & COMMERCIALIZATION OF TECHNOLOGIES

### a) Patent Filed

A patent application has been filed for 'A Process for the preparation of Dragon Fruit Ready-to-Service Beverage' at the Indian Patent Office on 7.7.2023 having an application number 202311045888.

### b) Commercialization Technologies

Sl · No	Details of Licensee	Technology licensed	Date of MoU exchange
1	Chamundeswari Traders, Harohalli, Jayapurahobli, H. D. Kote Road, Mysore Taluk, Mysore Dist-570008. Phone: 9901314347 Email: samruddhisuggi@gmail.com	Solar Power Integrated Outdoor Mushroom Growing Unit	06.1.2023
2	AG Organicz, #51/5, 2nd Cross, Bikasipura Main Road, JC Industrial Area, Yelachenahalli, Bangalore Karnataka Email: prashanthdec3@gmail.com	Arka Vegetable Special and Neem Seed Powder Pellet	06.1.2023

3	Ranjeeta's Agri Foods Health and Hygiene Pvt. Ltd., Institute of Hotel Management Catering Technology and Applied Nutrition, VSS Nagar, Bhubaneswar-751010, Khordha (Dist.), Odisha. Email: govindaswain@gmail.com	Arka Humidity Storage Box	17.01.2023
4	Ecophytocare India Pvt. Ltd. 462, ground floor, 6th Cross Road, Roopa Nagar, Mysuru, Mysuru, Karnataka, 570026 kjnp1007@gmail.com, ecophytocareindia4u@gmail.com phone:	Arka Sasya Poshak Ras	12.1.2023
5	Craftizen Foundation, 844, 7th main Road, 2nd Cross, HAL, 2nd Stage, Indiranagar, Bangalore-560038 Email: mayura@craftizen.org	Arka Floral Agarbathi and Dhoop	13.1.2023
6	AIRR Organics and Biofertilizers Private Limited A205, Parimala Trinity Apartments, Boganahalli Road, Panathur, Bengaluru-560103 Email: anilkumar.varnam@gmail.com Dr. Ruchi Sahu Dr. Anil Kumar M	Arka Mango Special	10.2.2023

7	Nutrient Crop Science: Nutrient Crop Care Pvt. Ltd., Plot No. 539/2257/3445, Village Badagumula, Near Kali Temple, Post Bhabinpur, Berhampur Ganjam, Orissa-761001, India. Mr. Siba Prasad Pani, Director. Email: nutrientcropcare@gmail.com;	Arka Microbial Consortium (Solid & liquid formulations) and Arka Vegetable Special	21.2.2023
8	Ecophytocare India Pvt. Ltd. 462, ground floor, 6th Cross Road, Roopa Nagar, Mysuru, Mysuru, Karnataka, 570026 kjmp1007@gmail.com, ecophytocareindia4u@gmail.com phone:	Arka Shubra	23.2.2023
9	Devbhoomi Enterprises Near Nirmal Nursery, NH-72, Paonta Road, Dharmavala Herbartpur Tq. Vikasnagar Distt. Dehradun-248 142 (UK) INDIADr Hemant Kumar Mahure Partner Pusa Produce sale centre, IARI, New Delhi-110 012 (DELHI) INDIA +91 email: devbhoomihort@gmail.com	Mango Variety - Arka Suprabhat	25.2.2023
10	Arekal Organics and Bio Fertilizers Pvt. Ltd. , #70, Sri Lakshmi Ranganatha Nilaya, 4th Cross Basaveshwara layout, Madanayakanahalli, Kuduregre, Dasanapura (Hobli), Bangalore-562162  Email divakaras@gmail.com	Arka Vegetable Special	21.2.2023

11	Action Aid Association No.139, Richmond Road Bangalore 560025  Lalitha.Srinivasan@actionaid.org	Mushroom Fortified Rasam Powder, Arka mushroom chutney powder (all 7 types), Arka mushroom Nutri-Cereal cookies (all 5 types)	13.2.2023
12	Sivabharathi Farms 1/41, Vellimalaippattinam, Narasipuram, Coimbatore, Tamilnadu – 641 109 Phone: 9842034340, Email: revathi@sivabharathifarms.com, Revathi S	Arka Minimally Processed Onion	20.2.2023
13	Kerala Agro Machinery Corporation Limited, Athani.P.O, Aluva, Ernakulam District, Kerala- 683 585 Mobile: 9446541303 Mr. M. K. Sasikumar, General Manager (Technical), # 0484 - 2474301/2/3/4/5/6 Email: arunkumartk@kamcoindia.com	Solar power operated tricycle cart for fresh fruits and vegetable vending	15.2.2023
14	Leadbeter Seeds Pvt. Ltd. 19, Rajmahal, 84, Veer Nariman Road, Mumbai-400020, India. : Rajesh Ramdas Wankhade, Head breeding : rajeshr.wankhade@mahyco.com	Bottle Gourd GSB resistant lines BG95, BG-114-3, BG-114-1	14.2.2023



15	Eco Naturals, Plot no:42, Matrusrinagar, Nandininagar,Miyapur,Hyd erabad Telangana 500049 9866147071 Ms. Naineni Aparna, Managing partner  Email: naineni.aparna@gmail.com	Arka Floral Agarbat hi and Dhoop	10.3.20 23
16	Srilakshmi Enterprises, H. No. # 4-70/2/3, Harithavanam Colony, Chengicherlla, Medchal Dist, Telangana-500092 Ms. Archana, Proprietor Email: gundamaddy1981@gmail.c om,	Arka Floral Agarbat hi and Dhoop	10.3.20 23
17	Thara Rose Nursery, 5-6, Cheemalapalli, Porlupalem (P.O), Visakhapatnam, Andhra Pradesh Mr. R. Srinivasa Rao, Proprietor email: vrn.rsr@gmail.com	Arka Savi Rose	30.3.20 23
18	Go Green Bio Plants, Anekal Taluk Gudhanalli Village, Muthkatti Road, Bangalore-562106 Email: 6055yathishreddym@gmai l.com	Arka Asawa Gerbera	24.3.20 23

19	Dharma Technologies 60ft Road, Saptagiri Extension west,Tumkuru.Karnatak a-572102 Ms. Shylaja H vittala, Proprietor, Email: dharmaagrotech@gmail. com	Root media sieving and bag filling unit, Rooting media mixer cum bag filling machine, Protray dibbler cum vacuum seeder	24.3.20 23
20	KVK Kheda, Dr Praveen Kumar Sharma Senior Scientist & Head Krishi Vigyan Kendra At & Post- Dethali, Taluka-Matar. Dist-Kheda-387210 Gujarat-Mo, kvkkheda@gmail.com	Trichoder ma harzianum 1% W. P.	8.3.202 3
21	Yetram Farmer Producer Company Limited, 25, Periyakottapalli village & Post, Krishnagiri Taluk & Dist., Tamil Nadu-635002 Ms. Sujatha Saravanan, Director Email: kgi.tnrtp@yahoo.com, yetrampc@gmail.com	Arka Crushed Tomato Technolog y	10.4.20 23
22	Dewbati Enterprises, At & P.O.- Rajkhand, P.S. Aurai, Dist. Muzaffarpur, Bihar- 843312 Ms. Mridubala Kumari and Mr. Gopal Prasad Shahi M. Email: gopalshahi.bjp@gmail.c om, shahikundankumar@gm ail.com	Mango Fruit Bar	17.4.20 23

2 3	Darjeeling Gardens Pvt. Ltd., Room No. 403, Sri Kamakhya Tower, G. S. Road, Christian Basti, Guwahati-781005, Email: saleh.siddik@gmail.com, rajesh@darjeelinggardens.com Sri Deva Kumar Saikia	Arka Savi, Arka Parimala, Arka Bangara 2	27.4.2023
2 4	Ecoknow Agro Products Private Limited, 3/188-A Syamalabhavan (H), Nediya sala (PO), Thodupuzha, Kerala Mr. Hari S. K., Managing Director Email: ecoknowagro@gmail.com	Arka Vertical Garden Model	28.4.2023
2 5	Vaishnavi Biotech, Founder Rashmi C. N., c/o Ayyappa, #8, Niggachanadevanilaya, 2nd Floor, 4th Cross, Anganappa Layout, Thammehalli, Bangalore-560107 Email: vaishnavibiotech23@gmail.com (Permanent address: Near Ring Road, Ground Floor, No. 40, Katha No. 8/2/9/2, Ward No. 1, Konkani Doddi Main Road, Ramanagara, Channa patna-562160)	Embryonic cell suspensions for mass multiplication of Banana (cv Elakki balle)	27.4.2023
2 6	Sashanka Agro Tech Private Limited, Near Divyayan, Harihar Singh Road, Near Manda Baghecha, Morabadi, Ranchi, Jharkhand-834008. Mr. Nibir Roy Manager [Business Development & Sales] Plant Bio Technology Division Email: dr.hemant.tcl@sashanka.co.in, info@sashanka.com, nibir.bds@sashanka.co.in	Gerbera Arka Asawa	28.4.2023

2 7	Avadh sugar & Energy Ltd., Sitapur Lakhimpur Road, Hargaon, Sitapur, Uttar Pradesh-261121, India : Mr. Devender Kumar Sharma : avadhsugarenergylimited@gmail.com	Trichoderma viride 1.5% W.P.	03.04.2023
2 8	Shreya Enterprises, 16-C Scheme No. 51, Indore, Madhya Pradesh-452006, India : Mr. Pankaj Chaturvedi, Proprietor : pankaj.shreyaenterprises@gmail.com	Trichoderma viride-1.5% W.P.	24.4.2023
2 9	Agri Biotech Foundation, PJTSAU Campus, Rajendranagar, Hyderabad – 500 030, India : Dr. D. Vishnu Vardhan Reddy, Director : agribiotechfoundation@gmail.com	Trichoderma harzianum-1% W.P	27.4.2023
3 0	BioPrime AgriSolutions Pvt. Ltd, survey No. 143/1 to 10/6B, 2nd floor, Lagad Mala, Sinhagad Road, Opp. Lokmat office, Dhayari, Pune, Maharashtra- 411041, India: Mr. Rahul Jog, R & D Manager: research.bioprime@gmail.com	Trichoderma harzianum-1% W.P	17.5.2023

3 1	The United Provinces Sugar Company Ltd., Tamkuhi Road, P.O. Seorahi, Kushinagar, Uttar Pradesh-274406, India: Mr. Ramgopal Rameshwarla IPanchbhai, : theunitedprovincessugarlimited@gmail.com	Trichoderma viride 1.5% W. P.	19.5.2 023
3 2	Nav Durga Agro Science Pvt. Ltd., B 8, Industrial Estate, Kheri Karmu, Shamali, Uttar Pradesh-247776, India, : Dr. L.C Rohela, Asst. Vice President QC&QA: dr.rohela@insecticidesindia.com:	Pochonia chlamydo sporia 1% W. P.	25.5.2 023
3 3	Mega Food Cooperative Society, Jampara, Mendipathar, North Garo Hills, Meghalaya - 794112 mmesmushroom@gmail.com Anoop James,  https://meghamushroom.com	Arka mushroom chutney powder (all 7 types)**	29.5.2 023
3 4	Pan Oceanic Seed Solutions Pvt. Ltd. First Floor, No. 92 B1 Type SFS, 6B Cross (Near Yelahanka Central Mall), Yelahanka New Town Bangalore, Bangalore, Karnataka-560064, India: Mrs. Nirmal Dwivedi, Director, info@panseeds.com,	CGMS LINES IHR 4390 & IHR 4391 and IHR 4392 & IHR 4393	26.5.2 023

3 5	Namdhari Seeds Pvt. Ltd., Uragahalli, Bidadi Post, Ramanagara Taluk & District, Bengaluru-562 109, India: Mr. Nateshan H M: gurumurthy@namdhariseeds.com:	Chilli CGMS Lines IHR 4390 & IHR 4391 and IHR 4392 & IHR 4393	23.5.20 23
3 6	Alpine Seeds Pvt. Ltd. 303, Sidharaj Zavod, near. Sargasan Cross Road, Sargasan, Gadhinar, Gujarat – 382 421, India. Mr. Limbani Alpesh Kumar Kantilal, <a href="mailto:alpesh.alpine@gmail.com">alpesh.alpine@gmail.com</a> .	CGMS 3 line	26.5.20 23
3 7	BARATH TECHNO, R. SUGUMAR S/O Raju, Door No. 9/4 53, Ramugounder Street, KK Patti, Cumbum, Theni District-625 521, Tamil Nadu. nanosugumar@gmail.com, manorani87@gmail.com 9788224101/9229235999	Arka High Humidity Storage Box	07.6.20 23
3 8	Sana Agro Services, Ranger Thottam, Ayyan Valasu, Singanallur Post,  Kavanthpadi, Erode District, Pincode 638455  Email: sanaagroservices@gmail.com	Aka Herbiwash	02.6.20 23



39	Ecophytocare India Pvt. Ltd. 462, ground floor, 6th Cross Road, Roopa Nagar, Mysuru, Mysuru, Karnataka, 570026 kjnp1007@gmail.com, ecophytocareindiab4u@gmail. com phone: 9686659285, +91 9591411317	Arka Deco mposer	07.06 .2023
40	IIL Biologicals Ltd., 407- 408, Lusa Tower, Azadpur Commercial Complex, North Delhi, Delhi-110033, India Director : Email: ritika.pathak@insecticidesindia .com, : +91-9891334649	Pseud omonas fluores cens- 1% W.P	06.6. 2023
41	Ecosafe Management, A-13, Commercial Inderpuri, New Delhi-110012, India: Mr. Hari Narayan Singh, : ecosafemgmt@gmail.com, : +91-8141124381	Tricho derma harzia num- 1% W.P	19.6. 2023
42	M/S. Samhita Soil Solutions, 2-46-26/9B, Venkat Nagar, Near D Mart, Kakinada- 533003 email: parurajyam@yahoo.co.in, phone 9848549349	Arka Micro bial Conso rtium (Solid + liquid)	09.6. 2023
43	Tierra Agrotech Ltd.8-2- 269/19/S/A/2, Sravana Complex,1st Floor, Kamalapuri Colony,Road No.-2, Banjara Hills, Hyderabad, Telangana- 500034, India. : Mr. Hari Singh Chauhan, Director :arpita.p@tierraagrotech.com,n agaraja.c@tierraagrotech.com, hari.c@tierraagrotech.com	CGM S3 line	26.6. 2023

### Photos of MoU exchange for technology commercialization



Rose varieties, Arka Savi and Arka Parimala; and Marigold variety Arka Bangara 2 licensed to Darjeeling Gardens Pvt. Ltd.



Arka Floral Agarbathi and Dhoop Technology has been licensed to Srilakshmi Enterprises, Medchal Dist., Telangana

## 9. DISTINGUISHED VISITORS

### ICAR-IIHR, Bengaluru

1. Shri Dinesh Pratap Singh, Minister of Agriculture, Govt. of Uttar Pradesh visited the institute on 21.01.2023.
2. Shri R. Ravindra, General Manager, APEDA (Sothern Region) visited the institute on 22.02.2023.
3. Dr. A.K. Sigh, Deputy Director General (Horticultural Science), ICAR, New Delhi visited the institute on 22.02.2023.
4. Shri Charan Singh Rathore, IPS, RFFRO, Bengaluru visited the institute on 25.02.2023.
5. Dr. Suresh, S.V., Vice Chancellor, UAS, GKVK, Bengaluru visited the institute on 25.02.2023.
6. Dr. S.B. Borbuddhe, Director, NTRI, Hyderabad visited the institute on 27.02.2023.
7. Dr. Shreekant Sharma, SEE, National Institute for Micro, Small and Medium Enterprises, Ministry of MSME, Govt. of India visited the institute on 09.03.2023.
8. Dr. D.L. Maheshwar, Former Vice-Chancellor, UHS, Bagalkot visited the institute on 15.03.2023.
9. Justice R. Devadas, Rtd. Chief Justice of Karnataka visited the institute on 17.05.2023.
10. Mr. Sukanta Ku Panigrahi, Member –APEDA, Bhubaneswar- Odisa visited the institute on 10.01.2023.
11. Dr. T. Mohapatra, Chairperson, PPV & FRA, New Delhi visited ICAR-IIHR, Bengaluru to attend DUS review meeting on 22-23<sup>rd</sup> May 2023.
12. Dr. S. V. Suresha, V. C, University of Agricultural Sciences, GKVK, Bengaluru visited on 23.5.23.
13. Dr. R. P. Jagadesha , V.C, Keladi Shivappa Nayaka University of Agricultural, UAHS, Shivamogga on 23.5.23.

## 10. REVENUE GENERATION

**Technology licensing:** Total revenue collected (inclusive of tax) through licensing of ICAR-IIHR technologies during Jan-June, 2023: **Rs. 1,05,32,900/-**

**Professional Service Function (CPC): Rs. 1,34,19,302/-**

**Natural Resource Management: Rs.63,06,211/-**

**CHES, Chettali: Rs. 44,69,720/-**

**Crop Protection: Rs. 20,37,105/-**

**ATIC: Rs. 55,66,239.70/-**

## 11. PERSONNEL

### PROMOTION

- Dr. S. Vijaya Rakesh Reddy, Scientist, Div. of PHT & AE has been promoted to the next higher grade of Rs. 7000 w.e.f. 01.07.2019.
- Dr. Sumangala. H. P, Sr. Scientist, Div. of Flower and Medicinal Crops has been promoted to the next higher grade of Rs. 10, 000 w.e.f. 16.04.2021.
- Dr. K. V. Ravishankar, Sr. Scientist, Div. of Basic Sciences has been promoted to the next higher grade of Rs. 10,000 w.e.f. 13.02.2010.
- Dr. Prakash Patil, Pr. Scientist, has been promoted to the next higher grade or pay scale of level-14 (Rs. 1,44,200-2,18,2000 to the post of Project coordinator (Fruits) w.e.f. 03.05.2023.
- Shri H.R. Surendra, Assistant, promoted to the post of Asst. Administrative Officer w.e.f. 02.01.2023.
- Shri Nagappa, Ex-ACTO (Lab.) promoted to the next higher grade of CTO (Lab.) w.e.f. 01.01.2019.
- Shri K. Redappa, Ex-ACTO (Lab.) promoted to the next higher grade of CTO (Lab.) w.e.f. 01.07.2019.
- Shri B. Madhusudhan Rao, STO (Field /Farm) promoted to the next higher grade of ACTO (Lab.) w.e.f. 10.09.2018.

### TRANSFER

- Shri G.G. Harakangi, CAO(SG), has been transferred to ICAR-Research Complex NEH Region, Barapani, Shillong & reported on FN of 15.06.2023
- Shri Sachin Agnihotri, CAO, has been transferred to ICAR-IIHR, Bengaluru & reported on AN of 26.06.2023
- Dr. Raju. R, Sr. Scientist, ICAR -IARI, New Delhi has been transferred to ICAR-IIHR, Bengaluru & reported to ICAR-IIHR, Bengaluru w.e.f. 05.01.2023.

- Dr. Abhishek Mandal, Scientist, ICAR -IARI, New Delhi has been transferred to ICAR-IIHR, Bengaluru & reported to ICAR-IIHR, Bengaluru w.e.f. 24.03.2023.
- Dr. Yukti Verma, Scientist, ICAR -NRCG, Pune has been transferred to ICAR-IIHR, Bengaluru & reported to ICAR-IIHR, Bengaluru w.e.f. 27.03.2023.
- Dr. Nagaraja. A, Pr. Scientist, ICAR -IARI, New Delhi has been transferred to ICAR-IIHR, Bengaluru & reported to ICAR-IIHR, Bengaluru w.e.f. 03.04.2023.
- Dr. Chandrashekar. N, Scientist, ICAR -Central Institute of cotton Research, Regional station, Coimbatore has been transferred to ICAR-IIHR, Bengaluru & reported to ICAR-IIHR, Bengaluru w.e.f. 17.05.2023.
- Dr. Nayan Deepak. G, Scientist, ICAR -IARI, New Delhi has been transferred to ICAR-IIHR, CHES Chettalli & reported to ICAR-IIHR, CHES Chettalli w.e.f. 25.05.2023.
- Dr. V. Venkataravanappa, Scientist has been transferred from ICAR – IIHR, Bangalore to ICAR – CHES, Chettalli and reported at CHES, Chettalli on 27.04.2023.
- Shri K.B. Tittu Kumar, Administrative Officer, has been transferred to ICAR-IIOR, Hedarabad AN of 17.03.2023.
- Shri P. Senthil Kumar, Asst. Administrative Officer, has been transferred to CHES, Chettalli & reported to CHES, Chettalli on 10.04.2023.
- Shri C.M. Mohan, Asst. Administrative Officer, has been transferred to IIHR, Bengaluru & reported to IIHR, Bengaluru on 13.04.2023.

### SUPERANNUATION

- Dr. C. Aswath, Pr. Scientist, retired from council's service on superannuation on the AN of 31.05.2023.
- Dr. P. E. Rajashekar, Pr. Scientist, retired from council's service on superannuation on the AN of 31.05.2023.

- Shri M. Venkatesh, Skilled Support Staff retired from council's service on superannuation on the AN of 31.01.2023.
- Shri M. Lakshmaiah, Skilled Support Staff retired from council's service on superannuation on the AN of 30.04.2023.
- Shri M. Hanumantharaju, Skilled Support Staff retired from council's service on superannuation on the AN of 30.04.2023.
- Smt Parameshwari, Skilled Support Staff, CHES, Chettalli retired from council's service on superannuation on the AN of 30.04.2023.
- Shri Syed Rabbani, Asst. Administrative Officer retired from council's service on superannuation on the AN of 31.05.2023.
- Shri Anjanappa, Skilled Support Staff retired from council's service on superannuation on the AN of 30.06.2023.
- Shri A.S. Narayana, Skilled Support Staff, CHES, Chettalli retired from council's service on superannuation on the AN of 30.06.2023.

### OBITUARY

- Smt. D. Anjanamma, Skilled Support Staff, Library expired on 30.04.2023

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Compiled & Edited by: **Publication committee, ICAR-IIHR:2023-24** (Drs. R. Venugopalan, R. Venkattakumar, V.Keshav Rao, K. Padmini, K. Usha Rani, Pushpa Chethankumar and Shri. A.K. Jagadeeshan)