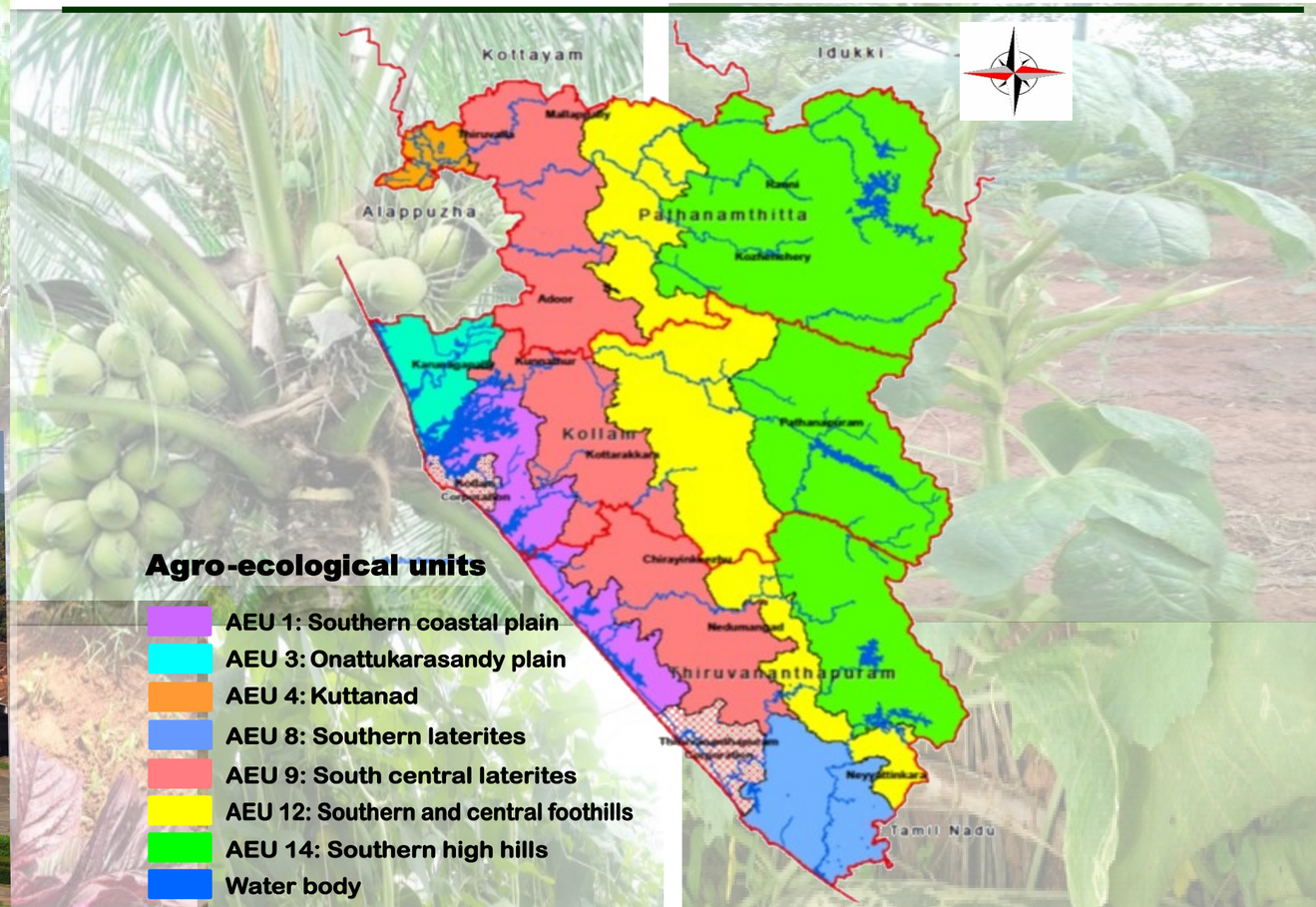
XXXVIII ZREAC MEETING

05–06 January 2022

ZONAL RESEARCH REPORT 2020 - 2021



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Kerala Agricultural University

RARS (Southern Zone), College of Agriculture, Vellayani,

Thiruvananthapuram, Kerala – 695522

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KAU PLAN PROJECTS

1. **Network project on Soil loss estimation and monitoring in the highland ecosystems of Kerala for effective conservation planning**

(PI: Dr. R.Gladis, Assistant Professor(SS&AC), ARS,Thiruvalla)

Objectives:

- Quantification of soil loss from the selected highland ecosystems of Thiruvananthapuram district of Kerala and identification of vulnerable land use classes.
- To develop suitable soil management protocol for the high land ecosystems.

Major Research Highlights :

The Neyyar river basin of Thiruvananthapuram district and the Chittar sub basin were selected for the study and area was delineated and maps were prepared using Arc GIS software. The watersheds identified and delineated were 1N18 (a, b, c). The data required for quantification of soil loss viz., monthly rainfall data (10 years - 2009 to 2019) was purchased from IMD, soil data regarding soil texture - sand, silt & clay percentage and soil organic carbon percentage were collected, land use and land cover maps and watershed maps were purchased from KSLUB. Digital Elevation model of the study area was delineated, NDVI was calculated and aspect map was prepared using Arc GIS. The slope length and steepness (LS factor), crop cover and management (C factor), rainfall erosivity (R factor), conservation practice (C factor) and soil erodibility (K factor) required for quantification of soil loss were worked out and related maps were prepared. The quantification of soil loss and preparation of soil erosion map using Arc GIS are in progress.

2. **Productivity enhancement of coconut based cropping system through vertical intensification**

(P.I. Dr. Shalini Pillai, P, Professor & Head, Agronomy)

Objectives:

- To assess the suitability of maize, finger millet, black gram and green gram as intercrops in coconut garden
- To study the impact of intercropping on the nutrient status of soil
- To work out the economics

Major Research Highlights :

The field experiment was laid out in December 2020 as intercrop in coconut garden. The experimental site for the intercropping study was located at the Coconut Research Station, Balaramapuram under uniformly aged palms of more than 60 years old. Composite soil samples were collected to assess the initial nutrient status of the soil. Composite soil samples was collected from 0-15cm depth before the experiment and analysed for its mechanical composition and chemical properties. The experimental site analysed to be acidic in reaction with a pH of 4.65, low in available nitrogen (218.15 kg ha^{-1}), medium in available phosphorus (17.02 kg ha^{-1}) and low in available potassium (100.11 kg ha^{-1}). Two pulses, *viz*., black gram and green gram were raised as intercrops with maize and finger millet. Observations were recorded on the growth attributes, yield attributes and yield of the main crop and intercrops. The field experiment was completed by the end of April, 2021. Soil samples were collected from the individual plots after the experiment. Soil sample analysis and data tabulation is progress.

3. **Strengthening of Lead Centre for Organic Farming at College of Agriculture, Vellayani**

(PI: Dr.B.Aparna, Associate Professor & Head, Department of Organic Agriculture)

Objectives:

- Upgrade the existing Lead Centre for Organic Farming in the Department of Soil Science and Agricultural Chemistry, College of Agriculture, Vellayani to promote teaching and extension activities in the field of organic farming, organic certification and good agricultural practices.
- To manage the bio wastes and production of quality organic manure from farm wastes and aquatic weeds for meeting the nutritional requirements of various crops and sustain soil quality and health
- To highlight the significance of green nano fertilizer technology for major crops of Kerala and to study the influence on soil health.

Major Research Highlights:

- An Organic museum was set up in the organic farm with models (vermicompost unit model, Vermiwash collection model etc) and various organic inputs like Vermicompost,Coirpithcompost,Mineral compost, Panchagavya,Dashagavya, Fish Amino Acid, Egg Amino Acid biofertilizers etc which benefits the student and farming community.About225 visitors had visited this museum during the period 2020-2021which includes farmers and students from various institutions .
- Strengthened the model production units viz. Vermicompost unit, coir pith unit, NADEP Unit, Biogas units, Azolla unit for demonstration purposes .Also strengthened the students demonstration plots – vegetable plots, medicinal crop plots etc for demonstration purpose
- Training at Agricultural knowledge Centre (AKC) at Attingal on organic farming technologies , collection of soil samples from organic growers and distribution of soil heath cards to the organic growers of the locality
- An experiment on the effect of Organic nano NPK formulation for on the growth, yield and quality in banana cv. Nendran (*Musa* AAB) is being carried out at the Model Organic Farm, Vellayani. Intially, the characterization of TAG Nano fertilizer was carried out and it was reported that the Organic Carbon and humic acid contents were 2.85 per cent and 17.19 per cent respectively.While the N, P and K contents in the formulation were 1.87 per cent, 1.52 per cent and 2.36 per cent respectively. Of all the eight treatments imposed, Treatment T_7-1/5 dose of KAU POP as organic Nano fertilizer reported the highest yield - weight of bunch, fingers per bunch and weight of fingers. Analysis of post experimental soil samples is in progress.

4. **Elucidation of high temperature stress tolerance in rice and development of suitable management strategies**

(PI: Dr. Beena R., Assistant Professor, Department of Plant Physiology)

Objectives:

To study the management method for high temperature tolerance in rice

Major Research Highlights :

A two year experiment was conducted to make certain the effects of exogenously applied plant growth regulators (PGR), nutrients and pink-pigmented facultative methylotrophs on rice growth and yield attributes under high day (HDT). Rice variety Uma (MO-16) was subjected to HDT in controlled polyhouse and ambient temperature with ten different treatments namely, brassinosteroid, boron, calcium chloride, salicylic acid, glycine betaine, pink-pigmented facultative methylotrophs, 1-methyl cyclopropane, gibberllic acid, water spray and absolute control (no spray) were applied as foliar spray at three stages viz., panicle initiation, heading and flowering stage.. Physiological observations were taken at 50% flowering stage and yield parameters were taken at harvest stage. There was significant variation for physiological, biochemical, morphological and yield components among treatments. Exogenous application of PGRs was helpful in alleviating the adverse effects of high temperature. Brassinosteroid treatment (5ppm) recorded high pollen viability, spikelet fertility and grain yield per plant by improving the physiological such as cell membrane stability index (CMSI), photosynthetic rate (Pn), stomatal conductance (Gs), Fv/Fm ratio, chlorophyll stability index (CSI). In total, these results will be of importance for further understanding the adaptation and survival mechanisms of rice to high temperature and will support in upward rice cultivation under high temperature conditions.

5. **State Plan Project-Development of improved formulations of Biopesticides**

(PI: Dr. Reji Rani O.P, Associate Professor, Department of Agricultural Entomology)

Objectives:

1. To develop a tablet formulation of Entomopathogenic Fungus *Lecanicillium saksenae.*
2. To standardise the consistency and composition of the tablet.
3. Evaluate the effectiveness of tablet against a test insect

Major Research Highlights:

The tablets made of bran and talc showed cent per cent germination of spores irrespective of the additives and adjuvants used for formulation. A low moisture content is preferred for

microbial formulations as this would reduce the growth of microbial contaminants. At the same time it should retain the moisture to an optimum level to maintain viability. Therefore tablets composed of conidial spores @ 10^8, 30% Carboxy methyl cellulose (Binding agent), 3% Magnesium stearate (Lubricant), 15% Chitin (Antimicrobial agent), 2% Sodium starch glycolate (Desiccant) and 50% filler material (bran/talc) was determined as the ideal combination for formulating tablets. This tablet formulation with negligible contamination ensures its efficacy in field conditions and can be effectively used in IPM. Gelatin based gels of *M.anisopliae* was prepared with a view to manage banana weevils.

6. **Potential impact of climate change and flood on Kerala soils: AEU wise mitigation and adaptive strategies - AEU 1 & AEU 2**

(PI: Dr.Biju Joseph, Assistant Professor, ARS, Moncombu)

Objectives:

- Generation of AEU wise soil resource inventory and mapping using GIS
- To assess the actual and potential productivity of soil and derivation of related indices
- To assess the impact of climate change and flood on soil characteristics and soil health in relation to crop productivity and prediction using suitable models
- Development of AEU wise management plans to reduce the gap between actual and potential productivity
- To carry out awareness programmes and demonstrations related to the restoration of soil productivity
- To conduct of participatory research in the farmers' field for optimizing targeted yields in major crops of the AEU's

Major Research Highlights:

Geo-referenced surface (0-15 cm) and subsurface (15-30 cm) and core soil samples were collected from AEU 1 and 2. In AEU 1 soil samples were collected from Kadinamkulam, Mangalapuram, Anchuthengu, Kadakavoor, Andoorkonam, Varkala and Attingal panchayaths of Thiruvananthapuram district and Ittikara, Mukhathala, Kollam, Chittumala, Perayam, Thrikkaruva and Panayam panchayaths of Kollam district. For AEU 2, samples were collected from Kannur

cantonment, Chirakal, Pappinissery, Narath, Cherukunnu, Matool, Madayi, Udumbanthala and Azhikode panchayaths of Kannur district and Thrikkaripur south, Thrikkaripur north, Padne, Cheruvathur, Pilicode, Bare, Uduma, Bekal, Panayal, Pallikkara, Chittari, Kanghangad, Hosdurg and Nileswaram panchayaths of Kasargode district. The analysis of soil samples for physical and chemical properties are in progress.

7. **Development and evaluation of organic nutrient formulations as pellets / tablets for better nutrient delivery in organic farming.**

(PI: Dr.Biju Joseph, Assistant Professor, ARS, Moncombu)

Objectives:

- To develop multi nutrient formulations enriched with critical nutrients in the form of pellets / tablets for organic farming.
- To study the nutrient release pattern of the organic nutrient formulations.
- To evaluate the efficiency of these formulations in terms of nutrient delivery, and maintenance of soil health.
- To assess the suitability of these formulations for organic production of fruits (banana) and vegetables (brinjal and bhindi).

Major Research Highlights:

Nutrient formulations have been prepared using various nutrient sources permitted under National Programme for Organic Production (NPOP). The nutrient sources selected were blood meal, soybean meal, corn gluten, rock phosphate, steamed bone meal, borax, epsom salt, langbeinite, sulphate of potash, kainite, sylvinite, patentkali, glauconite etc. Using the nutrient formulations, organic nutrient pellets were prepared after mixing nutrient sources with biodegradable binding agents starch and bentonite. The compatibility of different combinations of nutrient sources with binding agents were studied and the organic nutrient pellets were prepared with compatible sources. The pellets were characterized for content of major and secondary nutrients. Evaluation of the pellets is being done in tissue culture Nendran banana.

8. **Strengthening the breeder seed production of selected newly released varieties of vegetables**

(PI: Dr. Simi. S, Assistant Professor & Head, Department of Fruit Science)

Objectives:

To scale up the breeder seed production of selected newly released varieties of vegetable crops

Major Research Highlights :

As a part of the project, purchase of inputs and repair and maintenance works for strengthening the breeder seed production in the seed production unit attached to the Department of Vegetable Science could be effected. Repair and maintenance works of irrigation facility of the unit was done to ensure efficient utilisation of water. Establishment of a composting unit to produce organic compost from farm crop residues for use in vegetable seed production unit is another achievement. Breeder seed production of cluster bean variety KAU Suruchi was carried out by planting in an area of 1.5 cents each at three different spacings, 60X45 cm (T1), 60X30 cm (T2) and 45X45 cm (T3). The experiment was laid out in Randomised block design with three treatments and eight replications in February 2020. Observation on seed yield per plant was recorded. The seed yield per plant was the highest in T1 (22.160 g) and was on par with T2 (21.995g). The seed yield per plant was the least for T3 (17.495g). The increased yield per plant obtained from the higher spacings could be attributed to the better infiltration of sunlight to the crop which facilitated better photosynthesis and thus higher yield. From an area of 4.5 cents, 10.15 kg of breeder seeds were produced thus earning a revenue to the tune of Rs. 12, 180 @ Rs. 1200 per kg seed.

Plants of cluster bean variety KAU Suruchi 2 months after planting

View of cluster bean seed production plot

9. **Network project on fruit development and planting material propagation protocols and cataloguing of minor fruits**

Sub project 3: Characterisation of mango genotypes grown in southern Kerala and development of field gene bank of superior types'

(PI: Dr. S. Simi, Assistant Professor & Head, Department of Fruit Science)

Objectives :

1. Survey and characterization of mango types under *in situ* condition
2. Collection of mango germplasm
3. Establishment of field gene bank of mango

Major Research Highlights:

Conducted survey in different parts of southern Kerala . Located around 50 mango accessions in parts of Thiuvananthapuram, Kollam and Alappuzha districts. Vegetative and floral characters and fruit morphological characters of some of these could be recorded. Surveys are being continued. Characterization of these accessions is in progress. Scions of around twenty accessions were collected. Stones of wild mango varieties were collected and rootstocks raised. Grafts are being prepared. Land preparation for establishment of field gene bank is being initiated.

Variability in fruit size among the different accessions

Mango rootstocks and grafts of different stages

10. **Chitosan mediated elicitation of plant growth and alleviation of biotic stress in black pepper (*Piper nigrum*L.)**

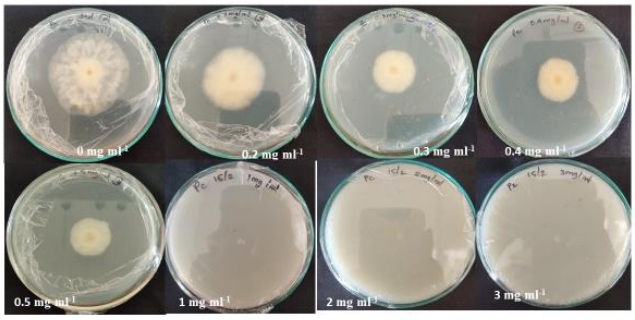
(PI: Dr. Deepa S. Nair, Assistant Professor &Head, Dept. of Plantation Crops & Spices)

Objectives:

1. To study the effect of chitosan on alleviation of biotic stress under *in vitro* and *in vivo* conditions
2. To study the effect of different modes of application of chitosan on plant growth and yield of bush pepper (*P. nigrum*) plants
3. To study the effect of different modes of application of chitosan on yield parameters of standing pepper plants

Major Research Highlights :

Effect of chitosan on alleviation of biotic stress under *in vitro* conditions :Concentrations of chitosan (0, 0.2, 0.3, 0.4, 0.5, 1,2,3 mg ml^{-1}) was tried to observe the inhibition effect on *Phytophthoracapsici.* Chitosan was dissolved in acetic acid by constant stirring. Chitosan and potato dextrose agar (PDA) were autoclaved separately and combined after autoclaving. Chitosan was incorporated into potato dextrose agar at concentrations of 0, 0.1, 0.2, 0.3, 0.4, 0.5, 1, 2 and 3 mg ml^{-1}. A 3mm diameter plug from the advancing margins of colonies of *Phytophthoracapsici*was seeded centrally onto plates of each chitosan concentration. Cultures were incubated at 25^{o}C. The diameter of all the colonies was measured daily. The treatments were replicated thrice. The mycelial growth of *Phytophthoracapsici* was inhibited by chitosan, and its



Inhibition of chitosan (0, 0.2,0.3, 0.4 ,0.5,1 , 2 & 3 mg ml^{-1}) on mycelial growth of *Phytophthora capsici*

growth rate showed a dose-dependent effect on the concentration of chitosan. 0.2 mg/ml showed

least inhibition whereas 0.5 mg/ml showed the highest inhibition. *Phytophthoracapsici* was almost completely inhibited by chitosan at the concentration of 1mg ml^{-1} onwards.

11. **Strengthening tissue culture unit for commercial and medicinal plants**

(PI: Dr.M.M.Viji, Professor and Head, Department of Plant Physiology)

Objectives:

To strengthen the existing tissue culture unit of the department of Plant Physiology as an advanced tissue culture and training unit for commercial and medicinal plants .

Major Research Highlights :

The facility in tissue culture laboratory is upgraded with the purchase of incubator shaker which helps in establishing liquid cultures.Also in the current project , protocols for *in vitro* culturing of dendrobium orchids, *Aloe vera*, banana, Tinospora and Withania have been standardized.Infrastructure facilities developed viz.purchase of incubator shaker to establish liquid cultures as well as other minor facilities and modifications carried out in the plant tissue culture laboratory during this project will facilitate more research and trainings in plant tissue culture of important crops of Kerala .

12. **Characterization, *in vitro* culturing and *in vitro* manipulation for enhanced production of secondary metabolites of medicinal orchids and *Aloe vera* (*A. barbadensis* Mill.)**

(PI: Dr.M.M.Viji, Professor and Head, Department of Plant Physiology)

Objectives:

To set up an *in vitro* secondary metabolite production unit and to standardize *in vitro* culture techniques for enhancing the production of anticancer and other therapeutic compounds in medicinal orchids and *Aloe vera* (*Aloe vera* L. (*barbadensis* Mill.) .

Major Research Highlights :

Basic infrastructure and facilities in the existing tissue culture lab has been upgraded by

way of providing more culture room light and temperature control facilities. Also minor equipments and other items needed for the laboratory have been purchased. Characterization studies of medicinal orchid and *Aloe vera* collected from various sources were done and the best one ecotype from each of the plant species based on their therapeutic values were selected for the *in vitro* studies. *In vitro* culturing protocols of medicinal orchid, *Dendrobium nobile* and *Aloe vera* were standardized. The best callus induction medium for the medicinal orchid *Dendrobium nobile* was identified as MS medium supplemented with NAA(0.5 mg/l) and metatopolin(1 mg/l) and the nodal explants were found to respond well for callus induction. In *Aloe vera,* leaf base explants responded well for callus induction in MS medium supplemented with 2,4-D(2.5 mg/l) and BAP (2 mg/litre).However callus induction rate in *Aloe vera* L. (*barbadensis* Mill)was found higher when adventitious bud was used as explant in MS medium supplemented with kinetin(0.5mg/l) and NAA(1.5 mg/litre). Also standardization of procedure for elicitation studies for the synthesis of therapeutic compounds in callus cultures in both medicinal orchid, *Dendrobium nobile* and *Aloe vera* were carried out.

13. **Development of nanoparticle incorporated edible coating for extending shelf life of nendran banana**

(PI: Athulya S. Kumar, Assistant Professor, Processing Technology)

Objectives:

- To explore the possibility of incorporation of nanoparticles in edible film coating
- To study the effect of incorporation of nanoparticles on enhancing antimicrobial properties
- To develop an environment friendly method for enhancing shelf life of nendran banana

Major Research Highlights:

- Synthesized silver nanoparticles from neem leaves.
- Initiated characterization works of synthesized nanoparticle
- Initiated synthesis of silver nanoparticles from aloe vera leaves
- Preliminary trial was conducted for extraction of aloe gel for preparing edible film coating

14. **Growth and Defense trade-off in unstable continuum: Exploration of root endophytes including *Piriformospora indica* & their biomolecules for enhanced yield and management of biotic and abiotic stress in tropical fruit and vegetable crops**

(PI: Dr. Joy M., Professor (Plant Pathology) and Head, FSRS Sadanandapuram)

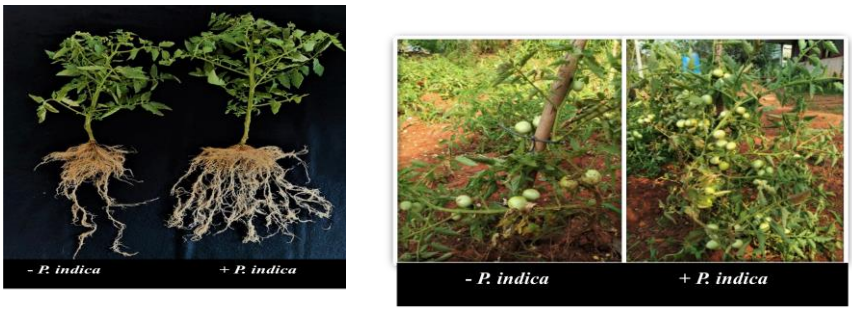
Objectives :

- Standardization of the protocol for the co-cultivation of *P. indica* (root endophytes) with major tropical fruit and vegetable crops
- Determining the stage of fruits and vegetable seedlings for *P. indica* (root endophytes) colonisation
- Deciphering the mechanisms: how the recruitment of *P. indica* (root endophytes) to the roots of TC plants and seedlings helps their establishment in the field under moderate to extreme abiotic stress conditions
- Evaluation of the *P. indica*-colonised fruit and vegetable seedlings against various biotic stress
- Development an ideal and efficient methodology and medium for the mass multiplication and commercial formulation of *P. indica*

Major Research Highlights:

Standardized the protocol for the co-cultivation of *P. indica* with major tropical fruit and vegetable crops. The best co-cultivation method for *P. indica* with tissue cultured banana plantlets & suckers and papaya; and vegetables viz. vegetable cowpea, tomato, okra, and chilli were standardized under *in vitro* and *in vivo* conditions with enhanced germination, establishment in the field, growth and yield under field conditions. Ready to use *P. indica*-mass multiplied medium were also standardized for co-cultivation with fruits and vegetable crops. *In vitro* and *in vivo* antagonistic activities of *P. indica* against different foliar and root fungal pathogens viz., *Fusarium* / *Rhizoctonia* / *Colletotrichum* were established through antibiosis, lysis, coiling and overgrowth. *In vivo* evaluation of *P. indica*-colonised seedlings/plantlets of vegetable and fruit crops against fungal, bacterial and viral diseases through pot culture and field experiments revealed that in addition to more than 50 per cent growth promotion, the colonized-plants could reduce the fungal,

bacterial, phytoplasmal and virus diseases incidence by more than 60 per cent and the disease severity by more than 72. The endophyte could exceptionally reduce the viral diseases both prophylactically and curatively. Field experiments were carried out with two treatments replicated 15 times. All cultural operations were carried out as per the Package of Package recommendations of Kerala Agricultural University. Natural incidence of fungal, bacterial phytoplasmal and viral diseases was recorded at different intervals *viz.*, 45, 60, 75 and 90 days after transplanting in vegetables and monthly intervals in banana and papaya. It was recorded that *P. indica* significantly reduced natural incidence of fungal, bacterial, phytoplasmal and viral diseases upto 90 per cent and severity upto 78. *P. indica*-colonised plants recorded increased root plant growth, early flowering and fruit set, enhanced yield and quality parameters of fruits compared to the non-colonised plants.



Growth and yield enhance in *P. indica*-colonised tomato in field

Growth and yield enhance in *P. indica*-colonised chilli in field

Early bunch emergence and enhanced yield in *P. indica*-colonized banana var. Nendran

Normal bunch emergence and yield in *P. indica*-non-colonized banana var. Nendran

15. **Investigation on etiology of root (wilt) and mid whorl yellowing diseases in coconut**

(PI: Dr. Joy M., Professor (Plant Pathology) and Head, FSRS Sadanandapuram)

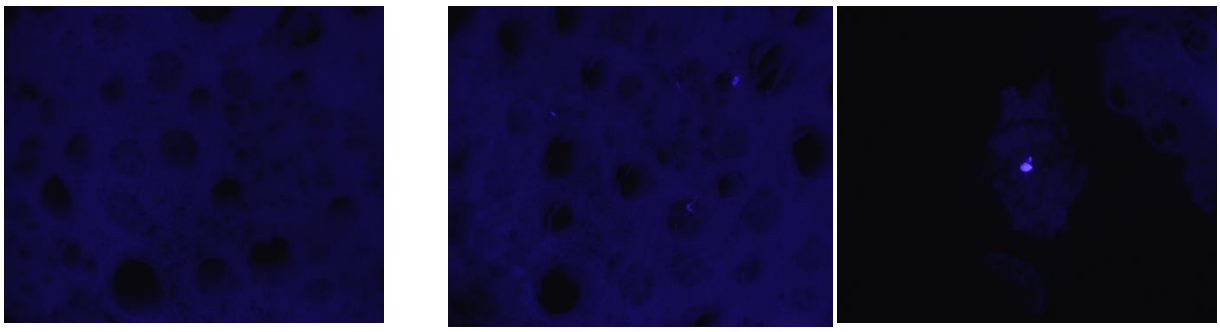
Objectives:

- To survey the incidence and intensity of root (wilt) and yellowing diseases of coconut in southern districts of Kerala (Thiruvananthapuram, Kollam, Alappuzha, Kottayam, and Pathanamthitta)
- To assess the yield loss due to root (wilt) and yellowing diseases in coconut

- To identify the cause / etiology of root (wilt) and yellowing disease in coconut
- To develop suitable diagnosis tools (serological and molecular) for the early and quick detection and identification of these diseases.

Major Research Highlights:

Surveyed the incidence and intensity of root (wilt) and mid whorl yellowing diseases of coconut in southern districts of Kerala (Thiruvananthapuram, Kollam and Pathanamthitta). There were incidences of root (wilt) and mid whorl yellowing diseases individually and in combination in different surveyed locations. Incidences of these two diseases were seen in most of the popular varieties grown in the field in the scattered manner. There were partial yield loss in root (wilt) affected coconut palms; and complete yield loss in mid whorl yellowing affected coconut palms in different varieties of coconut. Roots, leaf (outer, mid and inner whorls) and inflorescence of most susceptible and healthy palms are used to study the histopathological changes associated with the diseases. Preliminary study with DAPI staining indicates the presence of phyto plasma in root (wilt) and mid whorl yellowing affected palms. The confirmation studies are progressing. DNA isolation from different tissues of the infected palms is being standardized. Molecular detection of the pathogen is progressing.



DAPI Staining in healthy plants; DAPI staining in mid whorl yellowing affected palms
Mid whorl yellowing affected palms

16. **Feasibility of low cost hydroponics fodder production system in Kerala - Qualitative and Quantitative study**

(PI: Dr.Usha C. Thomas, Associate Professor & Officer i/c AICRP on Forage Crops & Utilization)

Objectives:

The study was aimed to identify suitable fodder crops for hydroponics fodder production, to standardise seed rate and period of harvest of fodder in hydroponics fodder production unit and to popularize fodder production technology among dairy farmers.

Major Research Highlights:

Work was done to identify suitable fodder crops for hydroponics fodder production from ten crops *viz.*, rice, barley, maize, wheat, sorghum, bajra, ragi, cowpea, horse gram and green gram. Among the crops, maize recorded highest B:C (2.51) ratio and net income. Considering yield and quality, green gram recorded significantly superior GFY (10.17 kg kg^{-1} seed), protein content (20.97 %), lowest values for fibre and ash, and a B:C ratio more than 1.0. Considering all these factors, maize and green gram were found to be the best among the ten crops grown in hydroponics fodder production system.

The best combinations of seed rate and period of harvest

- Maize :-seed rate of 200 g ft^{-2} and harvested on 11^{th} day
- Greengram :- seed rate of 200 g ft^{-2} and harvested on 7^{th} day

Nutrient solution for hydroponics fodder production

The third experiment was done to standardize nutrient solution for hydroponics fodder production. In greengram, different treatments were found to have no significant effect on the quality characteristics of the crop and significantly higher B:C ratio of 1.19 was recorded for spray of 19:19:19 (0.5%).In maize, highest B:C ratio of 2.36 was recorded in the treatment with, water (control).

17. **Performance evaluation of promising fodder varieties in different AEUs in Kerala**

(PI: Dr.Usha C. Thomas, Associate Professor & Officer i/c AICRP on Forage Crops & Utilization)

Objectives:

To identify suitable fodder crops/varieties for different AEUs in Kerala

Major Research Highlights:

Crops- BN hybrid , Guinea grass, Fodder cowpea, Fodder Sorghum, Fodder oats
BN Hybrid Varieties- Suguna, Susthira, CO-3 & CO-5
Guinea grass varieties- Harithasree, Culture-2, CO(GG)-3
Fodder cowpea varieties- Aiswarya, CO FC-8,COFC-9, EC4216
Fodder Sorghum:- COFS-29, COFS-31
Fodder oats:- Kent, JHO-810, JHO-822,RO-19 (High Range)
Locations- Vellayani, Thrissur, Kasargode and Ambalavayal

All the crops and varieties were planted at all the four locations in February-March 2021. Observations have been recorded and tabulation of data is under progress. Perennial crops/varieties are maintained in field for recording one year data. Seven varieties of fodder oats was sown at RARS, Wayanad on 20 November 2021 and will be ready for harvest by January 2022. The project will be concluded by March 2022.

18. **Breeding yard long bean (*Vigna unguiculata* subsp. *sesquipedalis* (L.) Verdcourt) for yield and anthracnose resistance**

(PI: Dr. Sarada S, Assistant Professor & Head, Department of Vegetable Science)

Objectives:

To breed for high yield and resistance to anthracnose disease in yard long bean through artificial inoculation and natural incidence in the main field

Major Research Highlights:

Fifty genotypes of vegetable cowpea were collected from different parts of India including reported resistant lines from previous research programmes of KAU. The genotypes were screened against anthracnose disease using pot culture method. Artificial inoculation was done using the most virulent isolate of *C. gloeosporoides* (from Dept. of Plant Pathology, CoA, Vellayani) on 15 days old seedlings. Disease scoring was done and percentage disease severity calculated. Based on the disease severity, the cowpea genotypes were grouped into five categories and the most resistant genotype identified. Two crossing blocks were laid. In crossing block I, three susceptible, high yielding, pole types, used as female parents were crossed with the resistant male parent to obtain seeds of three F_1 hybrids. In crossing block II, seeds of the threeF_1 hybrids were sown and selfed to produce F_2seeds. The three F_1 hybrids and parents are being evaluated as replicated trial in the main field for trailing nature and yield.

Artificial inoculation in pots

Crossing blocks

19. **Standardization of grafting techniques and mass production of grafts in solanaceous and cucurbitaceous vegetables for biotic and abiotic stress resistance**

(PI: Smt. Shruthy. O. N., Assistant Professor, Department of Vegetable Science)

Objectives:

- To standardize the grafting rootstock and grafting method suitable for solanaceous and cucurbitaceous vegetables like tomato, bell pepper, bitter gourd and cucumber.

- Mass production of grafts in solanaceous and cucurbitaceous vegetables for public

Major Research Highlights:

The project envisaged to standardize the grafting techniques and rootstocks in solanaceous vegetables viz. tomato and bell pepper and cucurbitaceous vegetables viz. bittergourd and cucumber. In tomato three scions were selected ie., Vellayani vijai, Anagha and Manuleshmi. Four rootstocks ie., chilli var Ujjwala, *Solanum torvum,* brinjal variety Haritha and self grafted and three grafting methods viz., cleft grafting splice grafting, approach grafting have to be standardized. In bell pepper three scions were selected ie., Orobelle, Arka Gourav, Arka Athulya. Four rootstocks ie., chilli var Ujjwala, Hot pepper (*Capsicum chinense*), brinjal variety Haritha and self grafted and three grafting methods viz., cleft grafting splice grafting, tube grafting have to be standardized. In bittergourd three scions were selected ie., Maya, Preethi and Priyanka. Four rootstocks ie., pumpkin, ashgourd, bottlegourd and self grafted and three grafting methods viz., hole insertion grafting splice grafting, approach grafting have to be standardized. In cucumber three scions were selected ie., KPCH-1, Heera and Subhra. Four rootstocks ie., pumpkin, ashgourd, bottlegourd and self grafted and three grafting methods viz., hole insertion grafting splice grafting, approach grafting have to be standardized. As a part of the project, a grafting cum healing hamber was established for the healing of grafted plants. Standardization of grafting in tomato, cucumber and bitter gourd at final stage completed and standardization of grafting initiated in bell pepper.

1. Seedlings ready for grafting

2. Grafted seedlings

3. Grafting cum healing chamber

20. **Technological interventions for productivity enhancement in wet land rice**

(PI: Dr. Ameena M, Associate Professor, Department of Agronomy)

Objectives:

Standardization of priming techniques for healthier and quicker establishment of seedlings under adverse situations, development of a 'Ready to lay seed tape' for reducing the establishment cost of rice, development of multi nutrient cum growth regulator mixture to enhance productive tillers, spikelets and grain filling for enhancing rice production.

Major Research Highlights:

Vigour enhancement for quicker establishment of rice seedlings was evaluated using various priming techniques *viz.*, osmopriming, nutripriming, hormopriming and vermipriming. Confirmatory experiment on speed of germination was completed and the results revealed that nutripriming with Boron at 0.1per cent and hormopriming with Salicylic acid at 20 ppm were found to have significant influence on enhancing speed of germination. Bioprimingof rice seeds with beneficial root endophyte *Piriformospora indica* for enhancing tolerance to drought under various irrigation schedule was conducted during summer 2021. Plants colonized with *P. indica* recorded significantly superior grain yield (2305.5 kg ha^{-1}) and straw yield (2566.33 kg ha^{-1}) compared to noncolonized control plants. Grain yield and straw yield were found to be significantly higher for colonized plants compared to noncolonized control plants irrespective of the irrigation ratio. The experiment on development of multi nutrient cum growth regulator mixture to enhance grain filling is progressing in screen house.

21. **Standardization of agro techniques for protected cultivation of leafy vegetables**

(PI Dr. Sheeba Rebecca Isaac, Professor, Department of Agronomy)

Objectives:

- To standardise the seed treatment method to enhance germination in coriander

- To identify the most appropriate planting method, season, spacing, and
- To assess the economic number of harvests for higher leaf yields in palak and coriander under protected conditions

Major Research Highlights:

The lab and field experiments were conducted at the College of Agriculture Vellayani during 2020-21. The salient findings include

Palak: The effect different growth media on the germination and seedling characters revealedmaximum germination, seedling length and vigour index in the medium of soil + vermicompost + coir pith compost (1: 1: .5).

Planting of two week old seedlings in a growth medium of soil + vermicompost + coir pith compost in 1: 1: .5recorded better establishment, growth and higher leaf yields.

Under rain shelter conditions, per plant yield was the highest in 40 cm x 40 cm spacing and per unit area yields in 40 cm x 20 cm and four harvests proved the most economic for palak cultivation. The performance of the crop during the four seasons revealed it to be suitable for year round cultivation in rain shelters, with comparatively higher yields in July- September period.

Coriander :Seed treatment studies revealed maximum germination and seedling vigour with potassium dihygrogen phosphate @ 1% concentration (16h soaking), in both, whole and split seeds. However, a modification with the use of a higher quantity of seeds (whole) as required for field cultivation, soaking and incubation of a minimum of 30 g seeds revealed significantly higher germination percentage compared to lower quantities used. A 24 h soaking in water and incubation was found to the best. However, irrespective of the seed treatment methods, sprouting was observed only after five days.

Organic nutrition with farmyard manure, vermicompost, rajphos, PGPR Mix 1 and ash **s**upplying 0.16 g N, 0.08 g P_2O_5, 0.16 g K_2O per plant was found superior for grow bag cultivation of coriander.

The field experiment conducted during two seasons under rain shelter conditions revealed maximum yields in the wider spacing of 30 cm x30 cm on par with 30 cm x 20 cm and three harvests to the most economic.

22. **Establishment of centre for post harvest management and value addition for under exploited fruits and vegetables of Southern Kerala**

(PI: Dr. Mini C, Professor & Head, Department of Post Harvest Technology)

Objectives:

Refinement and Perfection of Technology for commercial production and marketing

Major Research Highlights:

The technologies developed in the project were refined and perfected and the following four different technologies were approved by the Directorate of Research, KAU for Transfer of Technology

1. Spray dried cashew apple juice powder
2. Portion packaging of jackfruit
3. Osmo air dehydrated fruits (cashew apple, carambola and papaya)
4. Fruit and vegetable jam

Developmental activity

Civil work for the Centre for post harvest management and value addition for under exploited fruits and vegetables is completed with the funds released.

23. **Establishment of Techno-incubation centre for the commercialization of value added products from under exploited fruits and vegetables**

(PI: Dr. Mini C, Professor & Head, Department of Post Harvest Technology)

Objectives:

Setting up of a Techno-Incubation Centre at College of Agriculture, Vellayani

Major Research Highlights:

A Techno-Incubation centre with the essential facilities required for the manufacture of value added products was established at COA, Vellayani to help the prospective entrepreneurs and SHG groups to utilize the facility ensuring sustainable income. The centre can effectively disseminate the value addition technologies, as more and more people could get convinced about the benefits of fruits and vegetables processing. The centre could provide an idea on the essential infrastructural requirement for setting up a processing unit. Technical support, transfer of technology and consultancy services can be provided to the entrepreneurs and SHG s on payment basis.

24. **Extraction and utilization of plant based natural colors for safe to eat food production**

(PI: Dr. Mini C, Professor & Head, Department of Post Harvest Technology)

Objectives:

To standardize an efficient, cost effective technology for plant based natural food colour production for utilization in food processing

Major Research Highlights:

Selection of an appropriate extraction technique and optimization of extraction conditions were done to improve the efficiency and productivity of natural colorant. Flesh and peels of four different raw materials *viz.*, beetroot, carrot, pomegranate and grape were extracted independently using 100% ethyl alcohol using cold solvent extraction method adopting 1: 1 and 1: 2w/v solid to solvent ratio for 24 and 48 hours. The collected extracts were evaporated at 60^0C; per cent yield and pigment content were calculated. Extract yield and pigment content were significantly influenced by raw material, solid to solvent ratio and duration of extraction. Extract yield was higher in flesh of carrot and beetroot as well as in peels of grape and pomegranate. Anthocyanin content in grape and pomegranate and betalain content in beetroot were high in peel where as β-carotene content was higher in carrot flesh extract. Per cent yield and pigment content increased with increased duration of extraction and solid to solvent ratio. Requirement of more solvent and longer extraction time are the drawback of conventional extraction methods and there is a growing

demand for nonconventional techniques to enhance yield and maintain pigment stability.

25. **Network Project on Potential impact of climate change and flood on Kerala Soils: AEU wise mitigation and adaptive strategies**

(PI: Dr. Rani B, Professor and Head, Dept. of Soil Science and Agricultural Chemistry)

Objectives :

- Generation of AEU wise soil resource inventory and mapping using GIS
- To assess the actual and potential productivity of soil and derivation of related indices
- To assess the impact of climate change and flood on soil characteristics and soil health in relation to crop productivity and prediction using suitable models
- Development of AEU wise management plans to reduce the gap between actual and potential productivity
- To carry out awareness programmes and demonstrations related to the restoration of soil productivity
- To conduct of participatory research in the farmers' field for optimizing targeted yields in major crops of the AEU's

Major Research Highlights:

Soil samples were collected from 1124 geo-referenced locations covering all the 23 AEUs. From each location surface, subsurface and core samples were collected. Altogether, nearly 3000 samples were collected. Field data of the sampling areas were also collected (Location details like Panchayat, Latitude and longitude, land characteristics like slope, drainage etc., details about crops grown and the management practices followed. Analysis of collected soil samples is in progress.

26. **Product formulation and standardization of secondary and micronutrient fertilizer mixtures for Southern Kerala**

(PI: Dr. Rani B, Professor and Head, Dept. of Soil Science and Agricultural Chemistry)

Objectives:

- Formulation of secondary and micronutrient fertilizer mixtures for various modes of application

- Experiments in the different crops viz. ginger, turmeric, pepper and cardamom, for scheduling the mode and time of application of secondary and micronutrient fertilizer formulations for increased yield.

Major Research Highlights:

Survey of farmers fields for ginger, turmeric and pepper fields were completed. Plant and soil samples were collected and processed for analysis The soil and plant samples collected were analysed and based on the analytical results, secondary and micronutrient fertilizer mixtures for southern Kerala were prepared. These fertilizer mixtures will be applied to different crops for studying the influence on growth and productivity.

27. **Refining technologies for by product utilization of major crops: jackfruit and pineapple**

(PI: Dr P.R.Geetha Lekshmi, Asst Professor, Dept of Post Harvest Technology)

Objectives:

a) Refining/ standardization of byproduct utilization from jackfruit
b) Refining/ standardization of byproduct utilization from pineapple

Major Research Highlights :

Pineapple and jackfruit waste are rich in nutrients but often wasted during the processing and were utilised for the development of value added products with nutritional benefits. Pineapple core and peel are the sources for byproduct utilisation and the technologies for pineapple wine using core as well as peel and core candy were standardised/ refined.

Pineapple wine from pineapple waste: Pineapple core and edible peel of pineapple which are generally wasted during pineapple processing is utilised for the development of the wine as per FSSAI standards. Pineapple core candy: Standardised the protocol for pineapple core candyfor different process variables (pretreatmetns, slice thickness) and humectants.

Jackfruit seed is a nutrient rich byproduct from jackfruit. Jackfruit pasta: Standardised the protocol for the development of jackfruit pasta using different proportions of jackfruit bulb flour and jackfruit seed flour in suitable combinations to replace maida in pasta preparation.

Functional jackfruit pasta: Standardised the functional jackfruit pasta with addition of vegetables (red amaranthus, beet root and carrot) in extrusion processing of jackfruit pasta.

Jackfruit cookies: Standardised the protocol for jackfruit seed flour preparation and developed healthy cookies using jackfruit seed flour replacing maida flour.

Jackfruit – Amaranthus pasta

Jackfruit – carrot pasta Jackfruit- beetroot pasta Pineapple core candy

28. **Product development on functional ready to serve beverages: refinement and protocol development**

(PI: Dr P.R.Geetha Lekshmi, Asst Professor, Dept of Post Harvest Technology)

Objectives:

- Product development on functional ready to serve beverages, refinement and protocol development
- To assess the storage stability and change in nutritional composition during storage

Major Research Highlights :

Technologies for the development of functional beverages from different fruits and vegetables were standardized/refined.

Passionfruit Functional Beverage: Passion fruit juice was blended with aloe gel processed through osmodehydration technology in different proportion and based on organoleptic and biochemical qualities the best formulation was subjected to storage stability studies. The blended beverage recorded a shelf life of two months under room temperature storage.

Bilimbi functional beverage: Bilimbi fruits were preprocessed and juice extracted was used for the development of blended beverage with aloe gel, osomdehydrated aloe gel and ginger extract and the best formulation recorded a storage life of two months at room temperature.

Red Banana functional beverage: Clarified red banana juice and prepared red banana RTS beverage and blended beverages using pomegranate and kinnow orange.

Bitter gourd Carrot functional beverage: Bittergourd juice and carrot juice were blended in different proportions and the best formulation was selected for the storage studies which recorded a shelf life of two months without loss in quality.

Mangosteen nectar: Mangosteen nectar was formulated with different proportions and was standardized as per FSSAI specifications. Process standardization for colour extraction from mangosteen rind, which is wasted during consumption was done and based on colour stability studies the protocol was developed. The natural colour extracted from mangosteen rind was incorporated in mangosteen nectar to improve its nutritional and sensory attributes. The mangosteen nectar with natural colour extract from mangosteen rind recorded a shelf life of two months at room temperature storage.

29. **Development of value chain in banana and pineapple for postharvest loss reduction and enhanced farmer income (Banana)**

(PI: Dr P.R.Geetha Lekshmi, Assistant Professor, Department of Post Harvest Technology)

Objectives:

a) Assessment of postharvest loss for banana (Thiruvananthapuram dist)
b) Value chain analysis of banana (Nendran and Red Banana)
c) Postharvest handling studies to extend the shelf life and value addition through product diversification

Major Research Highlights:

Primary survey has been conducted among farmers from Krishi bhavan, VFPCK and FPOs for the value chain analysis. Standardization of postharvest treatments to extend the shelf life of nendranand red banana and development of value added products through dehydration technology are in progress.

30. **Germplasm collection, evaluation and evolving management practices for regular bearing in clove (*Syzigiumaromaticum* (L) Merr. & Perry) accessions**

(PI: Dr. Sreekala G.S., Assistant Professor, Department of Plantation Crops & Spices)

Objectives :

1. To observe growth and yield parameters of elite accessions of clove
2. To standardize high density planting and canopy management

Major Research Highlights:

Clove (*Syzygium aromaticum* (L) Merr. & Perry) accessions of fifteen different locations of major clove growing regions comprising of Aryankavu, Ponmudi, Braemore,Nedumangad, Balaramapuram, Anchal, Vellayani, Vithura and Kallar in Kerala and Maramalai, MukkumpalaAzhakiapandipuram,Karumparai, Velimalai and Pechiparai in Kanyakumari district

of Tamil Nadu were surveyed to identify the extend of genetic divergence in the existing populations during 2017-18. After surveying 1800plants, accessions which showed special characters and superiority in yield based on surveywere selected for characterization and evaluation.Selected accessions were characterized with the help of descriptors of Mangosteen (*Garcinia mangostana*) developed by IPGRI(2003) and minimal descriptors for other tree spices published by NBPGR, NewDelhi. Qualitative characters including tree, leaf, bud, flower, fruit and seed characters were observed. Quantitative characters such as Plant height, girth at 30 cm, canopy spread, leaf length, leaf breadth, leaf area, number of inflorescence per m^2, number of flower buds per inflorescence, single bud weight (fresh), single bud weight (dry), mature bud length, mature bud diameter, flowering period, fresh bud yield per tree and dry bud yield per tree , fruit weight , seed weight were also determined. Thirty genotypes were morphologically characterized based on twenty one qualitative characters. UPGMA (unweighted pair group method with arithmetical averages) cluster analysis using Jaccards coefficient of similarity of thirty accessions showed similarity, which were distributed between 41-100%. At genetic similarity of 73% the thirty accessions were grouped into 5 major clusters. Among the genotypes the predominant tree characters were elliptical tree shape (40%), semi erect branching pattern (56.67%), bud forming during mid season (70%) , combination of 1,2,3 flower buds per cluster (86.67%) and medium bud size (70%).The yield has been recorded for these accessions for last five years and the highest fresh and dry yield, stable yield as well as combination of 1,2,3,4,5 bud clustering habit was observed in Acc.5 and can be recommended as a good genotype .The volatile oil and oleoresin were highest for Acc.1.

Analysis of 18SrRNA region and phylogenetic analysis was done for accessions which showed superior yield such as Acc.1, Acc.3,Acc.5 andAcc.7. ITS4 and ITS5 primers of the 18SrRNA region was used for PCR amplification. The amplified products were sequenced by Sanger's method and used for analysing the variance present in between the four accessions. From the phylogenetic analysis it was found that Acc.5 was very distinct from all other three genotypes, corroborating with the phenotypic characters.Among the four accessions, Acc. 1 and Acc. 5 showed combination of 1,2,3,4,5 flower buds/ cluster (branching) while Acc. 3 and Acc. 7 showed combination of 1,2,3 flower buds/cluster (non branching).Based on ITS region it was not possible to conclude the genetic variability contributing for branching and non branching of the inflorescence.So it was decided to find the genetic variance present in the genotypes by

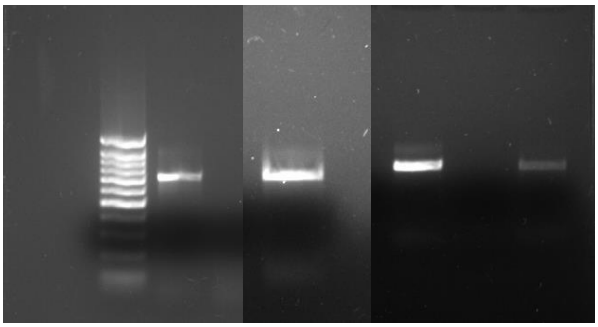
RAPDanalysis.The genomic DNA extracted were used for PCR using operon primers (OPB 1 to OPB 10) for RAPD analysis. The presence or absence of polymorphic bands were scored andbased on that the similarity coefficient were calculated. Based on that phylogenetic tree wereconstructed and the genetically different four accessionswere classified based on bud clustering habit as branching (Acc.1 and Acc.5) and non branching (Acc.3 and Acc.7). Even between Acc 3and Acc.7 there were several characters which showed difference. In RAPD analysis there were more common bands between Acc.1 and the Acc.5; but more polymorphic bands were present in Acc.1. There were 13 polymorphic bands in Acc.1 but in Acc.5 with respect to Acc.1 there were only two bands. Polymorphic bands were detected in Acc.5 when OPB 6 was used, these polymorphic bands were absent in Acc.3, Acc.7and Acc. 1.The polymorphic band which was present in Acc. 1 using OPB 1 was common in Acc. 3 and Acc. 7. But there were a few polymorphic bands in Acc. 3 which were absent in Acc. 7, Acc. 1 and Acc. 5. More polymorphic bands were detected in Acc. 3 with respect to Acc. 7 using OPB 3 and more polymorphic bands observed in Acc. 7 with respect to Acc. 3 in OPB 6.Based on these polymorphic bands a SCAR marker can be developed to distinguish these four accessions at seedling stage to avoid mixed planting.

Four replications of four clove accessions (Acc.20, Acc.3, Acc.5, Acc.6) maintained in Block 1 of Instructional Farm, Vellayani were observed for seedling characters.

Acc. 5 -Tree

Bud clustering habit – Acc.5

Acc.3 Acc. 7 Acc. 1 Acc.5



PCR amplification of 18srRNA region between ITS4 and ITS5 from four different genotypes. A fragment between 700 to 800 bp is amplified.

28. **Development and evaluation of polyploids and superior genotypes in ginger (*Zingiber officinale* Rosc) for yield and resistance to rhizome rot**

(PI: Dr. Sreekala G.S., Assistant Professor, Department of Plantation Crops & Spices)

Objectives :

- Development of autotetraploids in ginger cultivars using colchicine
- Molecular characterization of superior genotypes
- Screening of ginger cultivars against rhizome rot under natural condition

Major Research Highlights:

Expt 1.Development of autotetraploids in ginger cultivars using colchicine

Standardised colchicine treatment method for induction of polyploidy (0.1% colchicine for 2 consecutive days @ 1ml per day applied from 6.00 am to 9.00 am , washed and then allowed to shade dry and planted in protrays).Colchicine treated single sprouted ginger rhizome bits were planted in polybags and is under observation. The sprouting percentage was 32% and the survival percentage was 5%.The superior genotypes of ginger has also been planted on field is under evaluation.

29. **Establishment of mother plant blocks of spice plants**

(PI: Dr. Sreekala G.S., Assistant Professor, Department of Plantation Crops & Spices)

Objectives :

1. To collect elite genotypes of clove, nutmeg, garcinia and black pepper from the farmers field
2. To evaluate the genotypes of clove, nutmeg, garcinia and black pepper collected.
3. To establish mother blocks of elite cultivars of clove, nutmeg, garcinia and black pepper

Major Research Highlights:

Seedlings of thirteen clove genotypes were collected from Merchinston estate , Ponmudi and planted in the germplasm area for tree spices at College of Agriculture, Vellayani. Six elite nutmeg genotypes evaluated from farmers field as well as grafts of released varieties of nutmeg plants were collected for planting at College of Agriculture, Vellayani.

30. Standardization of precision farming technologies for mango under high density planting (HDP)

(PI: Dr. Rafeekher M, Assistant Professor & Head, Dept. of Floriculture and landscape Architecture)

Objectives:

To create a precision farm research unit of mango under high density planting system in College of Agriculture Vellayani in order to create a platform for further research and standardization of various technologies

Major Research Highlights:

One Ha area for the establishment high density planting was identified, land was prepared and planting was done partially. Mango grafts are prepared for completion of planting and drip

fertigation is needed to be installed. Completion of planting and layout of precision farming technologies will be completed this financial year as an ongoing project.

31. Network project on development of high yielding short duration rice varieties tolerant to abiotic stress through marker assisted breeding and mutagenesis

(PI: Dr. Beena R., Assistant Professor, Department of Plant Physiology)

Objectives:

Marker assisted stacking of drought and heat tolerant QTLs into the popular rice variety Uma (MO-16)

Major Research Highlights:

Four sets of staggered sowings of Uma, CR-Dhan801 were done and crossing work was completed and collected the F_1 seeds of Uma and CR-Dhan801. Sowing of F_1 seeds were done and crop is in grain filling stage. Another set of crossing was done between Uma and CR-Dhan801.

Four sets of staggered sowings of Uma, Nagina-22 were done and crossing work was completed and collected the F_1 seeds of Uma and Nagina-22. Sowing of F_1 seeds were done and crop is in grain filling stage. Another set of crossing was done between Uma and N-22.

Extraction of DNA from Uma, CR-Dhan801, Nagina-22 were completed, quality and quantity were checked. Polymorphism survey between the Uma and CR-Dhan801; Uma and Nagina-22 were in progress. Among 100 primers, 22 primers were found polymorphic between parents.

32. Development of production protocol for Dwarf Red Banana(*Musa acuminata* cv. Dwarf Red Banana)

(PI: Dr. Sheeja K Raj, Assistant Professor, Department of Agronomy, CoA, Vellayani)

Objectives:

To standardize the cost effective growing medium for the macro propagation of dwarf red banana using PIF technique, to standardize the fertilizer recommendation for higher yield in dwarf red banana and its morphological characterization.

Major Research Highlights:

Six growing medias *viz*., coir pith + soil in 1: 1 ratio (M_1), sawdust + soil (1:1 ratio) (M_2), coir pith + soil in 1:1 ratio +VAM (30 g per corm) (M_3), Saw dust + Soil in 1:1 ratio + VAM (30 g per corm) (M_4), coir pith + soil in 1:1 ratio +VAM (30 g per corm) (M_4)+ Trichoderma enriched FYM (30 g per plant) (M_5) and saw dust + soil in 1:1 ratio + VAM (30 g per corm) + Trichoderma enriched FYM (30 g per plant) (M_6) were assessed to find out the cost effective growing media for the macropropagation of dwarf red banana using PIF technique. Results revealed that the highest number of seedlings were produced in M_3(coir pith + soil in 1:1 ratio +VAM @30 g per corm) followed by coir pith + soil in 1: 1 ratio (M_1) and sawdust + soil (1:1 ratio) (M_2). Nutrient analysis of the medium revealed that growing medium composed of coir pith + soil in 1:1 ratio +VAM (30 g per corm) was normal in EC (0.178 ds m^{-1}) and medium in organic carbon (0.99%). The N, P and K content of the medium were 0.3, 0.24 and 7.39 per cent, respectively. Economic analysis also revealed that coir pith + soil in 1:1 ratio +VAM (30 g per corm) was the cost-effective growing medium for the macro propagation of dwarf red banana using PIF technique. The field experiment to standardize the fertilizer recommendation and morphological characterization of dwarf red banana are progressing at Coconut Research Station, Balaramapuram.

33. Upgradation of technological facilities at RARS(SZ)

(PI: Dr. Geetha Radhakrishnan, Assistant Professor, RARS(SZ), Vellayani)

Objectives:

- Facilitate upgraded computer and network system at RARS(SZ)
- Facilitate networking systems
- Render facilities to showcase the results of various projects undertaken at the RARS (SZ)
- Update and upgrade the library facility at the RARS

Major Research Highlights:

- Existing computer systems upgraded and updated
- Facilitated WIFI and LAN network within RARS(SZ)
- Upgraded the conference room with video conferencing facilities and electronic display unit

34. Development of hybrid rice technology for the state of Kerala

(PI: Dr.Jayalekshmy.V.G, Professor & Head, Department of Seed Science and Technology)

Objectives:

1.Standardization of hybrid seed production technique for Kerala

2.Comparative yield trial of the promising hybrids developed for Kerala

Major Research Highlights:

Hybrid seeds of CRMS 31A xRemya was evaluated in Moncompu done during late kharif 2020 and kharif 2021along with the commercially accepted varieties Uma, Jyothy, Prathyasa, Manuratna, Shreyas and Pournami. In the the first trial during late kharif 2020 the hybrid reported higher yield than Jyothy and Manuratna but the yield was less than the other varieties. In the second trial during kaharif 2021 the hybrid yielded higher than Jyothy and Prathyasa. But the yield of hybrid was lesser than the other commercial varieties.

35. Comparative yield trial of the promosing tomato and cherry tomato hybrids

(PI: Dr.Jayalekshmy.V.G, Professor & Head, Department of Seed Science and technology)

Objectives:

Comparative yield trial of the promising hybrids

Major Research Highlights:

Four hybrids produced from Anagha as one parent and varieties Vaibhav,Nandhi, IIHR 2372 and IIHR 2200 as male parents were found superior and with TOLCV resistance in the student PhD Research project. The hybrid from Anagha and*Solanumlycopersicum* var. *cerasiformae*L.cerasiformae also was found superior with more of cherry tomato characters. The male parents and female parent were raised and hybridization was done using hand emasculation and Pollination technique. The field trial for hybrid evaluation done during May 2021 was lost due to unexpected rain and water stagnation in the field. Hybrid seeds of the promising crosses with

IIHR 2896, IIHR 2200 and Vaibhav is produced and seedlings are being raised for field evaluation.

36. Development and evaluation of bio-organic ready-to-use composite manure mix and pellets for organic cultivation of vegetables

(PI: Dr.Nishan.M.A., Assistant Professor, Department of Agricultural Entomology)

Objectives :

a) To develop customized bio-organic composite ready-to-use manure mix and pellets for major vegetable crop
b) To characterize the properties and storability of bio-organic composite manure mix and pellets
c) To assess the nutrient release pattern of bio-organic composite manure mix and pellets
d) To evaluate the effect of customized bio-organic composite manure mix and pellets on growth and yield of major vegetable crops

Major Research Highlights:

Different organic sources were mixed in different proportion to produce composite organic manures. The composite organic manure mixes were subjected to nutrient analysis and the best combination was selected for preparation of ready-to-use nutrient mix. The physical and chemical properties of pelleted formulations were evaluated. The Nutrient release pattern, storage studies and field evaluation are under progress.

37. Network Project on Breeding Vegetable crops for yield and resistance to diseases

(PI: Ms. Sindura K. P., Assistant Professor, Department of Plant Biotechnology)

Objectives :

To develop doubled haploids in salad cucumber KPCH1 and Kian

Major Research Highlights:

- Breeding lines in salad cucumber procured for doubled haploid production
- Standardization of surface sterilization procedure for anther culture
- Initiation of anther culture

38. Micropropagation protocol for rapid multiplication of Jack (*Artocarpus heterophyllus* Lam.)

(PI: Shily C, Assistant Professor Department of Plant Biotechnology)

Objectives:

To standardize a reliable micropropagation protocol for the large scale multiplication of jack.

Major Research Highlights:

Collected Sindoor variety Jack grafts from FSRS Sadanandapuram. Establishment of contamination free culture is in progress.

39. "Multidisciplinary diagnostic support to address the field problems of farmers in the southern district of Kerala-KarshakaSanthwanam"

(PI: Dr.Santhosh Kumar T, Assistant Professor, Department of Agricultural Entomology)

Objectives:

- Render full technical advice to farmers in the field (Farm Advisory Service) at all times of need with the support of Multidisciplinary team
- Strengthen the already existing provisions of the Department of Agriculture in sorting out field problems
- Integrate IPM ,INM and other technologies to economize the production

- Help University or Government to tackle emergency field problems
- Promote safer food production
- Provide technical support particularly to resident's associations in the town areas in promoting kitchen gardens
- Equip the farming community to meet challenges in hi-tech farming .

Multidisciplinary advisory support to farmers of Kerala. 'KarshakaSanthwanam' operating at College of Agriculture, Vellayani has providing agriculture-based advisories to enquires from farmers and agricultural officers based on farmer's field visits as well as through phone and WhatsApp platforms. Majority of the enquires addressed so far were related to crop protection issues *ie*., pest and disease problems in vegetable crops, banana, other fruit trees, coconut as well as nutrient imbalances in these crops. Around 500 enquiries were attended till date. MDDT visited and addressed various field problems of padasekhrams of Kazhakkottam block ,coconut, vegetable and tuber cropfields of Neyyanttikara, Pallichal and Balaramapuram , Parassala , Kilimanoor AKC's of Trivandrum District and provided necessary solutions. MDDT also visited and addressed various field problems of AKC'S of Kottarakkara, Chathannoor, Chittoomala, Chadayamangalm, Kilimanoor, Kattakkada and Perinkadavila Blocks. So far more than 75 fields visited and remedies given in addition to the telephonic advices from August2020 to till date. Three major problems identified in Thiruvananthapuram and Kollam districts. They are tapioca wilt, banana rhizome rot, nutrient management problems in coconut and disease complex in betel vine. More than 100 problems were addressed during this lockdown period (May2021 alone) through online platforms.

Disease complex problems associated with betel vine in Kadakkal panchayath were addressed and a research activity has been taken up to develop an IDM tool for it.Incidence of plague caterpillars(*Tiracolaplagiata*) reported first time from different regions of Kerala ,studied its bio-ecology and submitted a paper of this in the Journal of lepidopterists society. Lepidopteran pests affecting the jack fruit variety Vietnam early were reported first time from Erumeli village of Kottayam district .Recommendations were given for managing it and submitted apaper of this in the Journal of Tropical Agriculture.

40. Demonstration unit of Rosarium and hydroponics

(PI: Dr. Rafeekher M, Asst. Professor & Head, Dept. of Floriculture and Landscape Architecture)

Objectives:

To create a demonstration unit of Rosarium and Hydroponic system

Major Research Highlights:

Hardscaping of rosarium completed. Rose plants of 30 varieties are getting ready at RARS Ambalavayal - can be planted in January 2022. Project will be completed this financial year as an ongoing project.

41. Nutrient management for maximizing productivity in minisett cassava cultivation

(PI: Dr Rajasree G, Professor (Agronomy), RARS, Ambalavayal)

Objectives:

To develop nutrient management practices for higher productivity and better quality in minisett cassava cultivation

Major Research Highlights:

Field experiment started in September 2020 and minisetts were planted with and without PGPR mix I application in 50 cavity portrays filled with potting medium. Observations in the nursery indicated thatminisetts raised under PGPR mix I had better growth in the nursery than the no PGPR mix I treatment with respect to rooting parameters *viz*., shoot length, root length and number of roots per minisett. However there was no difference between PGPR and no PGPR treatment in nursery with respect to days to sprouting.

Minisetts were transplanted to the main field on 18th day for evaluating the field performance under different nutrient management treatments. Observations of growth attributes the yield attributes and yield were taken from the field experiment. The data tabulation and statistical analysis of the biometric observations, yield parameters, uptake pattern and soil properties of the field experiment are under progress.

42. Identification of *Stylosanthes*species for yield and quality suited for cultivation in Kerala

(PI: Dr.Gayathri G, Assistant Professor, AICRP on Forage Crops and Utilization)

Objectives:

Collection and genotypic evaluation to study the variability and performance of different *Stylosanthes* species suited to be used as perennial fodder legume; Identification of *Stylosanthes* genotypes amenable to shade to be used as intercrop in coconut gardens; Seed production of superior genotypes identified and distribution to farmers.

Major Research Highlights:

Collected seeds of four species of *Stylosanthes*- viz. *S.hamata* (3 accessions), *S.guianensis* (2 accessions), *S.seabrana* (2 accessions), *S.scabra* (5 accessions).Crop was sown in April 2021 and is in the field. All the accessions have flowered and seed set is awaited. Due to untimely rains, seed set was affected this season. As it is a perennial crop, yield data of next year too will be recorded. Biochemical and molecular characterisation of the available accessions also will be attempted.

43. Network project on Utilization of beneficial endophyts for plant growth promotion and management of plant diseases in important crops of Kerala

(PI: Dr. K. N. Anith, Professor & Head, Department of Agricultural Microbiology)

Sub project 1: Endophytic bacteria for plant growth promotion and management of fusarium wilt of vegetable cowpea (*Vigna unguiculata sub sp. sesquipedalis*(L.)Vericourt)

Objectives :

1. To evaluate the role of endophytic bacteria in plant growth promotion and management of fusarium wilt of vegetable cowpea
2. To evaluate the biochemical and molecular mechanisms of endophyte mediated tolerance to *F. oxysporum*.

Sub project 2: Evaluation of the root endophytic fungus *Pirifurmosporaindica* and its formulated products on plant growth promotion and stress mitigation in important spice crops of Kerala.

Objectives:

1. Development of formulated products of *Piriformospora indica*
2. Plant growth promotion studies in black pepper, ginger and cardamom
3. Evaluation of stress mitigation imparted by the endophytic fungus and it formulatedproducts.

Major Research Highlights:

- Isolation of endophytic 38 endophytic bacteria from cow pea varieties completed
- They were evaluated for in vitro antagonism against *Fusarium oxysporum*
- Talc based formulation of *P. indica* developed and the evaluation for survival is going on.
- Evaluation of plant growth promotion in bush pepper plants and field grown black pepper plants have been initiated at two different sites.

44. CENTRE OF EXCELLENCE IN MICROBIAL TECHNOLOGY

(PI: Dr. K. N. Anith, Professor & Head, Department of Agricultural Microbiology)

Objectives:

- Strengthen the Department of Agricultural Microbiology, College of Agriculture, Vellayani for R & D in Microbial Inoculant Technology.
- To act as a nodal center for catering the technological requirement of the State by supplying mother cultures of biocontrol and biofertilizer organisms.
- Development of Liquid and bead formulations of PGPR Mix-I and evaluation of shelf life of the liquid and bead formulations and its efficiency.
- Training for creating awareness on microbial technology and dissemination of technologies.
- Continuous advisory service to the farmers visiting the centre.
- Quality analysis of microbial Products marketed in Kerala
- Search for new organisms of agricultural importance.

Major Research Highlights:

- Liquid PGPR Mix -I formulation was developed and the field trials are progressing at KVK, Kottayam, KVK, Kollam and ORARS, Kayamkulam.
- Calcium alginate based encapsulated formulation of PGPR mix-I with 10% starch as filler material and 2% sodium alginate exhibited maximum viable count of component cultures in terms of longterm storage and retainment of moistutre content. Beads inoculated with PGPR mix-I in non-sterile soil showed highest value in biodegradation scale.

- Out of the five best isolates of PPFMs selected for drought tolerance, PPFM 37 and 38 were effective in improving yield and drought tolerance characters of Paddy.Field trials are progressing in ORARS, Kayamkulam and KVK, Kollam.
- Twentyseven isolates of Silicate Solubilizing bacteria were obtained from Vellayani, Karamana and Onaatukara region. Based on qualitative and quantitative silicate, P and K solubilization potential, invitro studies are progressing.
- The technology of household waste management using composting inoculum was further tested in different types of bins. Different service providers are continuing the use of Composting Inoculum for biowaste management across the State.
- Mother cultures of AMF, *Pseudomonas*, *Trichoderma* and Biofertilizers provided to different centres of KAU & State Department of Agriculture.
- Advisory service provided to 679 nos. of farmers who visited the centre during 2020-21.
- A total quantity of 13145 kg of microbial inoculants was supplied to farmers from the centre generating a total income of Rs. 11,43,672 during 2020-21

45. CIB &RC Registration of bio control agents: Bio efficacy studies and molecular characteriztion of Bio Controlagents

(PI: Dr. K. N. Anith, Professor & Head, Department of Agricultural Microbiology)

Objectives:

- Bioefficacy studies of the two biocontrol agents in various crop-pathogen systems at different agro ecological zones of Kerala
- *In vitro* studies with the two biocontrol agents
- Toxicological studies
- Molecular characterization of the biocontrol agents.

Major Research Highlights:

- Biochemical characterization of the pseudomonas isolate has been carried out
- The pseudomonas isolate has been identified as *Pseudomonas fluorescens* by 16 S rRNA cataloguing. The *Trichoderma* strain has bee given for identification at molecular level

- Expression of interest for toxicological studies have been invited
- *In vitro* studies on antagonism by the bacterial and fungal agents have been initiated

46. Development and quality assessment of blended beverages from fruits and vegetables (Observational Trial)

(PI: Athulya S. Kumar, Assistant Professor, Department of Post Harvest Technology)

Objectives:

Development of quality blended beverages from fruits and vegetables

Major Research Highlights :

- Developed blended beverages from five different combinations of fruits and vegetables
- Conducted sensory analysis (organo leptic evaluation)
- Selected the best treatments from the developed blended beverages
- Initiated storage studies and quality analysis

47. Development and Quality Analysis of Beverages Fortified with Botanicals

(PI: Dr.Suma Divakar, Professor & Head, Department of Community Science)

Six botanical based Ready to serve beverages have been standardized

Sl.No	Botanical	Combination standardised
1.	Hibiscus	Hibiscus petals – 15nos Ginger juice– 30ml Lime- 1 Sugar- 90g Sodium benzoate-2g
2.	Curry leaves	Curry leaves extract- 30ml Ginger juice-20ml Salt-1g
3.	Mint	Mint extract -50ml Ginger juice-15ml Sugar-90g Sodium benzoate-2g

4.	Aloe vera	Aloevera extract-30ml Pineapple-15ml Ginger juice- 15ml Sugar-90g Sodium benzoate-2g
5.	Ginger	Ginger extract-50ml Lemon juice-20 ml Jaggery 90g Cardamom-5 Sodium benzoate-2g
6.	Tulsi	Tulasi extract- 100ml Ginger juice- 20ml Sugar- 75g Water-25ml Sodium benzoate-2g

Analysis for nutrients and anti oxidant activity , on going

ALL INDIA CO-ORDINATED RESEARCH PROJECTS (AICRP)

1. **AICRP on Honey Bees and Pollinators, Vellayani Centre**

(PI : Dr. Amritha V.S., Associate Professor and Principal Investigator AICRP onHoney Bees and Pollinators, Vellayani Centre)

Objectives:

- To undertake need based apicultural research on problems faced by beekeepers in the southern part of the country
- To standardize advanced scientific technologies in bee management, bee health, bee pollination, in *Apis cerana indica*, *Apis mellifera*, stingless bee *Tetragonula iridipennis* and value added products of honey
- Transfer of technology to beekeepers through training programmes
- Teaching apicultural course to the students

Major Research Highlights:

I. Pollen production potential – *Apis cerana*

Evaluation of the pollen production potential of *Apis cerana indica* colonies conducted in the apiaries of AICRP on Honey Bees, Vellayani centre revealed that significant variation was observed among the treatments (daily collection, alternate days, once in three days, once in a week and control) on the parameters *viz*., quantity of pollen, egg laying area, brood area, honey and pollen stores. Significantly high amount of pollen was recorded in the daily collection (9.878 g) which was on par with that of once in three days collection (9.860). While significantly high egg laying (91.792 cm^2), brood area (145.782 cm^2) and pollen stores (43.520 cm^2) was observed in the hive where pollen was collected once in three days. Maximum honey stores was recorded from the control hive (146.200 g). Hence, in the present investigation it was found that the pollen can be effectively collected from the Indian bee hive once in three days. Designed a pollen trap which is suitable to the Newton hive of Indian bee in Kerala as a part of the pollen production potential

experiment.

II. Evaluation of pollen substitutes:

Significant variation was observed in the quantity of diet consumed with the maximum quantity in the corbicular pollen both on the 14th day (56.598 g) and 28th day (93.048 g) which was followed by YSPUHF pollen substitute (35.280g and 46.865g). Maximum honey stores was also recorded from the hives fed with corbicular pollen both on 14th day (108.298 g) and 28th day (105.655 g). Observations on the incoming foragers revealed that least incoming and outgoing foragers was also recorded from the corbicular pollen fed hives during the third and fourth week which shows that the bees are satisfied with the dietary requirements from the corbicular pollen provided within the hive. Thus in the present study, it was found that the bees prefer corbicular pollen than the pollen substitute under the Kerala situations.

III. Feasibility studies of stingless bee under protected cultivation

Significant increase in per cent fruit set was observed in stingless bee pollinated cucumber (*Cucumiss ativus* L.) (76%) under protected cultivation compared to hand pollinated one (54%) whereas the qualitative yield parameters like per cent malformed fruits, length and diameter of fruit were statistically on par. With regard to the quantitative yield parameters, significantly higher single fruit weight, number of seeds per fruit and germination per cent (2 DAS) (685.00 g, 344.10 seeds/ fruit and 90.60 % respectively) was recorded from the stingless bee pollinated crop than that of the control crop (555.00 g, 210.90 seeds/ fruit and 63.00 % respectively). Higher yield was observed in augmented pollination (5.09 kg m^{-2}) compared to hand pollination (3.16 kg m^{-2}). Apart from this, bee assisted pollination was economically feasible with a B:C ratio 1.23 than that of the hand pollinated one (0.67). Thus, augmentative pollination with stingless under protected cultivation has increased the yield of salad cucumber both in terms of quantity (61 % yield increase) and quality in the protected cultivation.

2. AICRP on Mushrooms

(PI : Dr. Heera. G., Assistant Professor and Principal Investigator, AICRP on Mushrooms)

Objectives :

The main objectives are

- To conduct survey of naturally occurring wild mushrooms, cataloguing of the edible / medicinal species
- To evaluate the promising and high yielding strains for regional adaptability
- Standardisation of cultivation techniques
- Exploring the possibility of using locally available materials as substrates
- Supply good spawn to the mushroom growers
- Popularization of mushroom cultivation in different agro ecosystems

Major Research Highlights:

Surveys were conducted in different parts of Thiruvananthapuram and Kollam districts. A total of 14 specimens were obtained. These were isolated and brought into pure culture. Cultures of these specimens were sent to DMR and accession numbers obtained for 12 cultures. These include Leucocoprinus, Trametes elegans, Calocybe, Tricholoma, *Lentinus squarrosulus*, Marasmius cureyi, Cyathius, *Pleurotus tuber regium*, *P. sajor caju*, Chlorophyllum, Lyophyllum, and Coprinellus sp etc. The promising edible species of mushrooms were evaluated for the suitability of the cultivation. The advanced varietal trial for *Pleurotus* sp. PL- 20-201 to 206 was carried out in December 2020. The strain PL-20-204 and Pl-20-205 with minimum days for spawn run and good yield attributes were identified as a promising strain. The advanced varietal trial for milky mushroom strains CI-20-01 to CI-20-10 was laid out in April- May 2021. Among the different strains CI-20-05 and 20-06 took minimum days for spawn run and first harvest. CI-20-05 and 20-06 had the maximum biological efficiency (77.67 and 71.44 %). CI-20-05 produced the maximum number of sporocarps. Five one day awareness programme on mushroom

cultivation were conducted to various participant's *viz.*, unemployed youth, women / housewives and senior citizens. Four two-day training was conducted at AICRP on Mushrooms, Vellayani with 194 participants The problems of the mushroom growers were addressed directly or over telephone and email. AICRP on Mushrooms issued crop advisory services to the growers at the lock down period. Additional revenue was generated by the sale of 854 kg spawn: 29.62 kg mushroom, 16 mushroom beds and 25kg compost from the centre. A total revenue of Rs 1,20,590 was generated.

3. AICRP on Nematodes in Agriculture

(PI : Dr. Nisha M.S., Assistant Professor, Department of Nematology)

Objectives:

1. To identify endemic areas of economically important crops showing major nematode problems in hitherto unexplored areas of the country; and documentation of emerging nematode problems through molecular diagnostic tools and sustained surveillance all over the country.
2. To prepare inventories on nematode dissemination through planting materials, and sharing with concerned government departments for strict compliance of phyto-sanitary provisions.
3. Priority testing of new green molecules against major nematode pest of crops through special emphasis on crops grown under protected cultivation systems, fruit crops, vegetable crops, spices and ornamentals.
4. Development of indigenous biocontrol agents for major phytonematodes
5. To develop root knot nematode resistant cultivars of rice; and identify sources of nematode resistance in other crops.
6. To isolate, identify and develop indigenous strains of entomopathogenic nematodes for the management of major insect pests of crops.
7. Special drive to impart training to farmers on nematode damage symptoms, dissemination and management technology

Major Research Highlights:

A.I. Diversity and distribution mapping of plant parasitic and entomopathogenic nematodes in

Kerala. Plant Parasitic Nematodes (PPN's)

Random survey was conducted in Ernakulam, Alappuzha, idukki and Kottayam districts of Kerala to document occurrence and distribution of plant parasitic nematodes in banana, vegetables, black pepper, ginger, cardamom, turmeric, betelvine, amorphophallus and yams. A total of 350 samples were collected. *Meloidogyne incognita*, *Pratylenchus coffeae* and *Rotylenchulus reniformis* were the major nematodes found in banana. Samples collected from vegetables and polyhouse cucumber revealed presence of root-knot and reniform nematodes. Occurrence of root-knot nematode in betel vine was observed in samples collected from pallimukku area in Alappuzha district. Samples collected from Thovalappady area in Idukki district recorded high population of root-knot nematode in small cardamom (320-580 J2/200cc soil with 80% frequency of occurrence) and black pepper (420-580 *M.incognita* juveniles/200cc soil samples). Occurrence of *M. incognita*, *R.reniformis* and *Trophotylenchulus piperis* were observed in rhizhosphere of black pepper plants in Idukki district. Samples collected from rhizhosphere of ginger, turmeric from Kuravilangadu area in Kottayam district showed presence of root-knot nematode (380-520/200cc soil). Occurrence of root-knot nematode in betel vine was observed in samples collected Pallimukku in Alappuzha district. Samples collected from rhizhosphere of amorphophallus in Nedumanagadu area of Thiruvananathapuram district revealed presence of *Scutellonema bradys.*

Entomopathogenic nematodes (EPN's)

A total of 40 samples were collected from the rhizosphere of vegetables, banana and coconut grown in districts Thiruvanathapuram, Kollam, Pathanamthitta and Alappuzha districts by random sampling. Three isolates of entomopathogenic nematodes (EPN) were isolated by 'insect baiting technique' using rice moth larvae (*Corcyra cephalonica*). Isolate 1 was obtained from the sample collected from cowpea plant grown in College of Agriculture, Vellayani, Thiruvanathapuram was identified as *Steinernema* sp. (Plate 1). Isolate 2 was obtained from the sample collected from tomato plant grown in a multicropped field in Mylom, Kottarakara (Kollam). Based on morphological characters and morphometric measurements it was identified as *Metarhabditis rainai* (Plate2). To confirm the identity molecular characterization was done and blast analysis result revealed the Isolate as *M. rainai*. It was first report from Kerala. Isolate 3 was obtained from the banana rhizosphere in Kainidi area of Alappuzha district and was identified as *Rhabditis* sp (Plate 3). The frequency of distribution of EPNs in Thiruvananthapuram, Kollam and Alappuzha was recorded as 10 per cent. No EPN species were obtained from the samples collected

from Pathanamthitta district.

Plate 1 *Steinernema* sp.

Plate 2 *Metarhabditis rainai*

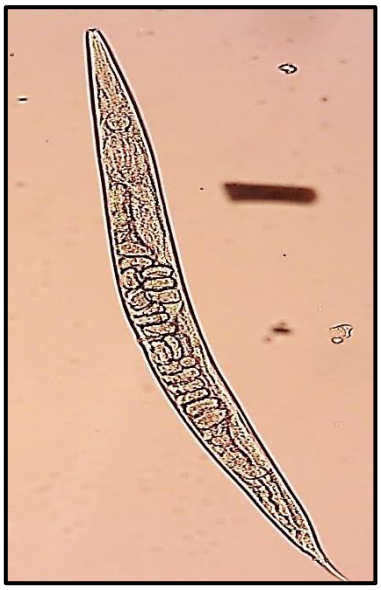


Plate 3 *Rhabditis* sp.

CD 1. Management of root-knot nematode, *M. incognita* infesting vegetable cowpea using bioagents

Soil incorporation of neem cake @100g/m^2 two weeks prior to sowing and application of *Purpureocillium lilacum* at the time of sowing @20g/m^2 reduced nematode population in soil (75.85 percent reduction over untreated) and increased yield (74.96 per cent increase over untreated) in cowpea.

CD 4. Management of *Meloidogyne incognita* in okra by biofumigation and bioagents

Biofumigation using chopped residues of cauliflower leaves @25t/ha+ seed treatment with *P.lilacinum* @5g/kg seed significantly reduced root-knot nematode in soil (92.24 per cent reduction over untreated) and root (80.11 per cent reduction over untreated) and increased yield (85.21 per cent increase over untreated) in okra.

4. Bio-intensive management of nematodes attacking ginger

In ginger, rhizhome treatment with *P. lilacinum* @ 3%w/w+mulching with green leaves of glyricidia @1kg/m^2 significantly reduced nematode population in soil (80.28 per cent reduction over untreated). Highest yield was recorded in rhizome treatment with *P.lilacinum* @ 3 %w/w+ green mulching with glyricidia @1kg/m^2 and it was significantly superior to all other treatments giving 72.72 per cent increase over untreated.

5. Development of technology for application of bio-inoculant in banana for nematode management

Sucker treatment with biocontrol agents viz. *Pseudomonas fluorescens* /*Trichoderma asperellum* @5g/sucker + pit application @ 10g/plant 45days after planting (DAP) found effective in reducing nematode population in soil (81 to 83 percent reduction over untreated) and root (62 to 77 per cent reduction over untreated) in banana. Highest yield was recorded in *T.asperellum* sucker treatment @5g/sucker + pit application @ 10g/plant 45 DAP and it was significantly superior other treatments (77 per cent increase over untreated).

6. H.7. Evaluation of new chemical molecules against *Meloidogyne incognita* infecting cucumber in polyhouse

Fluensulfone @ 1.5 g (product)/plant one DAT, again 25 DAT by ring method manually and fluopyram 400 SC @ 250 g a.i./ha one DAT, again 25 DAT (200 ml/plant) manually can be recommended to manage root-knot nematode in salad cucumber under polyhouse condition.

7. **Isolation and evaluation of nematode antagonistic micro organisms.**

Indigenous bacterial isolates *Lysinibacillus capsici* strain NSK-KAU (accession number - MT509533) and *Bacillus paramycoides* strain NSK-KAU (accession number - MT510176) found effective in inhibiting egg hatching of *M. incognita*. Cell free extract of *L. capsici* and *B. paramycoides* at 25% concentration resulted 13.92 and 19.17 per cent egg hatching on 8^{th} day after treatment. Cell free extract of *L. capsici* and *B. paramycoides* at 100% concentration resulted 74.50 and 69.00 per cent juvenile mortality at 48 h after treatment. Pot culture studies in tomato

revealed that soil drenching of these two isolates significantly reduced nematode population in soil (76.81 to 83.31 per cent reduction over untreated) and root (64.18 to 70.64 per cent reduction over untreated). Plants drenched with *L. capsici* and *B. paramycoides* showed significant reduction in number of galls, females, egg masses and eggs per egg mass (53.75 to 88.92 per cent reduction over untreated).

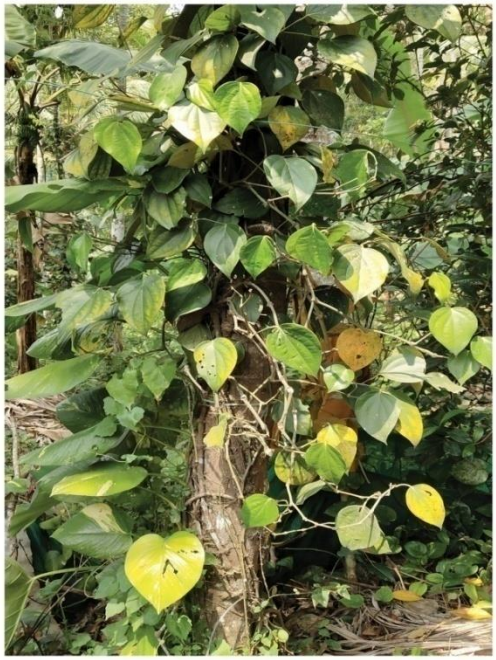
H. 7. Evaluation of new chemical molecules against *Meloidogyne* Spp. infecting cucumber in polyhouse

T_3 - Fluensulfone @ 3g / plant

T_2 - Fluopyram 400 SC @250 g a.i/ha

T_3 - Fluensulfone @3g / plant

Root-knot nematode infected black pepper field at Nanniyodu



Root-knot nematode infected black pepper

4. AICRP on Forage Crops & Utilization

(PI : Dr. Usha C. Thomas, Associate Professor & Officer i/c, AICRP on Forage Crops)

Fodder Production Technology accepted for inclusion in KAU POP-2

Sl. No	Title of the proposal	New recommendation to be included in the POP
1	Silage making from fodder grasses	Addition of tapioca flour/urea 1% on fresh weight basis is recommended for quality silage preparation from guinea grass and BN hybrid
2	Magnesium nutrition in Bajra Napier Hybrid	In Mg deficient soils, 80 kg $MgSO_4$ can be applied along with RDF (200: 50:50 kg NPK and 25 t/ha of FYM) for higher fodder yield and quality.

Technology recommendation by ICAR (2021 Rabi NGM Proceedings, of AICRP on Forage Crops) The cultivation of Agase as top feed planted at 2.0 X 0.5 m intercropped with one row of B X N Hybrid is recommended as sustainable and economical top feed base system.

Ongoing Forage Crop Production Trials-3

1. **Studies on organic source of nutrient on green forage yield and quality of Cowpea- Fodder maize under irrigated situation.**

A field experiment was started during kharif-2019 to study the effect of organic source of nutrients on forage yield, quality and soil properties and to compare the economics of organic source with inorganic in fodder cowpea-Maize cropping system. The treatments included are T_1-100% RDN through inorganic fertilizers, T_2-100% RDN through FYM, , T_3-75% RDN through FYM+ 25% RDN through vermin compost, T_4-75% RDN through FYM + 25% RDN through bio-compost, T_5-50% RDN through FYM + 50% RDN through vermin compost, T_6-50% RDN through FYM + 50% RDN through bio-compost, T_7-75% RDN of T_2 (both source), T_8-75% RDN of T_3 (both source), T_9-75% RDN of T_4 (both source), T_{10}-75% of RDN T_5 (both source), T_{11}-75% RDN of T_6 (both source) and T_{12}-50% RDN through FYM+ 25% RDN through vermin

compost + 25% RDN through poultry. The trial was laid out in Randomized block design replicated thrice.

The data revealed that among organic nutrient sources application of 50% RDN through farm yard manure and remaining 50% RDN through vermi-compost was better than 100% RDN through inorganic fertilizer

2. Evaluation of promising fodder grass varieties under shade conditions

The study was sanctioned in Kharif 2020 and the objective of the study was to assess the influence of different shade levels on the growth, quality and yield of promising fodder grass varieties. The experiment was laid out in split plot design with 15 treatment combinations in 3 replication, main plot treatments were different shade levels (open, 25 per cent shade, 50 per cent shade) and subplot treatments were different Fodder grass varieties (Suguna, Susthira, CO-3, CO-5 and CO GG-3).One year data shows that CO-5 is best suited for cultivation under open and 50 per cent shade and Suguna for 25 per cent shaded fields. The study will be concluded in 2023.

3. Standardization of Magnesium nutrition in Bajra Napier Hybrid

The study was laid out in Rabi 2020 to assess the impact of varying doses and frequency of application of $MgSO_4$ on the growth, yield and quality attributes of hybrid napier.The treatment comprised of two factors, namely $MgSO_4$ levels (M) and frequency of application (F). The treatment combinations included three levels of magnesium [m_1 - 80 kg ha^{-1} , m_2- 100 kg ha^{-1} and m_3- 120 kg ha^{-1}] and three frequency of application [f_1- split application once in 3 months, f_2- split application once in 4 months and f_3- split application once in 6 months]. Analysis of one year data shows that 100 kg $MgSO_4$ ha^{-1} given as split application once in 6 months as the best treatment.The study will be concluded in 2023.

Plant Breeding- Kharif trials 2020-21

1. Initial Varietal Trial in Fodder Cowpea.

   Among eight accessions, IVTC-5 (250 q/ha) recorded highest green fodder yield followed by IVTC-3 (236 q/ha) and IVTC-7 (208 q/ha).

2. Advanced Varietal Trial-1 in Fodder Cowpea.
   Among seven accessions, AVTC-1-7 (239 q/ha) recorded highest green fodder yield followed by AVTC-1-5 (214 q/ha) and AVTC-1-2 (208 q/ha).
3. Initial Varietal Trial in Fodder Ricebean
   Among eight accessions, IVTRB-3 (277 q/ha) recorded highest green fodder yield followed by IVTRB-4 (208 q/ha) and IVTRB-1 (199 q/ha) .

Rabi Trials 2020-2021

1. IVT Oat (SC) Initial Varietal Trial in Oat (Single Cut).
   Among sixteen accessions, IVTO (SC)-2 (444 q/ha) recorded highest green fodder yield followed by IVTO (SC)-13 (407 q/ha) and IVTO (SC)-16 (403 q/ha) .
2. AVT Oat (SC)-1 Advanced Varietal Trial in Oat (Single Cut)
   Among seven accessions, AVTO-1 (431q/ha) recorded highest green fodder yield followed by AVTO-2 (392q/ha) and AVTO-5 (369q/ha). Highest crude protein content was for AVTO-4 (6.4%) followed by AVTO-5 (5.67%) and AVTO-2 (5.5%).
3. AVT Oat (SC)-2 – Second Advanced Varietal Trial in Oat (Single Cut)
   Among ten accessions, AVTO-2-10 (478q/ha) recorded highest green fodder yield followed by AVTO-2-1 (430q/ha) and AVTO-2-6 (417q/ha). Highest crude protein content was for AVTO-2-6 (6.55%) followed by AVTO-2-1 (6.2%) and AVTO-2-5 (5.66%).

Summer Trials 2020-21

1. IVT Bajra (Multicut): Initial Varietal Trial in fodder bajra (multicut) in summer
   Among seven accessions, IVT-BJ-MC-4 (292q/ha) recorded highest green fodder yield followed by IVT-BJ-MC-6 (285q/ha) and IVT-BJ-MC-2 (271q/ha)
2. AVT Bajra (Multicut): Advanced Varietal Trial in fodder bajra (multicut) in summer
   Among five accessions, AVTBJ-MC-5 (330 q/ha) recorded highest green fodder yield followed by AVT-BJ-MC-3 (263 q/ha) and AVT-BJ-MC-1 (233q/ha)

Perennial Trial

1. VT BxNBajra Napier Hybrid

   Started in 2019. Sixteen accessions planted and are being evaluated. The cumulative highest green fodder yield over four cuts this year was recorded for VT BxN-3 (1076q/ha) followed by VT BxN-11(992q/ha) and VT BxN-16 (897q/ha).

In-house breeding trials

1. Development of coreset in fodder cowpea (*Vigna unguiculata* Walp.)

One hundred and thirty nine cowpea accessions were evaluated in the field for their forage characteristics along with three check forage cowpea varieties in an augmented block design. The core set has been identified and will be utilised for further crop improvement programmes. The best ten accessions based on green forage yield will be evaluated in different locations across three seasons.

2. Identification of *Stylosanthes* species for yield and quality suited for cultivation in Kerala

To identify the best *Stylosanthes* species from among S.*scabra, S.hamata, S.seabrana* and *S.guianensis* suited for the climatic conditions of Kerala. Available accessions are collected, raised in the field and evaluated for forage yield and quality. Molecular characterisation of the different species with SSR markers will also be attempted.

Extension programmes

Fodder Technology Demonstration (FTD)

To popularize the fodder production technologies and make the farmers aware about new fodder crop varieties, a total of 40 FTD's were allotted to Vellayani centre during 2020-21 for the crop- BN hybrid variety Suguna and fodder cowpea variety Aiswarya.

5. **AICRP on Biological Control of Crop Pests**

(PI : Dr. Reji Rani O.P., Associate Professor, Department of Agricultural Entomology)

Objectives:

- To evaluate the efficacy of chitin enriched formulation of *Lecanicllium lecanii* (Vl8 – NBAIR) and *L. saksenae* (ITCC 7714 – KAU) in managing pea aphid and other sucking pests in vegetable cowpea
- To evaluate the efficacy of capsule formulation of B. bassiana Bb5 (NBAIR isolate) to amaranthus leaf webber *Hymenia recurvalis*
- To validate the field efficacy of biocontrol agents in managing pest complex in Paddy
- To evaluate the efficacy of microbial agents such as *Trichoderma viride* and *Pseudomonas fluorescence* as prophylactic treatments against *Fusarium* wilt in vegetable cowpea
- To monitor the population build up of Rugose white fly in coconut and to study the biotic and abiotic factors associated with it.

Major Research Highlights :

Experiment I Evaluation of oil formulation of *Lecanicillium spp* against sucking pests of cowpea

Analysis of data (Table1) revealed that, after the first spraying, three days after treatment, chitin enriched oil formulation 10 ml/L of *L.saksenae* and its spore suspension 10^7 spores mL^{-1}were equally effective in managing pod bugs with a mean population of 0.5 bugs per plot. The corresponding population in *L.lecanii* treated plot was 2.5 with oil formulation and 1.0 in spore suspension treatment, which were on par with thiamethoxam treatment. The population in untreated plot was 1.8 bugs per plot. Though all the treatment were found to be ineffective after 3^{rd} day of second spraying, on the 7^{th} day *L.saksenae* oil formulation was the superior treatment for pod bugs where the bugs were totally absent. The corresponding population in *L.lecanii* treatment was 1.25 with oil formulation and 1.0 with spore suspension, the former being on par with that of untreated control.

Experiment II :Experiment II Management of *Fusarium* wilt in vegetable cowpea using microbial agents

As the variation in data was less with respect to number of plants infested, the CD was non significant. Therefore comparison of treatments was done based on percentage incidence. The results revealed that the incidence was least in plots treated with *Pseudomonas flourescence* foliar + *Trichoderma* basal application. Incidence was also found to be reduced in plots treated with *Peudomonas* alone. However need based application of copper oxychloride or copper oxy chloride along with biocontrol agents were found to be ineffective. This might be due to the fact that CoC is drenching is reducing the population of Trichoderma in soil.

Experiment III Surveillance of Rugose white fly in coconut and as the population of natural biocontrol agents

In Location I, Whitefly population was high to severe during Oct 2020 to March 2021, with a gradual increase in number of live spirals (Table 6). The corresponding parasitism levels were 59.29 to 71. 26 .Unlike in the previous year there was no species displacement by *P.mineyi*, though *P.bondari*was present during Jan-Feb 2021.Population of RSW was medium throughout the observation period in Location 2. The parasitism level ranged from 55.35 to 63.55 %. In the Location 3, population of RSW was low till Dec 2020 and thereafter there was a gradual increase to moderate levels till March 2021. Extent of parasitism was 33.09 % to 65.39 %. The period of low parasitism coincided with lest pest density.

Experiment IV: Biointensive pest management in rice.

Analysis of data on leaf rollers revealed that the population was less in farmers practice during the crop period, compared to BIPM plots, until 14 DAP the population of both the plots attained a non significant variation. The mean population was 0.28/plot in BIPM while it was nil in Farmers practice. The population of rice bug was statistically on oar in both the fields after 7 days of spray I and spray II. Thereafter at 14^{th} day the bug population was significantly high in chemical treatment (farmers practice). Obviously the natural enemy population accounted a significantly high count in BIPM plots, both in the vegetative as well as reproductive phases of the crop. Population of

stem borer was lowered significantly14 DAS in BIPM plots. It was equivalent to chemical treatment by farmers during the first week of first sprayg and second spraying. Obviously the natural enemy population accounted a significantly high count in BIPM plots, both in the vegetative as well as reproductive phases of the crop.

Experiment V : Efficacy of capsule formulations of *Beauveria bassiana* in managing amaranthus leaf webber *Hymenia recurvalis*

The experiment carried out during March 2021 at Palappuru village in an area of 10 cents, in amaranthus variety Vaiga (KAU) revealed that biocontrol agents could exert 66 % control of leaf webbers with respect to untreated plants. Capsule formulation of indigenous KAU isolate B.bassian 6065 was faster in action (50 % control on 5^{th} day) than NBAIR isolate (50 % control on 8^{th} day). The spore suspension of NBAIR and KAU isolates were equally good after the second spraying.

6. AINP on Soil Biodiversity - Biofertilizers – "Integration of Biofertilizer Technology with farming practices of tribal farmers of Attappady"

(PI : Dr. K. N. Anith, Professor, Department of Agricultural Microbiology)

Objectives:

- Mass production and distribution of Biofertilizer organisms such as *Azospirillum*, *Azotobacter,* AMF, P solubilizers and PGPR MIX-I developed by KAU for cashew, millets and vegetables cultivated by tribal farmers.
- Field trials at different locations of Attappady to demonstrate the beneficial effects of microbial inoculants.
- Training to create awareness on beneficial aspects and method of application of biofertilizers to tribal farmers, SHG's and Extension officials.
- Publication of bulletins in vernacular language for dissemination of biofertilizer technology among tribal farmers.
- Isolation and evaluation of native efficient strains of biofertilizer organisms such as *Azospirillum*, *Azotobacter* and *Rhizobium* from Attappady hill tract.

Major Research Highlights:

Demonstration trials were conducted in vegetable crops at different locations in Attappady hill tract to show the effect of PGPR Mix -1. Local varieties of tomato,chilli, andlobia beancultivated by tribal farmers were selected. In the trials there was an increase in yield on treatment with PGPR Mix -I when compared to control. In chilli the average yield per plant was 606.56 g per plant in PGPR Mix 1 treated plants compared to 382.5 g per plant in control plants.There was no difference in height of plant and number of leaves. In tomato plants there was increase in yield, height and number of branches. PGPR Mix-1 treated plants showed yield of 0.972 kg/ plant which was significantly higher compared to control plants (0.643 kg/plant).The field trials conducted till date in different areas of Attappady showed that PGPR Mix 1 is capable of increasing the yield by 20 to 30 % in different crops when integrated with the farming practices of tribal farmers. Biofertilizer consortium PGPR Mix -I developed by Kerala Agricultural University was distributed to 470 tribal farmers (at 1 kg each per farmer) cultivating vegetables, pulses, banana, sorghum, groundnut, ragi etc. and the method of application demonstrated. Field visits were conducted with MDDT to address the field problems of farmers at Agali and Sholayur and recommendations were given. Eight isolates of *Azospirillum*, seven isolates of *Azotobacter* and four isolates of P – solubilizers obtained from different locations in Attappady were subjected to preliminary screening. The growth promotion effect of these isolates was studied by pot culture experiment in Amaranthus. Promising isolates were selected based on the screening. The isolates ASPA4 showed maximum performance followed by ASPA1 and ASPA3. All the isolates showed significant increase in all growth parameters compared to control. *In vitro* studies of the isolated are being conducted.

7. **All India Net work Project on Pesticide Residues**

(PI : Dr. Thomas George, Professor and PI, AINP on Pesticide Residues)

Objectives:

(a) To devise simple, sensitive and cost effective analytical methodology for quantification of pesticide residues and their degradation products in different components of the environment.

b) To maintain up-to-date information on pesticide residues and to provide guidelines in this regard to research and extension workers in the country.

Major Research Highlights:

1. Status of NABL Accreditation of Laboratory

Accreditation of the laboratory has extended up to **11.03.2022**. Scope of the Laboratory includes water, fresh fruits, vegetables, cereals, pulses, spices, meat, milk up to a maximum of 97 pesticides.

2. Results / Z-score obtained in the national and international PT programme

It is mandatory for ISO 17025 :2017 accredited laboratories to take part in proficiency testing (PT) programs to demonstrate its performance, competence and excellence. Accordingly PRRAL has participated in four PT programmes and secured satisfactory Z-scores.

PT/ ILC programme conducted by	Commodity	Pesticide Detected	Z-Score
NIPHM, Hyderabad (PT, October 2020)	Water	Butachlor Chlorpyrifos Ethion Pendimethalin Profenofos	Not Analyzed -0.71 -0.93 Not Analyzed -0.61
Proficiency Testing	Rice Powder	Carbendazim	-0.15

Centre, Auriga Research Pvt. Ltd, New Delhi (PT, September 2020)		Buprofezin	-0.45
		Chlorpyrifos	0.21
		Profenofos	1.58
		Tebuconazole	-0.74
		Thiamethoxam	-0.31
		Triazophos	0.96
		Tricyclazole	-0.68
NIPHM, Hyderabad (PT, January 2021)	Green Gram	Acephate	11.16
		Buprofezin	3.46
		Carbaryl	1.83
		Chlorpyrifos	Not Reported
		Deltamethrin	0.42
		Monocrotophos	2.95
		Quinalphos	1.83
		Alpha-Cypermethrin	0.79
NIPHM, Hyderabad (PT, January 2021)	Tomato	Carbofuran & 3-hydroxy carbofuran	0.01
		Deltamethrin	2.41
		Dicofol	Not Reported
		Imidacloprid	1.60
		Profenophos	6.52
		Alpha-Cypermethrin	1.80
		Lambda Cyhalothrin	2.62

3. Conducted hands on training on “Pesticide Residue Analysis of Milk and Meat” to technical staffs of State Institute for Animal Diseases, Palode, Thiruvanathapuram, Department of Animal Husbandry from 19/5/2021 to 25/5/2021. Organised two off campus trainings on “Safe use of pesticides” for SC farmers of Kattakada and Aryanadu panchayaths on 29/1/2021 and 1/3/2021 respectively.
4. Laboratory is maintaining up-to-date data bank on presence of pesticide residues in food commodities

2 Supervised field trials

(PI : Dr. Thomas George, Professor and PI, AINP on Pesticide Residue)

Objectives:

- To study the dissipation of residues of newer molecules for data generation and registration.
- The laboratory has generated data under supervised field trials on persistence and dissipation behaviour of new pesticides on different crops under Kerala conditions. The data generated have been used for the registration of the pesticides in the country, label expansion purposes as well as for the fixation of the MRL value on the particular crop.

Major Research Highlights :

Sl. No	Crop	Pesticide	Days taken to reach BDL		Half life (days)	
			Recommended(X)	Double the recommended(2X)	Recommended(X)	Double the recommended(2X)
1	Brinjal	Cyantraniliprole 7.3%w/w+ Diafenthiuron 36.4% w/w SC (Minecto Forte 480 SC) in Okra				
		1.Cyantraniliprole	25	25	3.90	6.71
		2. Diafenthiuron Dose Rate (g a.i. ha^{-1})- 360 (X) and 720 (2X)	7	10	2.44	1.83
2	Tomato	Cyantraniliprole 7.3%w/w+ Diafenthiuron 36.4% w/w SC (Minecto Forte 480 SC) in Tomato				
		1.Cyantraniliprole	20	20	6.57	5.57
		2. Diafenthiuron Dose Rate (g a.i. ha^{-1})- 360 (X) and 720 (2X)	15	20	2.41	2.72

4	Brinjal	Cyantraniliprole 7.3%w/w+ Diafenthiuron 36.4% w/w SC (Minecto Forte 480 SC) Dose Rate (g a.i. ha^{-1})- 360 (X) and 720 (2X)				
		1.Cyantraniliprole	5	10	1.03	1.68
		2. Diafenthiuron	3	3	6.19	7.26
	Chilli	Luna Experience (Fluopyram 200g/l + Tebuconazole 200 g/l SC) Dose Rate (g a.i. ha^{-1})- 120+120 (x), 240+240 (2x)				
		Fluopyram (in Immature banana)	28	28	18.60	15.89
		Tebuconazole(in Immature banana)	28	28	16.85	12.53
6	Chilli	Fluopyram 250 G/L+ Trifloxystrobin 250 G/L SC (LUNA SENSATION) Dose Rate (g a.i. ha^{-1})- 150+150 (x), 300+300 (2x)				
		Fluopyram	7	14	1.66	2.67
		Trifloxystrobin	7	7	1.62	1.73
7	Chilli	Mancozeb 52.6% + Hexaconazole 2.4% WG (UPF 209b) Dose Rate (g a.i. ha^{-1})- 2000(x), 4000(2x)				
		Mancozeb	10	15	0.61	1.40
		Hexaconazole 2.4% WG	3	7	1.44	1.90

C. **Photographs of different activities**

SCSP-training at Kattakada panchayath



SCSP-training at Aryanadu panchayath


Capacity building programme to the officials of Department of Animal Husbandry


PROJECTS FUNDED BY OTHER AGENCIES

KERALA SOCIAL SECURITY MISSION, GOVT OF KERALA

1. Providing Horticultural Therapy and Establishing Community Horticultural Therapy Garden for Differently Abled

(PI: Dr Beela.G.K, Associate Professor, Department of Community Science)

Objectives:

Creating the opportunity for differently abled students and other special need population to become self-reliant through horticultural therapy.

Specific goals

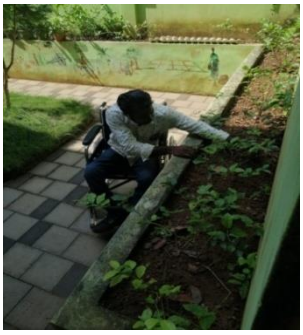
1. To have a community horticulture therapy garden that can be enjoyed by everyone from the very young to the very old, even the blind and wheelchair bound.
2. Equip the differently abled students through horticulture therapy to become self-reliant and nutrition secured in an ecologically sound way.
3. Teach differently abled children and youth basic horticultural skills.
4. Provide information on resources so that horticultural therapy can become an on-going program.
5. Add value for effective marketing of their produce.
6. Ensure that continuity of horticulture therapy practice and information is spread through medical and other rehabilitation professionals.
7. Establish the community horticulture therapy garden as a relevant, well organized, motivated and adequately resourced center for the needy differently abled.
8. Cancer patient receiving cancer treatment can also benefit from the reduction of anxiety, feelings of isolation or anger through the use of horticulture therapy and will be assisted by the differently abled children undergoing the programme

Major Research Highlights:

1) Developed a community horticultural therapy garden in the College of Agriculture, Vellayani. The garden is well maintained with help of the labourers of the University.
2) Steps has been taken to Collaborate with Physiotherapy centres and Rehabilitation centres in order to provide consultation on horticultural therapy to differently abled students
3) Several institutions visited the garden with the differently abled students and have also registered for the Horticultural therapy training programme
4) Due to lockdown horticultural therapy training programme was not conducted in 2020 ,however Online sessions on horticultural therapy for differently abled students was conducted. More focus was given for indoor activities due to lock down.
5) Steps to build a disability friendly toilet has been initiated, The funds transferred to the DPP.
6) From November 2021 ,offline training programme has been initiated and thirty students with disability has enrolled for the session.
7) Pre Assessment was carried out before imparting the training .

Figure 1 : The Community Horticultural Therapy Garden at College of Agriculture.

Figure 2: Differently abled students enrolled for the Horticultural therapy training programme



DEPARTMENT OF AGRICULTURAL DEVELOPMENT & FARMERS WELFARE, GOVERNMENT OF KERALA

1. Horticultural therapy –a tool to rehabilitate the differently abled children at schools

(PI: Dr Beela.G.K, Associate Professor, Department of Community Science)

Objectives:

a. To empower the physically and mentally challenged children at schools through horticultural therapy and enable them to generatincome through the skills attained.

b. To assess children's rehabilitation progress individually.
c. To assess the social and emotional intelligence of physically and mentally challenged school going students undergoing horticultural therapy.

Major Research Highlights :

The project was conducted in nine schools/institutes located at various districts in Kerala where disabled students were enrolled as part of the inclusive education. One hundred school-going students with autism were selected from certain schools for the study. In order to create two equivalent groups, children were assigned to Experimental and Control groups by counter balancing gender and age. The Students with Autism spectrum disorder undergoing Horticultural therapy Programme were assigned to the experimental group (n=22 ,14 males and 8 females, Mean age of 143 months' SD = 8.6)) and students who were not undergoing Horticultural Therapy were assigned in the control group (n=22 ,14 males and 8 females, Mean age of 142 months, SD= 5.7)) using a computerized blocked randomization. Pre Horticultural Therapy Assessment was conducted one week before the commencement of the horticultural activity program .Posttest was conducted one week after the horticultural therapy program's completion. Timeframe between baseline and pre test and post test was approximately three months.The result showed a significant difference in the emotional intelligence of the experimental group and control group. The children of the experimental groupshowed significant improvement in social intelligence and in the six subscales of the emotional intelligence scale, including the utilization of emotions, recognition and consideration of others' emotions, recognition and expression of their own emotions, emotional regulation and impulse control, and relationships with teachers and peers after the horticultural therapy program. The results of this study suggests that the horticultural activities program is effective in terms of social intelligence and emotional intelligence for school going children with Autism.

Figure 1 : A student with autism at Govt School, Ambalavayal , Waynadu district using sponge for watering in the hanging baskets with pulley .

Figure 2: A student with locomotor disability watering plants in the rotating pots at CRDAC , (Govt School) Arnattukara , Trissur District in the presence of Honourable Vice Chancellor, Kerala Agricultural University, Dr R. Chandra Babu and Dean , College of Agriculture, Vellayani Dr Anil Kumar.A.

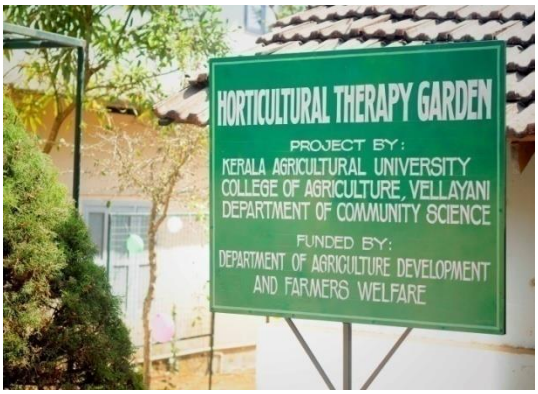


Figure 3: Horticultural Therapy garden established at Vimala Hridaya School, Kollam District and Govt School , Angamali , Ernakulam District

ICAR-IIFSR

1. On-farm crop response to plant nutrients in predominant cropping systems

(PI : Dr. Bindhu J.S., Assistant Professor (Agronomy), OFR Centre, Vellayani)

Objectives:

a) To assess the response of major crops to nutrients in pre-dominant cropping systems in different agro-climatic regions/ecosystems

b) To estimate the impact of nutrient application levels on deficiency in crop-livestock-human food chain continuum

Major Research Highlights :

In rice-rice-fallow cropping system having medium duration rice, application of recommended dose (RD) of NPK+Zn ($N:P_2O_5:K_2O$ @ 90:45:45 kg/ha + $ZnSO_4$ @ 20 kg/ha to *kharif* along with NPK alone to *rabi*) recorded higher grain yield (11,140 kg/ha/year) which was comparable with farmers practice ($N:P_2O_5:K_2O$ @ 96:46:44 kg/ha + $ZnSO_4$ @ 20 kg/ha to *kharif* along with $N:P_2O_5:K_2O$ @ 97:48:43 NPK kg/ha alone to *rabi*) with an yield of 10,891 kg/ha/year. Higher nutrient response (21.21 kg

grain/kg nutrient applied) was observed in RDF (NPK+Zn to *kharif* along with NPK alone to *rabi)* followed by farmers practice which recorded a nutrient response of 19.82 kg grain/kg nutrient applied .Net return (1.19 lakh/ha/year) and benefit: cost ratio (1.61) were higher in application of RD of NPK+Zn to *kharif* along with NPK alone to *rabi*.Farmers practice recorded net return 1.10 lakh/ha/year and BCR 1.55, respectively.

2. On-farm crop response to plant nutrients in predominant cropping systems

(PI : Dr. Jacob D., Assistant Professor & Head, OFR Centre, Vellayani)

Objectives :

a) To enhance the productivity and profitability of marginal farmers households through IFS approach
b) To improve the livelihood and nutritional security through diversification approach
c) To estimate the impact of capacity building in diversification of crop + livestock system

Major Research Highlights :

Hort + Crop + Dairy, Hort + Poultry and Hort + Dairy with mean holding size of 0.5, 0.3 and 0.4 ha, respectively were the three farming systems identified among

marginal farmers in Varkala and Chirayinkeezhu blocks of Thiruvananthapuram district. Average family consisted of 2 male adults, 2 female adults and 1 child. Annual food consumption of family was 740 kg cereals, 155 kg pulses, 205 kg oilseeds, 180 kg vegetables, 185 kg fruits, 350 litre milk, 125 kg meat and 280 eggs.

In each farming system, interventions were made at the start of first year for a total of Rs.10000 in cropping system diversification, livestock diversification, product diversification and capacity building modules. Interventions in cropping system diversification module were nutrient management for coconut with Muriate of Potash, Magnesium Sulphate and Lime for Rs.2000; Intercropping coconut with Nendran variety of banana for Rs. 1500 to Rs. 3000; Replacing local rice variety with high yielding Uma variety of rice for Rs.1500; Interventions in livestock diversification module were Incorporation of mineral mixture in feeding schedule of dairy cows for Rs.3000; Replacing local chicken breed with improved Gramalakshmi breed of poultry birds for Rs.3000; Interventions in product diversification module were Nutritional Kitchen Garden with Grow bag and Knapsack sprayer for Rs. 1500/-; Interventions in capacity building module were Training in Nutritional Kitchen Gardening for Rs.500/-. During fourth year of study 2020-21, Horticulture + Crop+ Dairy, Horticulture +Poultry and Horticulture + Dairy recorded a net income of Rs. 1.74, 1.53, and 1.95 lakhs from farm holding size 0.5, 0.3, and 0.4 ha which resulted in an increase of 198, 165, and 135 per cent respectively, over benchmark year 2016-17.

3. On-farm evaluation of farming system modules for improving profitability and livelihood of small and marginal farmers

(PI : Dr. Jacob D., Assistant Professor & Head, OFR Centre, Vellayani)

Objectives :

a) To address critical constraints of small and marginal farm holders for overall improvement of productivity

b) To increase the profitability of small and marginal households and ensure livelihood security

Major Research Highlights :

Hort + Crop + Dairy and Hort + Poultry with mean holding size of 1.0 and 0.9 ha, respectively were the two farming systems identified among small and marginal farmers in Varkala and Chairayinkeezhu blocks of Thiruvananthapuram district. Average family consisted of 2 male adults, 2 female adults and 1 child. Annual food consumption of family was 480 kg cereals, 120 kg pulses, 145 kg oilseeds, 240 kg vegetables, 130 kg fruits, 270 litre milk, 105 kg meat and 160 nos. eggs. In each farming system, interventions were made at the start of first year for a total of Rs.10000 in cropping system intervention, livestock intervention, on-farm processing and value addition and optional component modules. Interventions in cropping system module were nutrient management for coconut with Muriate of Potash, Magnesium Sulphate and Lime for Rs.2000; Intercropping coconut with Nendran variety of banana for Rs. 1500 to Rs. 3000; Replacing local rice variety with high yielding Uma variety of rice for Rs.1500; Interventions in livestock module were Incorporation of mineral mixture in feeding schedule of dairy cows for Rs.3000; Replacing local chicken breed with improved Gramalakshmi breed of poultry birds for Rs.3000; Interventions in on-farm processing and value addition module were hygienically storing and local marketing of milk. Provision of milk can for Rs. 500; De-husking, grading and sale of coconut. Provision of coconut de-husker for Rs. 500; Interventions in optional component module were Nutritional Kitchen Garden with Grow bag and Knapsack sprayer for Rs.

1500. During fourth year of study 2020-21, Horticulture+Crop+Dairy and Horticulture+Poultry recorded a net income of Rs. 3.23 and 3.66 lakhs from farm holding size 1.0 and 0.9 ha which resulted in an increase of 289 and 377 per cent

respectively, over benchmark year 2016-17.

RASHTRIYA KRISHI VIKAS YOJANA (RKVY)

1. Establishment of National level Quality control lab for Honey

(PI : Dr. Amritha V.S., Associate Professor, Department of Agricultural Entomology)

Establishment of National level Quality control

Objectives :

1. To establish laboratory facility for analysis of honey upto enzymatic level to assess the quality and serve as certifying laboratory for honey as per the approved national and international standards.
2. Rendering analytical and certifying services to beekeepers, institutions and entrepreneurs
3. Serve as a Referral Laboratory for quality honey and adulteration identification.
4. Streamline the processing procedures for good quality hygienic honey production among the bee keepers of the state
5. To equip unemployed youth /women for the production of value added products of honey

Major Research Highlights :

The construction of the building (6000 sq. ft.) for Quality Control laboratory was completed on 27.08.2019. The equipments (LC MS/MS and HPLC FTIR) have been installed and the standardisation procedure for the sample extraction is in progress.

2. Development of technologies including alternatives for banned pesticides for the management of pests and diseases of major crops in Kerala Subproject- 9 Registration of bio pesticides

(PI : Dr. Reji Rani O.P., Associate Professor, Department of Agricultural Entomology)

Objectives:

To register potential bioagents as per the Insecticide Act CIB& RC

Major Research Highlights :

Two potential bioagents, isolated from Vellayani Viz. Beauveria bassiana Accession No. ITCC 6063 and *Lecanicillium saksenae* Accession No. ITCC LsVs1 7714 has been proposed for toxicological studies. Expression of interest received through KAU website was scrutenised and the Committee constituted for the same has decided to accept the rate quoted by Indian Institute of Toxicological Research, Lucknow. Accordingly action has been taken up by the Director of Research to execute an MOU between KAU and IITR, to undertake the study. Later the Institute has withdrawn, for the want of publications on human safety. Further the Director of Research has invited EOI during 20-21 for which there were no respondents.

3. Establishment of "Centre for formulation of convenient foods"

(PI: Dr. Mini C. Professor & Head, Department of Post Harvest Technology)

Objectives:

Establishment of a Centre for formulation of convenient foods

Major Research Highlights:

Developmental project

A Centre for formulation of convenient foods was established at College of Agriculture, Vellayani which could serve as a model minimal processing unit fulfilling the requirement of FSSAI standards. The proposed centre could be utilized for technology dissemination and consultancy service with the intention of strengthening small scale processing units for undertaking commercial production and marketing of convenience foods and the centre could be utilized by the commercial entrepreneurs on payment basis.

INDIA METEOROLOGICAL DEPARTMENT (IMD)

1. Gramin Krishi Mausam Sewa (GKMS)

(PI : Smt Linitha Nair, Asst. Professor & Head, Dept. of Agricultural Meteorology)

Objectives:

(1) Preparation and dissemination of Agromet Advisory bulletins to farmers using medium range weather forecasts received from IMD

(2) To validate the forecasts against the actual weather experienced

Major Research Highlights

- District level Agromet advisory bulletins are prepared and uploaded in IMD website www.imd.gov.in on every Tuesdays and Fridays in English as well as in Malayalam for Thiruvananthapuram and Pathanamthitta districts
- Started issuing block level agroadvisories in English and Malayalam to eleven blocks of Thiruvananthapuram district
- Generation of crop specific agroadvisories based on district level and block level medium range weather forecasts through *agromet.imd.gov.in*

- Sending *email* to scientists, government officials and progressive farmers
- Sending 1,22,231 nos SMS to farmers of Thiruvananthapuram and Pathanamthitta districts through *mkisan.gov.in* on every Tuesdays and Fridays
- Started issuing agroadvisories through whatsapp groups.
- Conducting FARMER AWARENESS PROGRAMME (FAP)

  Farmer Awareness programme is being conducted every year as part of this project **"Gramin Krishi Mausam Sewa' (GKMS)** at various locations in Thiruvananthapuram, and Pathanamthitta districts. During 2020-21 it was conducted in online mode at three panchayaths of Neyyattinkara block *viz*., Athiyanoor, Neyyattinkara, and Vizhinjam. Number of farmers attended farmer awareness programme were around 95.

DEPT. OF AGRICULTURAL DEVELOPMENT AND FARMERS WELFARE

1. Production and marketing of "Safe to Eat" vegetables and fruits for sale through government outlets

(PI : Dr. Ambily Paul, Assistant Professor, PRRAL)

Objectives:

- Monitoring of pesticide residues in vegetables and fruits collected from government outlets, hyper markets and also from open market sand organic shops in Kerala and to provide the results in public domain periodically so as to make the consumers aware of high risk, low risk and risk free commodities to choose.
- Testing the quality of vegetables and fruits procured directly from farmers' clusters/groups and sold through eco-shops by Krishi bhavans, farmers' markets and government outlets (Horticorp, VFPCK etc.) to assess whether they conform to "Safe to Eat Brand" or GAP standards and certification/branding of produce to promote marketing avenues of producers.

Major Research highlights:

Under this project, monitoring studies on pesticide residues was conducted in vegetables and fruits collected from public markets, farm gate, ecoshop and "Organic" shops in Kerala. Total of 53 periodic reports have been published in Government website. The project has developed a database on the residue data generated from 2013 to 2021. Since the inception of the project in 2013, around 12,570 samples have been analysed for the presence of pesticide residues. Out of the total samples, around 3605 are the farmer's samples analysed free of cost. During 2020-2021, a total of 1,197samples of the various commodities such as vegetables, fruits, spices and other food products collected from various parts of the state were analysed for the presence of pesticide residues, out of which 325 (27.15 %) samples were found contaminated with pesticide residues. The extent of contamination of vegetables, fruits and spices were 28.04 %, 22.67 % and 40 % respectively. Presence of pesticide residues was more in capsicum (88-100%), red chilli (80%),green chilli (67%), mint leaves(60%) and coriander leaves(57%). Among the fruits the most contaminated was grapes (62.50-100%).

NATIONAL BAMBOO MISSION

1. Establishment of a small bamboo nursery for quality planting material production at Instructional Farm, College of Agriculture Vellayani

(PI: Dr.Biju Joseph, Assistant Professor, ARS Moncombu)

Objectives:

To establish small bamboo nursery for quality planting material production and distribution.

Major Research Highlights:

Established a small bamboo nursery at Instructional Farm, College of Agriculture

Vellayani. Mother plants were established for 33 species of commercially important and ornamental bamboo after obtaining mother plants from JNTBGRI Palode and KFRI Peechi. Infrastructure was developed for the nursery by repairing 500 sq m naturally ventilated polyhouse and inputs like manure, grow bags, weed mat, shade net etc were purchased for use in the nursery. Nursery work on production of bamboo planting material is in progress. 3100 Nos. of planting materials of bamboo have been produced.

DIRECTORATE OF ENVIRONMENT & CLIMATE CHANGE
GOVERNMENT OF KERALA

1. Development of drought tolerant cardamom hybrids through pollen selection and selective fertilization

(PI: Dr. Roy Stephen, Professor, Department of Plant Physiology)

Objectives :

1. To explore the genetic variability in cardamom for water stress and high temperature stress tolerance.
2. To identify the critical stress level for pollen selection and selective fertilization.
3. To evaluate the selectively fertilized hybrids for water stress and high temperature stress tolerance

Major Research Highlights :

Cardamom, ‘’the queen of spices’’ is a climate sensitive crop grown in the Western Ghats at an altitude ranging from 600m to 1500m above MSL. Increase in temperature and associated water stress causes significant loss in yield and quality of cardamom. High temperature causes pollen sterility, drying of stigma and reduced seed setting resulting in non development of capsule or malformed capsules. At this juncture, development of climate resilient cardamom which can tolerate drought and high temperature is essential to sustain cardamom productivity and the income of farmers. Development of drought tolerant cardamom through conventional breeding is time

consuming and tedious. In-vitro pollen selection followed by selective fertilization will be the most feasible and cost effective approach in this direction. The water stress is imposed by germinating pollen grains in media with different water potential created with PEG (Polyethylene glycol) and high temperature stress is imposed by germinating the pollen grains in the specific medium and exposing to critical temperature using incubator.

The genetic variability was assessed in the cardamom varieties available in Cardamom Research Station, *Pampadumpara*. The Critical water potential (-.1MPa) and critical temperature (36^0c) for pollen germination were identified in standardized pollen germination medium. The incubated pollen grains at critical temperature and critical water potential were used to pollinate the emasculated flowers of female parent for selective fertilization. The seeds from this developing selectively fertilized capsules will be collected for evaluation for drought tolerance.

STATE HORTICULTURAL MISSION

1. Establishment of Advanced referral plant health clinic at College of Agriculture, Vellayani for diagnosing pests, diseases and nutritional problems of crops of Kerala

(PI: Dr.Radhika N.S., Assistant Professor, Plant Pathology, College of Agriculture, Padannakkad)

Objectives:

To improve the facilities of the Advanced Research Centre of Plant Disease Diagnosis under the Dept.of plant Pathology, College of Agriculture , Vellayani as an efficient system in the state for timely identification and management of plant diseases, pests, and nutrient based problems, Consultancy and advisory services for farmers of the state, Training centre for extension personnels and research scientists and Advanced research facilities for the students and faculties

Major Research Highlights:

Funding of Rs 12.5 lakhs was received which was utilized for the purchase of lab equipments viz., vertical autoclave, orbital shaker, laminar air flow, deep freezer,precision balance, BOD and hot air oven. Consumables for detection and diagnosis of pathogens were also procured.

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

1. Development of biocontrol technology for the management of postharvest crown rot of banana

(PI: Dr. Susha S Thara, Asst. Professor, Department of Plant Pathology)

Objectives

1. To isolate and identify the fungal pathogens associated with crown rot of banana fruits
2. To take up the qualitative study of the naturally occurring mycoflora on banana fruit
3. To evaluate the antagonistic potential of the natural mycoflora and biocontrol agents developed by KAU against crown rot causing pathogen..
4. To understand the mechanism of action of antagonist
5. To study the effect of selected mycoparasite against important crown rot pathogens on fruit

Major Research Highlights

Lasiodiplodia theobromae and *Colletotrichum musae* were found as the virulent and major pathogens causing post harvest crown rot of banana.

KAU isolates viz., *Trichoderma harzianum* (KAU T_2), *Trichoderma viride* (KAU T_6), *Bacillus subtilis* and *Pseudomonas fluorescens* (PN026)along with two best native antagonists were selected for studying the antagonism using dual culture technique (Plate 1 and 2). Percent inhibition of radial growth of the pathogens *Lasiodiplodia theobromae* and *Colletotrichum musae* by the biocontrol agents were recorded (Table 1).Following observations were made on the dual culture studies of *Lasiodiplodia theobromae*with the biocontrol agents. *T. harzianum* recorded maximum inhibition of mycelial growth of the pathogen (55.60 %) followed by W3B-BC-*Aspergillusaculeatus* (44.44 %), A3B-BC –*Aspergillus niger* (40.00 %), *T. viride* (33.33 %) and *B. subtilis*(6.66 %). No inhibition was observed in growth of pathogen when dual cultured with *P. fluorescens* (PN 026).Among different native isolates of antagonist and the biocontrol agents tried against *Colletotrichum musae*, *T. harzianum* recorded maximum inhibition of mycelial growth of the pathogen (75.92%) followed by *T. viride* (72.59 %), W3B-BC- *Aspergillus aculeatus* (67.04 %), A3B-BC –*Aspergillus niger* (64.44 %),.

Since *T. harzianum* showed significant antagonism, mechanism of antagonism was studied by dual culturing in media layered with autoclaved cellophane membrane and the inhibition zone was observed under compound microscope (Plate 5). It was observed that branching of mycelia of *T. harzianum* increased and it continued to give out more terminal branches in three DAI. After four DAI, mycelia of *T. harzianum* coiled over the mycelia of the pathogen (*Lasiodiplodia* sp.). Six to seven DAI, the mycelium of the pathogen appeared swollen, deformed and resulted in lysis.

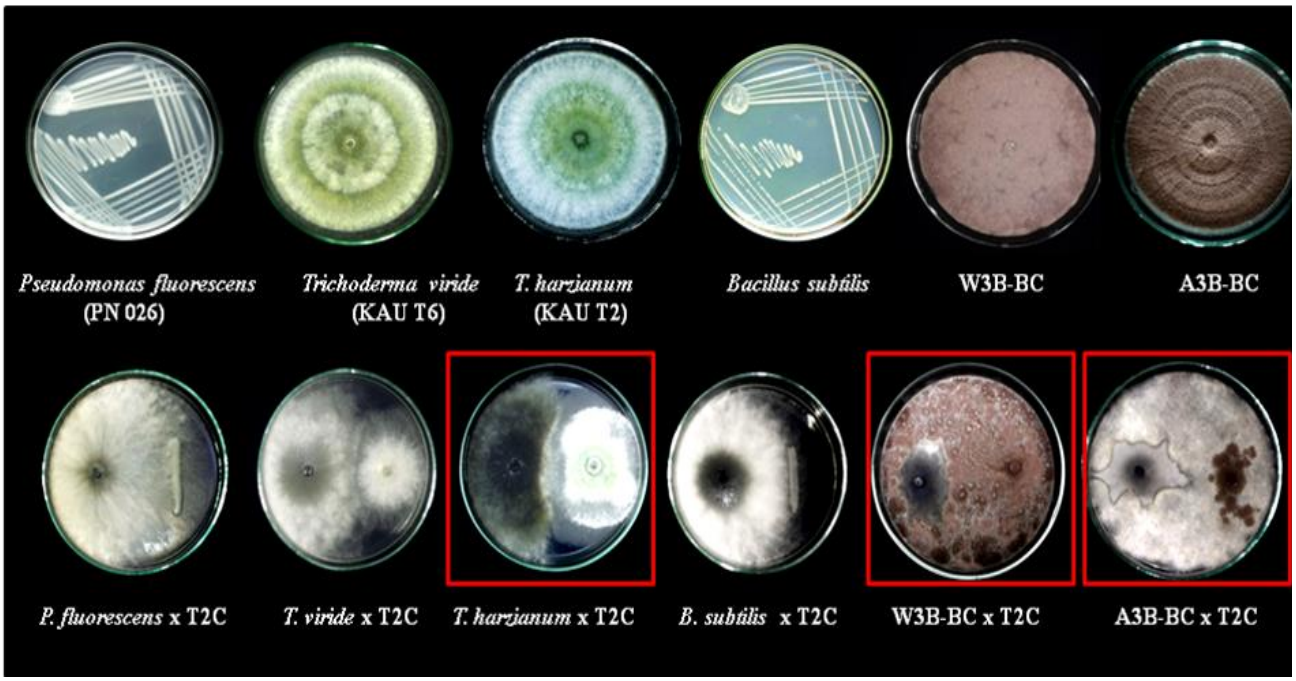


Plate :1 Antagonistic effect of biocontrol agents against *Lasiodiplodiatheobromae*

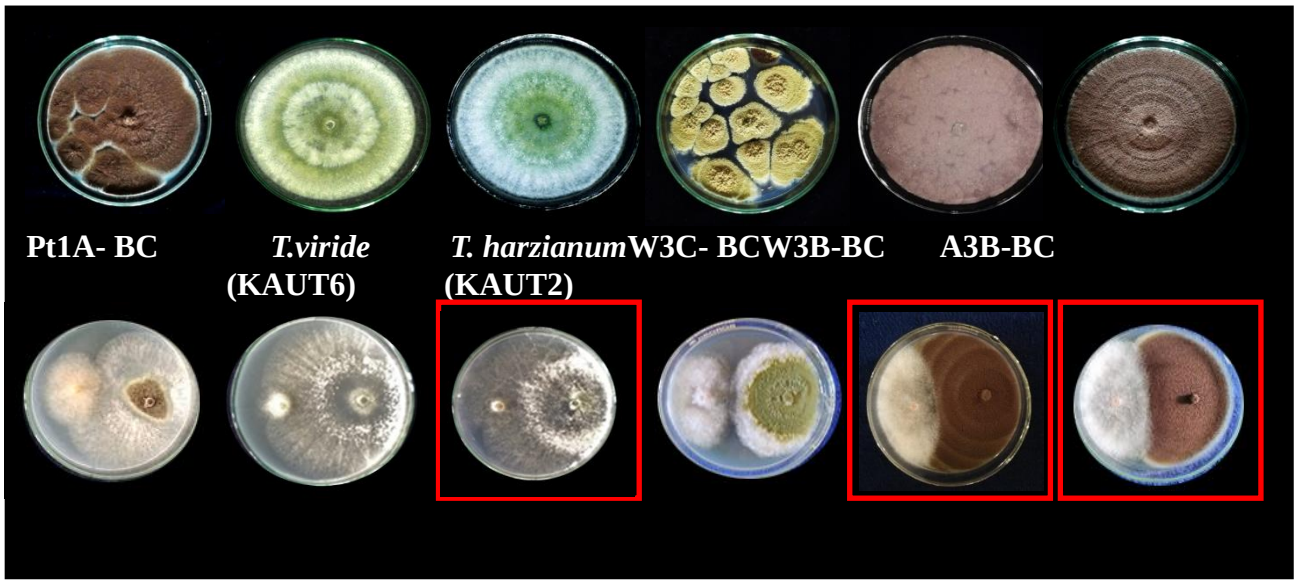


Plate :2 Antagonistic effect of biocontrol agents against *Colletotrichummusae*

Volatile inhibitory effect of *T. harzianum* on the pathogen was also studied. It was found that *T. harzianum* recorded considerable volatile inhibition of 55.56 per cent on growth of the pathogen.

REVOLVING FUND

1. AICRP on Honey Bees and Pollinators - RF

(PI : Dr. Amritha V.S., Associate Professor, Department of Agricultural Entomology)

Objectives :

Income generation through sale of honey, bee colonies, beekeeping equipments, etc.

Income generated during 2020-21:T hrough sales of honey and bee colonies

Rubber Honey(303.0 kg Kg)	-	Rs. 10,90,80/-
Forest Honey (20.5 Kg)	-	Rs. 10,250/-

Total	-	Rs. 1,19,330/-

Total Expenditure 2020-21 - Rs. 1,99,593/-

Total receipt for the year 2020-21 - Rs. 1,19,330/-

2. Revolving Fund on Soil Testing (RF - SSTL & MSTL)

(PI : Dr.R.Gladis (Stationary Soil Testing Lab) & Dr. B. Aparna (Mobile Soil Testing Lab))

Objectives:

1. To carry out the analysis of soil, plant, water, compost and manure samples received from farmers, students and researchers on payment basis
2. To provide need based mobile soil testing services to the farmers
3. To provide soil test based fertilizer recommendations for soil samples received from farmers field.

Major Research Highlights:

Sl.No	Samples Details	No. of samples analyzed	Income Generated during 2020-21 (Rs)
1.	Soil	227	2,55,280/- (Rupees Two Lakhs Fifty Five Thousand Two Hundred and Eighty only)
2.	Plant	177	
3.	Manure/Compost	8	
4.	Water	-	

Soil Health Cards distributed to the farmers – 58 nos Advisory services-76

The details of income and expenditure for the year 2020-21 are furnished below:

Period	Income generated 2020-21 (Rs)	Expenditure 2020-21 (Rs)	Profit 2020-21 (Rs)
2021	5,19,566	3,25,270	1,94,296

3. Solid Waste Management - Revolving Fund

(PI: Dr. Naveen Leno, Assistant Professor, Dept. of Soil Science and Agricultural Chemistry)

Objectives:

The project envisages to process the food waste generated in the hostels and canteen of the College of Agriculture, Vellayani using the patented rapid thermochemical processing technology (Patent 321857). The organic fertilizer thus produced is fortified and sold through KAU outlets.

Apart from waste processing, the centre provides waste processing kit @ Rs. 4 / kg waste for processing of organic waste to the agencies who have installed Suchitha machine. Analytical services of organic manures are also being done by the centre.

The details of income and expenditure for the year 2020-21 are furnished below:

Period	Income for 2020-21	Total income including previous year's balance	Expenditure	Balance (Profit)
2020-21	66,722	2,18,816	56,652	2,05,606

4. Revolving Fund – Biotech Keralam - for Mass multiplication and supply of Microbial Inoculants

(PI: Dr. Chitra N, Assistant Professor, Dept. of Agricultural Microbiology)

Gross income : Rs. 12,32,816/-

Expenditure : Rs. 10,30,103/-

Profit : Rs. 2,02,713/-

Production details from 01-04-2020 to 31-3-2021

Sl. No	Item	Total Production (kg)	Amount (Rs.)
1.	Pseudomonas	1969	1543308
2.	Trichoderma	789	84029
3.	AMF	640	54039
4.	Azospirillum	121	10285
5.	Azotobacter	1	85
6.	P-solubilizer	179	15003
7.	K-solubilizer	72.5	4259
8.	PGPR Mix I	7760	617512
9.	PGPR Mix II	830.5	65130
10.	Rhizobium	5	425
11.	Composting Inoculum	1759	157041
12.	Quality analysis	17	17000
Mother cultures			
13.	AMF	3.1	15200
14.	Trichoderma	9	12000
15.	Pseudomonas	9	12000
16.	Azospirillum	5	5500
17.	Azotobacter	2	2500
18.	P- solubilizer	2	2500
19.	K- solubilizer	2	2500
Total		**14129.1**	**12,32,816**

5. **Revolving Fund - Integrated Management of Fruit Flies Infesting Fruits & Vegetable Crops - concluded project - Sustenance Programme**

(PI : Dr. Reji Rani O.P., Associate Professor, Department of Agricultural Entomology)

Objectives:

Fabrication and sale of pheromone traps (Methyl euginol cue lure) : Mass production and sale of biopesticdes *Beauveria Bassiana,Metarhizium* anisopliae and *Lecanicillium lecanii*

Major research highlights:

Produced and sold biopesticides such as *Beauveria Bassiana, Metarhizium* anisopliae and *Lecanicillium lecanii* and pheromone traps such as cue lure traps and methyl eugenl traps worth Rs. 2.72lakhs . Started trichocard production which is expected for distribution by January 22.

Period	Income for 2020-21	Expenditure	Profit
	2.72 lakhs	1.79 lakhs	0.93 lakhs

6. **Establishment of leaf/ tissue analytical laboratory at College of Agriculture, Vellayani**

(PI : Dr. Shalini Pillai. P., Professor & Head, Department of Agronomy)

Objectives:

To undertake analysis of plant and soil samples for ascertaining the nutrient status and providing suitable fertilizer recommendations

Major research highlights:

The lab was established in August 2008, under the State Horticulture Mission (Kerala) funded project, for a total outlay of Rs.20 lakhs. The project terminated in June 2011. On the lab started functioning on a revolving fund mode with a corpus of Rs.1.250 lakhs. The lab is

undertaking analysis of plant and soil samples received to ascertain the nutrient status so as to provide suitable fertilizer recommendations. The Laboratory is catering to the needs of farmers, research scholars and scientists. An amount of Rs.4,94,820/- has been received as analytical charges during the period from April 2020 to March 2021.

Period	Income for 2020-21	Expenditure	Profit
2020-21	4.91820 lakhs	1.32027 lakhs	3.59793 lakhs

7. Vegetable seed production - RF mode

(PI : Dr. S. Sarada, Assistant Professor & Head, Department of Vegetable Science)

Objectives:

Production of quality seeds and seedlings through revolving fund of KAU

Major research highlights:

Production of breeder seed and truthfully labeled seeds of different vegetables are being carried out. A total of 236.40 kg of breeder seed and truthfully labeled seeds, 35254 protray seedlings and 1658 polybag seedlings worth Rs. 5.49 lakhs were distributed among the farmers during 2020-2021.

Period	Income for 2020-21	Expenditure	Profit
2020-21	549267	503594	Rs. 45,673/-

8. Revolving Fund - Commercialization of value added products

(PI : Dr. Suma Divakar, Professor & Head, Department of Community Science)

Objectives:

- To utilize locally available farm produce for value addition
- To generate employment for rural women

The details of income and expenditure during the year 2020-21 is furnished below

Period	Income for 2020-21	Expenditure	Profit
2020-21	136885.00	94502.00	42383.00

9. RF scheme on Planting material production in Fodder crops

(Dr.Usha C Thomas, AICRP on Forage Crops Utilization)

Objectives :

To establish a fodder seed production unit at College of Agriculture, Vellayani

Major research highlights:

A fodder seed production unit is established at College of Agriculture, Vellayani for the production and distribution of seed/planting materials of fodder crops like Hybrid napier varieties Suguna and Susthira and fodder cowpea variety Aiswarya.

The details of income and expenditure during the year 2020-21 is furnished below

Period	Total income (Rs)	Expenditure upto31.03.2021 (Rs)	Balance (Profit) (Rs)
2020-21	79,221.0	55,216.0	24,105.0

SATELLITE STATIONS

1. COCONUT RESEARCH STATION (CRS), BALARAMAPURAM

Strengthening Research on coconut and Developmental Activities at Coconut Research Station, Balaramapuram.

(PI :Dr.N.V.Radhakrishnan, Professor & Head, CRS, Balaramapuram)

Objectives:

Five station funding projects viz.,

i. Providing infrastructural facilities at CRS Balaramapuram.

ii. Effect of secondary and micronutrients on yield, pest and disease incidence in coconut.

iii. Performance evaluation of new and improved varieties of pepper as an intercrop in coconut in the red loam soil tracts of southern Kerala.

iv. Establishment and standardization of agro-techniques for dwarf coconut palms suitable to southern Kerala under rainfed conditions.

v. Training on transfer of improved technologies of hybridization in coconut, coconut production practices, IFS, mushroom and spawn production, upland rice production technology and organic farming to rural youths, farmers and agricultural assistants.

Major Research Highlights:

a. Laying out and planting dwarf coconut seedlings mainly, COD, CGD, MGD, MYD and MOD were carried out in the main field of CRS, Balaramapuram with an objective to study the most optimum spacing for dwarf palms for higher yield and to standardize the nutrient requirement for maximum yield from seedling stage.

The seedlings were planted at four different spacing viz., 6m x 6m, 6.5m x 6.5m, 7m x 7m and 7.5m x 7.5m with two schedules of NPK fertilizer application. .

The experiment is in progress. The plants put forth about 8 to 14 leaves in a year with mean plant height of 179.67 cm to 269.75cm with mean stem girth of 50.63cm to 83.37cm

at this stage. The data is presented in the table. The plants are often infested by rhinoceros beetle and red palm weevil. Pooled analysis has to be carried out during the bearing stage. Since coconut is a long duration perennial crop, the project has to be continued for more than one decade. Though dwarf coconut palms start yielding after 4-5 years, stable yield could be obtained only by 8-10 years.

b. Black pepper rooted cuttings of new and improved varieties (PN I to VIII and Vijay) were planted and it is in progress with the objective to identify the best performing pepper variety for the region, from among the new releases from KAU and to compare the yield as well as quality advantage of the variety. The treatments are laid out in Randomized block Design with 3 replications. The pepper vines put forth 3-5 branches, with vine length of 247.50 cm to 351 cm. The pepper vines of varieties I to VIII were planted in coconut garden. All pepper vines put forth 3 to 5 branches and PN IV & V recorded 5 branches at maximum. The variety PN III, VI recorded maximum vine length of 352.43 cm and 351.00 cm respectively while PN IV recorded the minimum length of 247.50 cm only. The number of leaves also more in PN III, VII, IV, II with mean observations of 78.80, 77.60, 76.60 and 71.00 respectively. The mean number of leaves are minimum in PN VI, VIII and PN I with observations of 58.20, 57.00 and 53.40 respectively. The study is in progress and need to continue in the coming years.

c. Physical targets / Minor infrastructure development at CRS, Balaramapuram

Purchase of organic manure and fertilizers, plant protection chemicals and related research & farm developmental activities were carried out. Maintenance and repairs of farm machineries /implements. Electrical accessories, Repair of Air-conditioner, motor pump, brush cutter, wheel barrow, spade etc. Maintenance of poultry shed, plumbing works to strengthen the irrigation line, purchase of coconut germplasm and transport charges from RARS, Pilicode.

d. Effect of secondary and micronutrients on yield, pest and disease incidence in coconut with objectives to study the effect of secondary nutrients *viz*., Calcium and Magnesium and micronutrients *viz*., B on the yield of coconut palm and to study the effect of secondary nutrients *viz*., Calcium and Magnesium and micronutrients viz., B on disease incidence in coconut palm. The infestation of major pest such as mite, coreid bug, rhinoceros beetle and diseases such as bud rot and leaf rot are being recorded. Application

of 1 kg lime + 0.5 kg Mg SO_4 + 0.15 % solubor @ 3.5 litre/palm –two times application first during May- June and second during September- October along with KAU POP recommendations for coconut is found to decrease the major pest incidence/infestation. Pooled analysis has to be done after recording this current year data. There were no incidences of bud rot and leaf rot diseases in the experimental palms. The study is in progress and it has to be continued for another two years so that the data can be put into pooled analysis to come out with salient findings.

e. Trainings on transfer of improved technologies of coconut

Trainings on transfer of improved technologies of coconut cultivation, hybridization in coconut, coconut production and plant protection practices, IFS, Value addition in coconut were conducted to rural youths, farmers, B.Sc. (Ag.) students through RAWE programme and online Webinar only.

Remarks:

Since coconut is a long duration perennial crop, the project has to be continued for more than one decade. Though dwarf coconut palms will start yielding after 4 years, stable yield could be obtained only after 8 to 10 years. Hence, the above projects have to be continued.

2. Quantitative and qualitative analysis of inflorescence sap of coconut varieties of Kerala (Network mode) at Coconut Research Station, Balaramapuram.

(PI: Dr.R.Sujatha, ADR(Coconut Mission)

Objectives:

To screen the existing germplasm of hybrids, dwarfs and tall with respect to the quantity and quality of neera production; to identify superior palms for better inflorescence sap (neera) production and those with better quality for further processing of neera as a healthy drink; to understand the effect of different seasons on neera production and quality; to study the influence of soil type and balanced nutrient application on neera yield and quality of selected palms and to standardize diversified byproducts from neera.

Major Research Highlights

The selection of palms with good bunching characters of West Coast tall, Chowghat Orange Dwarf, Malayan Yellow dwarf and Gangabondham and T x D palms was carried out and mulching the basins with coconut husk was done. License for neera tapping from Excise Department was obtained. Instruments for tapping neera from coconut and collection boxes were made ready and trial run for tapping inflorescence sap was carried out. We were able to collect very small quantities of sap from these palms in February-March 2021 period. The study is being continued in this year 2021-22.

Need training on neera tapping (KAU methology)

3. Standardization of certain organic preparations for the management of major fungal and viral disease complex of vegetable cowpea

(PI :Dr.N.V.Radhakrishnan, Professor & Head, CRS, Balaramapuram)

Objectives:

To study the effect of certain organic preparations for the management of major fungal and viral disease complex of vegetable cowpea, mainly yard long bean

Major Research Highlights:

The foliar diseases, mainly leaf spot and anthracnose were observed in the trial plants. The Fusarial wilt and cowpea mosaic were also observed, but in a negligible number. These affected plants were uprooted and destroyed. The foliar application of *Pseudomonas fluorescens* @ 2% checked the Cercospora leaf spot and anthracnose diseases in a significant way apart from chemical check i.e. copper oxy chloride @ 0.2% and some of the organic preparations such as Papaya Leaf extract, Coconut milk & curd preparation, butter milk and Egg-lemon juice extract were found to be effective in controlling both foliar diseases in a significant manner.

The experimental trial laid on to get confirmatory result was damaged due to heavy wind and rain during April-May, 2021. The study will be continued.

4. ICAR-NAHEP-CAAST-KAU Project on, "Knowledge and Skill development on Coconut based Secondary Agriculture"

(PI: Dr.R.Sujatha, ADR, Coconut Mission)

Objectives:

Capacity building among students for entrepreneurship development; facilitating establishment of coconut based industrial units on tie up with farmer collectives; promoting industry-research linkages for addressing the research gaps through postgraduate and doctoral research programmes and market research and Analysis. Special emphasis on product diversification in coconut based food sector.

Major Research Highlights:

Renovation and alteration of coconut seed building to facilitate coconut processing unit – Civil works and electrification works were completed. Coconut processing machineries purchased under CAAST-KAU Project like Coconut dryer, Coconut milk extractor,

Power grinder, Roaster and coconut chips slicer are installed and trial run was also carried out. Three day session on various value added products from coconut, was conducted for B.Sc. Agricultural students from VNMKV, College of Agriculture, Parbani, Maharashtra and one day session on various value added products from coconut, was conducted for B.Sc Agricultural students from College of Agriculture, Vellayani, as part of their RAWE Programme. Participated in the International Workshop and Exhibition on agro-processing and value addition –VAIGA 2021 at Thrissur, Kerala & exhibited value added products from coconut kernel such as coco-nutri ball, virgin coconut oil, coconut chips, Theeyal mix etc. and distributed the brochure to the visitors. Participated in the International Coconut Conference and Exhibition during September 1-2, 2021at Indonesia virtually. Steps were initiated to have a tube well to meet the water requirement of the Value addition facilitating Centre at CRS, Balaramapuram.

Research and Value addition activities are being carried out at CRS, Balaramapuram.

Sensory and Bio-chemical quality analysis including DPPH free radical scavenging assay was done for coconut water syrup incorporated with sarsaparilla and ginger extract. Standardization of methodology for the preparation of Desiccated coconut and development of desiccated coconut based value added products. Comparative studies were being done between the full fat and reduced fat desiccated coconut for assessing the quality parameters mainly focusing on the moisture barrier properties of the packaging material. Prepared Tender coconut smoothie and desiccated coconut based products like burfi , laddu, bounty bar. Experimental trials were conducted to prepare bottled coconut waterafter quality analysis. Extraction of coconut proteins by Wet processing and Dry Processing methods –Coconut protein can be prepared from copra meal or fresh coconut meat. We plan to conduct Training programmes for budding \ entrepreneurs on value added products from coconut in this year 2021-2022 as apart of capacity building among rural youth and women entrepreneurs including farmers.

5. **LoDP scheme: CDB SCHEME 2019-2020- INTEGRATED FARMING FOR PRODUCTIVITY IMPROVEMENT –"LAYING OUT DEMONSTRATION PLOTS (LoDP) THROUGH PUBLIC SECTOR – BY SAUS" AT COCONUT RESEARCH STATION, BALARAMAPURAM**

(PI :Dr.N.V.Radhakrishnan, Professor & Head, CRS, Balaramapuram)

Objectives:

Technology demonstration on Integrated farming for productivity improvement in coconut based cropping system with banana and pepper as major intercrops adopting balanced application of nutrients (organic manure+ major nutrients (NPK) + secondary nutrients (Calcium& Magnesium)+ minor nutrient Boron) along with *in situ* moisture conservation (husk burial, cover cropping, mulching) at CRS, Balaramapuram.

Major Research Highlights:

Laying out of demonstration plot for productivity improvement in coconut based integrated farming is in progress. Planting of black pepper was taken up. Panniyoor 1 to Panniyoor 8 were planted (130 nos) Banana was raised in the plot. Cassava was also planted as intercrop. Application of major nutrients and other nutrients are being taken up. Cover cropping, mulching and husk burial were also being carried out. Planting of nutmeg and papaya will be carried out.

ANNEXURE I

Seed and Nursery Programme 2020-2021

GoK Plan schemes on Seeds and nursery programme			
Sl No.	***Details/name***	***Variety***	***Quantity produced during 2020-2021 Nos./Kg***
	Plantations & Spices:		
1.	Coconut seednuts	WCT	25000 nos.
2.	Coconut seedlings	WCT	15192 nos.
3	Coconut seednuts Dwarf	Dwarf	393 nos.
4.	Coconut Dwarf seedlings	Dwarf	308 nos.
5.	Arecanut seedlings	Saigon	932 nos.
6.	Blackpepper rooted cuttings	Karimunda, Panniyur	1370
	Fruits		
1	Banana suckers	Red banana, Nendran	165 + 186 nos.
2	Banana suckers	Other vars.	37 nos.
	Vegetables:		
1	Amaranthus	Arun	2.7 kg
2	Bhindi	Salkeerthi	1.85 kg
3	Cowpea Yard long bean	Jyothika	0.5 kg
4.	Snakegourd	Koumudi	

5	Clovebean	-	18.5 kg
6	Cucumber	SambarVellari	0.125 kg
7	Salad cucumber	AAUC	-
8	Bush Cowpea	Bhagyalakshmi	18.25 kg
9	Papaya seedlings		50 nos.
10	Vegetable seed packets	All	2291 nos.

b. <u>Physical achievements under RF scheme for 2020-2021</u>

Sl. No.	Crop	Variety	Production/sale during 2020-2021
I	**Revolving Fund scheme**		
a.	**Seeds & Planting materials**		
1	Coconut seedlings (Bare Rooted)	Hybrids Kerasree & Kerasankara	2587
2	Coconut seedlings (PolyBag)	Hybrids Kerasree & Kerasankara	4216
3.	Coconut seednuts	Hybrids	4835
b.	**Value added products**		
1.	Coconut chutney powder		1.90 Kg
2.	UrukkuVelichenna		108.20 lit.
3	Theeyalkoottu		8.3 Kg
4	Turmeric powder		53.250 Kg
5	Coconut Oil		740.75 lit.
6	Ginger chutney powder		0.0
c.	**Livestock unit**		
1	Cow's milk		19336.95 litres

2	Egg		7942
3	Chicks		16
4	Goat Kids	Female	3
		Male	4
5	Culled chicken		115.9 kg
6	Culled goat		31 kg
7	Culled Beef		702.5 kg
8	Cattle feed bag		355 nos.
9	Curd		76.25 litres
10	Butter milk		348 cups

Coconut seedlings distributed to Coconut Development Council 2021-2022:

West Coast Tall Seedlings: 20550 nos.

Hybrid Seedlings (T X D) : 5200 nos.

Annexure II

Receipts during the year 2020-21:

Revolving fund: Rs.45,99,559.00

Station : Rs.15,20,215.00

Total : Rs.61,19,774.00

WEBINARS CONDUCTED (Period Jan. to Dec., 2021)

Sl no:	Topic of Webinar	Date
	Webinar Series- 2021 enitled**"Nalikerakrishi- Ariyendathellam"** (Coconut Cultivation) from 07/06/2012 to 11/06/2021	
1	Nalikerathintemoolyavardhanasadhyathakal- Value addition in Coconut	07/06/2021
2	Nadilvasthukkalthiranjedukkalum, nadilum-	08/06/2021

	Selection of planting materials, planting	
3	ShasthriyaValaprayogam – Scientific Nutrient management	09/06/2021
4	Idavilakrishiyum, mishrakrishiyum- Intercropping and mixed cropping	10/06/2021
5	Rogakeedaniyandranam- Pest and Disease management	11/06/2021
6	Karshikavila insurance- Karshakarariyendathellam- Agricultural crop insurance	08/07/2021
7	ThenginthoppukalileOushadhasasyakrishi-avasarangalum, sadhyathakalum- Medicinal plant cultivation in coconut gardens- Scope and opportunities	22/07/2021
8	Thenginthoppukalilesasthriyavazhakrishi- Banana cultivation in Coconut gardens	29/07/2021
9	Everything to know about Coconut- webinar to students in collaboration with Mathrubhoomi SEED Programme	02/09/2021
10	Virtual tour to Agriculture Diploma students	15/09/2021

Extension Activities

During lockdown, on 14/05/2021, announcement was given in newspapers, All India Radio, Magazines by IPRD, District Information Office about the facility available for Coconut farmers for getting scientific details about coconut cultivation through phone calls, Whatsapp from CRS, Balaramapuram. Whatsapp group named "Kera Community' was started on 09/06/2021 and still continuing.

Publications

"NalikerakrishiAriyendathellam" published in Janapadham as Special feature. March 2021

"NalikerakarshakarkkuvazhikattiyayiKattachalkuzhiNalikeragaveshanakendram" in Indian Nalikera Journal, April, 2021

Training programmes organized

1	RAWE Programme to 6 B.Sc (Agri) students from College of Agriculture, Vellayani	01/01/2021 to 07/01/2021
2	25 B.Voc. (Agri) students from KVK, Mitraniketan	27/03/2021
3	2 B.Sc. (Agri.) students from PDM University , Haryana	15/07/2021
4	RAWE Programme to 5 B.Sc. (Agri.) students from College of Agriculture, Vellayani	08/10/2021 to 13/10/2021
5	One day training to final year B.Sc. (Agri.) student of Karunya Institute of Science and Technology	18/10/2021
6	17 trainees from Friends of Coconut- CDB and KottukalKrishi Bhavan	19/11/2021
7	9 B.Sc. (Agri.) students from College of Agriculture, Padanakkad as part of RAWE	26/11/2021
8	20 trainees from Friends of Coconut – ICAR, KVK, Mitraniketan	10/12/2021

2. "Strengthening production of quality planting materials and bioinputs in KAU" & "Elite Seeds and nursery programme- production of disease free seeds and quality planting material"

(PI :Dr.N.V.Radhakrishnan, Professor & Head, CRS, Balaramapuram)

Objectives:

To produce elite seeds and quality planting materials

Major Research Highlights

Production of seeds and planting materials are being carried out. (List attached- Annexure 1)

3. Standardizing Agro techniques for raising Finger millet in coconut garden

(PI: Dr.K.Prathapan, Professor, CRS, Balaramapuram)

Objectives:

1. To identify the best method of sowing
2. To standardize the N,P and K requirement while raised as intercrop in coconut garden
3. To identify the best time of nutrient application
4. To enhance the production and productivity per unit area

Major Research Highlights

The results revealed that highest grain yield in ragi is attained by raising the seeds in nursery and transplanting in the main field at a spacing of 25 cm x 15 cm. The optimum dose of NPK was found to be 50:25:25 kg ha^{-1} and fertilizers should be applied in three splits as full P, one third N and one third K as basal dose, one third N and one third K at 20 DAS and remaining one third N and one third K at 40 DAS.

II INTEGRATED FARMING SYSTEMS RESEARCH STATION (IFSRS), KARAMANA

1. AICRP on Integrated Farming Systems [On Station Research]

Development and validation of on-station integrated farming system models (4 models each of 0.2 ha)

(PI: Dr. Jacob John, Professor & Head, IFSRS, Karamana)

Objectives:

- Characterization of the existing farming systems to know the productivity, viability and constraints.
- To optimize individual components of IFS in regional perspective.

The four models / sub-projects are

i. Homestead based IFS model
ii. Coconut based IFS model
iii. Rice based IFS model
iv. Banana based IFS model

Major Research Highlights:

- Rice based IFS model generated the highest gross returns (Rs.326821 per 0.20 ha); B:C ratio was higher in the coconut based model (1.38).
- Energy output was higher for coconut based (2045179 MJ) and homestead based IFS models (1877725 MJ), on account of the energy of standing tree stocks in these models.
- All the four IFS models had Sustainable Value Index (based on previous 6 years data) greater than 0.60. Highest SVI was for the coconut based IFS model (0.80).
- All the four IFS models are climate smart with net carbon sequestration. Net GHG emission was the lowest in homestead based model over the years. Inclusion of green leaf manure crop *viz*. Glyricidia along the boundaries enhanced carbon sequestration within the rice based system and net GHG emission was -315 (kg CO_2 equivalent).

2. Rice based cropping sequences to augment integrated farming systems in lowlands

(PI: Dr. Jacob John, Professor & Head, IFSRS, Karamana)

Objectives:

To study the performance of different rice based cropping sequences to supplement integrated farming systems in lowlands

Major Research Highlights :

1. Among the sequences, rice-cassava-amaranthus was most profitable (Rs.286765 ha^{-1}) followed by rice-bhindi-cucumber (Rs.223502 ha^{-1}). The B:C ratio was highest for rice-cassava-amaranthus (1.69) which was on par with rice-bhindi-cucumber (1.63).
2. The sequence rice-cassava-amaranthus was superior in terms of family nutrition while rice-para grass-fodder cowpea in terms of meeting livestock nutritional requirement.
3. The four year field study has been completed and hence, based on the gross return, the sustainability index of the different sequences was worked out. The sequences rice-cassava-amaranthus, rice-cassava-bush cowpea and rice-fodder cowpea-fodder maize had higher sustainability index. The sequence rice-cassava-amaranthus, consistently gave the highest gross return.

3. Analysis, Development and Validation of Integrated Farming System Models for marginal and small farmers in different agro ecological zones of Kerala (Network)

(PI: Dr. Jacob John, Professor & Head, IFSRS, Karamana)

Objectives:

Critically examine the sustainability of Integrated Farming Systems in different agroecological zones of Kerala. Recommend sustainable enterprise combination and IFS for the region based on the data generated through this study and taking into account farmer's preferences and socio-economic considerations specific to the region.

Major Research Highlights:

Benchmark details were collected from 10 farmers in each AEU (total 4 AEUs in Thiruvanathapuram; high hills excluded). Analysis of the soil samples collected from the selected homesteads has been completed. IFS plots have been selected and analysis related to assessment of sustainability is in progress. Based on the assessment, sustainable IFS models will be suggested for the predominant AEUs.

4. **Yield gap analysis of major crops and impact analysis of *Jaiva Griham* (IFS) project in different agroecological units of Kerala**

(PI: Dr. Jacob John, Professor & Head, IFSRS, Karamana)

Objectives :

- To identify the yield gap, present level of technology adoption and related constraints in improving crop productivity in major crops in different AEUs of Kerala
- Analyse and assess the impact of the integrated farming system units established under *JaivaGriham* project of the State in the different AEUs
- Identify successful, time tested, integrated farming systems in the different AEUs

Major Research Highlights:

Project just initiated. Methodology and proforma finalized. Data collection from farmers in progress.

5. **Identifying coir pith based nutrient rich growing media suitable for vegetable cultivation in terraces**

(PI: Dr. Sudha. B, Assistant Professor, IFSRS, Karamana)

Objectives:

- Develop a light weight, nutrient rich growing medium suitable for terrace cultivation by substituting the sand and soil fractions of conventional potting media with lignin rich crop residues like coir pith and rice husk.
- Assess the growth, yield and quality of vegetable crops grown on the medium
- Work out the economics of cultivation with different growth media.

Major Research Highlights:

- Different potting media generated and experimented in the study could significantly influence the weight of filled grow bags as recorded with the six main field trials. The conventional medium (Soil, rock dust and cow dung in the ratio 1:1:1 on volume basis) registered the highest weight per bag (13.82-13.96 kg). Maximum weight reduction was achieved with the medium comprising of rice husk and coir pith compost in the ratio 2:2 on volume basis (3.72- 3.96 kg). Other treatments (media) recorded weight reduction to the tune of 23-45 per cent compared to conventional media.
- The efficacy of media in enhancing production of vegetables was evaluated through pot culture studies. With regard to yield of different vegetable crops, among different treatments, the medium comprising of soil, vermicompost and coir pith in thé ratio 1:1:2 (volume basis) performed significantly better and was closely followed by or comparable to soil, rock dust, vermicompost and coir pith in the ratio 1: 0.5 :1 :1.5. Farm trials (pot culture) are proposed to be carried out at different locations of Thiruvananthapuram as part of extension activities under the project.

6. Developing climate smart banana based farming systems in AEU 1,8,9 and 12 of Thiruvananthapuram district

(PI: Dr.Meera, A. V., Assistant Professor, IFSRS, Karamana)

Objectives:

- Identify the major cropping systems prevalent in AEUs 1, 8, 9 and 12 of Thiruvananthapuram district
- Exploration of all recommended management practices to improve soil carbon sequestration potential of banana based farming system in the selected farms
- Development of location specific climate smart integrated farming system models ensuring food security and economic sustainability

Project initiated in AEU 9 of Thiruvananthapuram district. Management practices being adopted in the selected farms.

7. Quality assessment, characterization and phytoremediation possibilities of Killi River, Karamana, Thiruvananthapuram district

(PI: Dr.Meera, A. V., Assistant Professor, IFSRS, Karamana)

Objectives:

To analyse spatial and temporal variation in physical, chemical and biological properties of river water and sediments, identify potential sources of contaminants threatening river and utility based classification of water.

Major Research Highlights:

Sewage drains, hospital wastes, and discharge from automobile workshops were found to the potential contaminants threatening the river water quality, especially in the city areas. Higher levels of ammoniacal N, Fe, Pb and Cd were detected in some of the areas. Very high levels of coliform bacteria were also detected.

8. Exploring the prospects of utilizing newspaper as component of growing medium for raising vegetables Observational trial

(PI: Dr.Meera, A. V., Assistant Professor, IFSRS, Karamana)

Objectives:

- Evaluate the crop performance and fruit quality of bhindi and tomato under soilless cultivation using newspaper as a component of potting medium
- Detect the presence of heavy metal in the media and fruits

Major Research Highlights:

Potting medium prepared out of paper, vemicompost and coir pith in 1:1:1 proportion resulted in the highest yield, both in bhindi and tomato. The plants failed to establish in the growing medium made of paper and coir pith alone in 1:1 proportion. Neither Pb nor Cd was detected in the bhindi fruits, even towards the last stage of harvest, indicating safe use of newspaper in promotion of soilless cultivation. Traces of Pb were detected in tomato fruits raised in grow bags filled with Suchita manure.

FARMING SYSTEMS RESEARCH STATION (FSRS), SADANANDAPURAM

1. Conservation of germplasm and developing climate resilient black pepper varieties for sustainable farming

(PI: Dr. Bindu M.R., Professor, FSRS, Sadanandapuram)

Objectives:

- Survey and collection of local and released varieties of black pepper in South Kerala.
- Establishment and maintenance of germplasm at FSRS, Kottarakara.
- Screening of germplasm for drought and flood under artificial and *in vitro* condition.
- Identification of resistant genotypes in the germplasm.
- Collected germplasm will be deposited at NBPGR.

Major Research Highlights:

- Details of pepper farmers by contacting 226 krishibhavans of Thiruvananthapuram, Kollam and Pathanamthitta districts were collected and contacted 146 farmers in Kollam, 32 in Thiruvananthapuram and 16 in Pathanamthitta districts respectively. Among the farmers 31 farmers in Kollam, 13 farmers in Pathanamthitta, and 6

farmers in Thiruvananthapuram were short listed for collection of traditional varieties.

- Field level survey and collection of accessions were conducted in Kollam and Pathanamthitta districts.
- 20 traditional varieties and 3 wild types of black pepper were collected from Kollam and Pathanamthitta districts.
- Pepper varieties collected from farmers' fields were raised in nursery for production of rooted cuttings for further drought and flood screening studies in pot culture experiment.
- Accessions collected were established at FSRS, Sadanandapuram for further evaluation studies.
- Conservation of germplasm was done by growing in column method in polyhouses
- Eighteen local cultivars and three wild types are raised in the germplasm.
- Six released varieties of black pepper *viz*. Panniyur 1, Panniyur 2, Panniyur 5, Panniyur 6, Panniyur 8 and Sakthi and four local types*viz.* karuvilanchi, narayakodi, murithothan and malamahar are raised in progeny orchard.
- Rooted cuttings are produced for flood and drought screening in pot culture.
- *In vitro* screening for drought and flood tolerance has been started.

2. Conservation of Gene pool of Traditional Mango(*Mangiferaindica* L.) Varieties of South Kerala for Climate Resilient Farming

(FR-01-00-01-2020-KTR (15)- DECC)

(PI: Dr. Bindu. B, Assistant Professor, FSRS, Sadanandapuram)

Objectives:

- To Conduct survey in South Kerala for locating traditional mango varieties
- To identify traditional cultivars/varieties which are giving higher yield, fruit quality, pest and disease resistance under changing climatic scenario of Kerala
- To study the effect of changed climate on the performance of traditional mango varieties of South Kerala

- To categorize the identified traditional varieties
- To evaluate and characterize the trees using morphological markers
- Conservation of gene pool of selected traditional cultivars/varieties *in situ* and *ex situ* in farms of Farming System Research Station, Sadanandapuram
- Multiplication and popularization of selected traditional mango varieties through budding /grafting

Major Research Highlights:

- Survey conducted in 69 panchayats in 11 blocks of Kollam district, 53 panchayats in 9 blocks of Pathanamthitta district, 78 panchayats in 12 blocks of Thiruvananthapuram district and 72 panchayats in 12 blocks of Alapuzha district. Farmers having traditional mango varieties has been inventoried. This database formed the basis for further detailed studies.
- Data collection and field visits of farmers having traditional mango varieties in Kollam, Alapuzzha and Thiruvananthapuram and Pathanamthitta district were completed.
- Surveyed a total of 2212 farmers having traditional mango varieties in Kollam, Pathanamthitta, Alapuzha and Thiruvananthapuram districts. From this 81 numbers of elite traditional mango trees which are superior with respect to important economic characters like yield, fruit size, organoleptic qualities, regularity in bearing , offseason bearing, pest and disease resistance even under changed climatic scenario of Kerala were identified for future research works. The short listed trees are 39 from Kollam , 3 from Pathanamthitta, 12 from Thiruvananthapuram and 27 from Alapuzha district.
- Morphological characterization and fruit quality analysis works of selected 81 traditional mango varieties completed
- Detailed physiological study is going on in these selected 81 traditional mangoes in the second year.

3. Survey, collection , establishment and maintenance of superior lines of traditional mango variety Karpooram in southern Kerala

(FR-01-00-02-2018-SHM)

(PI: Dr. Bindu. B, Assistant Professor, FSRS, Sadanandapuram)

Objectives :

- To conduct survey in Sothern Kerala to locate traditional mango variety **'Karpooram'**
- To identify superior lines of the traditional mango variety **'Karpooram'** for future studies
- To establish germplasm by producing progenies of the selected superior trees of farmer's field by vegetative propagation method

Major Research Highlights:

- Survey in 69 panchayaths in 11 blocks of Kollam district, 53 panchayaths in 8 blocks of Pathanamthitta district, 73 panchayat in 11 blocks of Thiruvananthapuram district were completed. Farmers having Karpooram variety of mango has been inventoried. This database formed the basis for further detailed studies
- Data collection and field visits of farmers having traditional mango variety Karpooram in Kollam, Pathanamthitta and Thiruvananthapuram districts were conducted .
- Based on the survey it was found that number of farmers having Karpooram mango in Kollam district is 483, Pathanamthitta is 29 and Thiruvananthapuram district is 27.
- Based on yield, flowering regularity and minimal pest and disease incidence, 43 plants were identified in Kollam, 12 in Pathanamthitta and 17 in Thiruvananthapuram districts Detailed studies were conducted in these 72 selected plants. Of which 20 best performing accessions were carried forward for taking observations of third year and started taking observations of fourth year. Selected superior germplasm of best performing accessions were conserved in the Farming

Systems Research Station , Sadanandapuram.

- Genetic variability study of selected superior germplasm of best performing 20 accessions (using ISSR markers) were completed

4. Development of high yielding short duration and climate resilient varieties of greater yam (*Dioscorea alata*) and Tania (*Xanthosomasa gittifolia*) for strengthening food and nutritional security of homegardens

(PI: Dr. Bindu M.R., Professor, FSRS, Sadanandapuram)

Objectives:

- Collection, characterisation and conservation of traditional varieties of greater yams *(Dioscorea alata)* and Tania (*Xanthosoma sagittifolia)* in Southern Kerala
- Identification and development of high yielding short duration varieties with tolerance to drought

Major Research Highlights:

- Survey was conducted in AEU 9 and 12 of Kollam district for collecting local genotypes of greater yam and Tania.
- Collected 26 varieties of greater yam comprising of 21 local types from farmer's field and 5 released varieties (SreeSwathi, SreeHima, SreeKeerthi, SreeNeelima and SreeNidhi) from CTCRI, Sreekaryam.
- Collected 17 local types of Tania from farmer's field.
- Collected accessions were planted in the field of FSRS, Sadanandapuram for characterisation. Observations were recorded for the characterisation.

5. Establishment of Millet Hubs and Empowerment of women of Kollam District

(PI: Dr. Bindu M.R., Professor, FSRS, Sadanandapuram)

Objectives:

- Conducting demonstration of millet cultivation at FSRS, Sadanandapuram

- Establishment of one demonstration unit of cultivated millets at FSRS, Sadanandapuram and demonstration units of cultivated millets at farmers plot
- Creation of awareness among farmers through trainings/seminars

Major Research Highlights:

- Seeds of millets – chama (variety ATL-1) from NSC, Palakkad .sorghum (var. CO32), bajra (var. CO10) and maize (var. COH(M)8) from Department of Millets, TNAU, tenai (var. CO(Te)7), kuthiravali (CO(KV)2), varagu (TNAU 86) and ragi (CO15) from CEM, Athiyandal were collected..
- Thirteen farmers of Kunnathur, Sasthamcotta, Poruvazhy, Sooranad North and Mynagapally Krishibhavans were selected and seeds of millets (chama, sorghum, bajra, maize, tenai, kuthiravali, varagu, ragi) were distributed.
- Online training on 'Millet Cultivation' was conducted for selected farmers.
- Demonstration plots of millets were raised at FSRS, Sadanandapuram.

6. Evaluation of brinjal lines in AICVIP trial

(PI: Dr. Bindu M.R., Professor, FSRS, Sadanandapuram)

Objectives:

To identify high yielding variety of brinjal

Major Research Highlights:

- Yield evaluation was conducted with 6 brinjal lines and KAU-FSRS-SM-1 recorded the highest yield (6.42kg per plant).
- The pooled mean of the last three years was highest for KAU-FSRS-SM-1 (6.43kg per plant) compared to the variety Haritha (5.06kg per plant).

7. Evaluation of turmeric and kacholam accessions in the homesteads

(PI: Dr. Bindu M.R., Professor, FSRS, Sadanandapuram)

Objectives:

To identify high yielding variety of turmeric and kacholam suitable for the homesteads

Major Research Highlights:

- Evaluation was conducted with 28 accessions of turmeric and 20 accessions of kacholam for three years.
- Sadanandapuram local recorded the highest yield in turmeric followed by Sobha and Panjab Haldi II, Pooled mean for yield was also highest for Sadanandapuram local in turmeric (582g per plant)
- Palode local recorded the highest yield in kacholam and it was followed by Kannur local.

8. Drought mitigation strategy in banana cv. Nendran (Musa AAB)

(FR-14-00-01-2020-KTR (I5)- KAU Plan**)**

(PI: Dr. Bindu. B, Assistant Professor, FSRS, Sadanandapuram)

Objectives:

Development of drought mitigation strategy in banana

Major Research Highlights:

- Banana plants were planted and drip irrigation system was installed.
- Rain out shelter was constructed for the drought studies
- Drought induction studies were conducted.
- Regular biometric, yield and physiological parameters were taken
- Soil and foliar treatments for mitigating the drought were imposed
- Lab studies are going on

9. Empowerment of rural women by establishment of fruit park in selected homesteads of Kollam district

(PI: Dr. Bindu. B, Assistant Professor, FSRS, Sadanandapuram)

Objectives:

- Establishment of fruit park in selected homesteads of of Kollam district for increasing the availability of pesticide free fruit
- Promoting the cultivation of fruit crops (major and underutilized) in the homesteads by selecting rural women farmers for the purpose of nutritional security and income enhancement
- Creation of awareness among farmers through trainings/seminars

Major Research Highlights:

- In first year, the project was implemented in Vettikavala block of Kollam district
- Conducted survey in Vettikavala block for identifying suitable homesteads for establishing fruit parks
- Conducted six one day trainings on "Integrated crop management and nutritional importance of fruit crops" to the farmers as part of the awareness programme of the project, one in each six panchayats of Vettikavala block viz. Melila, Kulakkada, Vettikavala, Mylom, Ummannoor and Pavithreswaram
- Conducted one farmer seminar on" Advances in crop management and nutritional aspects of fruit crops"
- Selected 25 homesteads (from all six panchayats) in Vettikavala block for the implementation of the fruit park
- Distributed fruit basket containing twenty important major and underutilized fruit crops (grafts/layers/seedlings) and bio inputs to selected 25 rural women farmers
- Fruit park was established in selected 25 homesteads of rural women farmers Vettikavala block
- Started follow up visits and scientific advices for crop management and maintenance of fruit parks in 25 homesteads

10. Organic nutrient management of papaya (*Carica papaya* L.**)**

(PI: Dr. Bindu. B, Assistant Professor, FSRS, Sadanandapuram)

Objectives:

To study the effect of organic nutrient management on growth, yield and quality of papaya

Major Research Highlights :

- The trial had been conducted in RBD with 11 treatments and 3replications.
- Results revealed that, application of 100% of recommended dose of N as organic along with PGPR Mix –I (10g/plant) and AMF (5g/plant) was found to increase the growth, yield and quality of papaya .

11. Establishment of rural agri technology park

(PI: Dr. Bindu. B, Assistant Professor, FSRS, Sadanandapuram)

Objectives:

- Establishment of a rural agri technology park
- Training to unemployed youth and women
- Equip the youth for prodution and sale of bio agents and planting materials to farmers of the State through interest groups/ SHGs.

Major Highlights:

- Agri Technology park where farmers are getting training in apiculture, mushroom cultivation, plant propagation techniques,nursery management, vegetable seed production. production of biocontrol agents etc.was established
- Conducted nine trainings in apiculture, three trainings in mushroom cultivation two trainings on propagation techniques and landscaping and one on vegetable cultivation
- Trained 294 of person in apiculture , 81 in mushroom cultivation Trained 15 unemployed youth in vegetable cultivation and 15 in propagation techniques and landscaping

- Trained persons started mushroom cultivation, apiculture ,nursery units etc

KRISHI VIGYAN KENDRA (KVK), KOLLAM

KRISHI VIGYAN KENDRA, KOLLAM :

Technologies assessed/refined:

During 2020-21 KVK has conducted eight On Farm Trials in the thematic areas of varietal evaluation, plant protection, organic pest management, mechanization etc. In all 40 trials conducted in the farmer's field, the following technologies were tested/ refined during the period 2020-21:

1. **Assessment of Nano organic NPK formulation in Bhindi in Kollam District:**

Technology options assessed

TO1- Farmers practice – heavy use of complex fertilizers

TO 2-KAU POP (lime as per soil test value + FYM@20t/ha + NPK @ 110:35:70 kg/ha

TO 3-KAU POP (organic) lime @500kg/ha+FYM@20t/ha+PGPR mix I @ 2.5 kg /ha + top dressing with vermiwash @500L/ha at 10-15 days interval

TO 4- Lime as per soil test value +FYM (20t ha-1) + Soil application of nano NPK formulation (25 kg ha-1) Foliar application of nano NPK formulation (0.2%) at 15 days interval

Outcome: Application of nano organic fertilizers gave the highest BCR of 2.83 with a yield of 10.32 t/ha but the highest yield (10.75 t/ha) was recodedby the technology option TO2 (RDF) and BCR of 2.42. Hence the technology -soil application of nano NPK formulation (25 kg ha-1) along with foliar application of nano NPK formulation (0.2%) at 15 days interval can be recommended for wide scale adoption in the district.

2. **Management of mosaic disease of bitter gourd in Kollam district:** Technology options assessed

TO 1- Farmers practice –Application of systemic insecticide for vector control

TO 2 -Application of balanced nutrients as per POP + secondary and micronutrients 30-

45-60 DAP

TO 3- Viruscides (commercial antiviral principles) 2g/lit at30-45-60 DAP

TO 4- Application of balanced nutrients as basal and top dressing + secondary and micronutrients +Viruscides + biofencing with maize

Application of balanced nutrients as basal and topdressing along with micronutrients (KAU Sampoorna) + viruscides at 30-45-60 DAP yielded 51.3 per cent increase in yield over farmer practice. The application of balanced nutrients and viruscides did not completely control the disease, the symptom was suppressed with the application of micronutrient. With the application of micronutrient the flowering and fruiting was enhanced. Hence the technology of balanced nutrients along with micronutrients and biofencing with maize can be a better option for severe mosaic incident areas.

3. **Assessment of different poultry varieties for backyard rearing in Kollam:** Technology options assessed

T.O.1 (Farmers practice)Gramapriya

T.O.2Kalinga Brown

T.O.3Nammakal Chicken

T.O.4BV380

Outcome: It showed that Kalinga Brown variety is good for maximum . Egg production for backyard rearing and attains first in age at sexual.

4. **Assessment of ready to cook dehydrated Jack fruit:** Technology options assessed

TO.1 Jack fruit dried under sunlight

TO 2.Jack fruit dried after blanching with electrical drier

TO 3.Blanched, pre treated jack bulb is dehydrated with spice mix at 650 C for 4 to 5 hours (breaking stage)

Outcome: dehydrated Jack fruit based curry mix (Avial) prepared from Blanched, pre treated jack bulb with spice mix (Jack fruit bulb and seed + Green chilly + Garlic + Jeera + Turmeric powder +Curry leaves. (Avial mix) at 65 ºC for 4 to 5 hours (breaking stage) exhibited high sensory qualities with an overall acceptability

score 44.76 Sensory Attributes of Reconstituted RTC (Avial mix) exhibited high sensory qualities with an overall acceptability score 45.10High consumer acceptance in terms of reconstituted RTC. Shelf life stability 6 months

Ongoing On Farm trails:

1. **Assessment of high yielding black gram varieties in Kollam District :**

   Technology options assessed

   TO1-Local (Farmers practice)

   TO 2 - Vamban – 8

   TO 3- DBGV 5

   TO 4 -TBG 104

   TO 5- KKM -1

2. **Assessment of Cashew Nut Shell Liquid based botanical pesticide for pest management of yard long bean in Kollam District: Technology options assessed**

   This OFT is proposed based on the results of the PhD work of Dr.Lekha M, Asst Professor (Agrl Entomology) , KVK, Kollam on Cashew Nut Shell Liquid (CNSL) based botanical insecticide for pest management in yard long bean (*Vigna unguiculata subsp. sesquipedalis* (L.) Verdc). The outcome of the project is a botanical pesticide formulation (20% CNSL EC formulation) and its 0.3 % was found promising in managing sucking pests of yard long bean.

   TO1- KAU POP for plant protection

   TO2- Cashew nut shell liquid 20% EC formulation @ 0.3 %

   TO3- KAU Raksha

3. **Assessment of Different Broiler Quail varieties in Kollam District: Technology options assessed**

   T.O.1 Japanese quail

   T.O.2 Cari - Uttam

   T.O.3 Nammakal Quail

4. **Assessment of onion varieties for Kollam district : Technology options assessed**

   TO 1-Nil

   TO 2-Agrifound dark red

TO 3 ArkaBheem

Frontline demonstrations:

Under Frontline demonstrations, proven technologies were demonstrated in the farmers field. In 2020-21 KVK Kollam has conducted 125demonstrations. The technologies demonstrated were:

S.No	Crop	Technology demonstrated	No. of demo.
1	Rice	Demonstration on high yielding short duration rice variety Manuratna for the second crop season in Kollam district	15
2	Rice	Demonstration of Sampoorna KAU Multimix spray using UAV	1
3	Cassava	Demonstration on nutrient use efficient (NUE) cassava genotype Sreepavitra for reducing chemical NPK fertilizers in Kollam district	15
4	Yard Long Bean	Demonstration of Yard long bean KAU Deepika	10
5	Amaranthus	Demonstration of Amaranthus variety KAU Vaika	10
6.	Cluster bean	Demonstration of cluster bean variety KAU Suruchi in homesteads	10
7.	Bitter gourd	Demonstration on soil test based nutrient management for pest and disease tolerance in Bitter gourd	5
8.	Elephant foot yam	Popularization of *Trichoderma*against collar rot of Gajendra variety of elephant foot yam	10
9.	Mushroom	Demonstration of oyster mushroom , Pleurotus florida in Kollam district	15
10.	Vegetables	Demonstration on Value addition and product diversification of vegetables for maximization of income	3
11.	Locally available fruits	Demonstration on osmo dehydrated locally available fruits	3
12.	Goat	Demonstration of oestrous synchronization and AI in Goats	10

13.	Poultry	Demonstration of production of low cholesterol eggs in Kollam District	5
14.	Japanese Quail	Demonstration of Scientific Management of Japanese Quail (Egg Production) among Rural Women farmers in Kollam District	5
15.	Amur Carp Hungarian Strain	Demonstration on Amur Carp Hungarian Strain rearing in FW natural ponds	3
16.	GIFT Tilapia	Demonstration of Performance of GIFT in fresh water resources	5

Trainings:

Type of training	No.of trainees (No. of trainings)	Category
Training (On and off campus)	11652 (104)	Farmers
Training (On and Off campus)	7549 (93)	Rural Youths
Training including sponsored training programmes	3880 (84)	Farmers
Vocational training programmes carried out by KVKs	214 (22)	Rural Youths

Other extension activities: In addition to the OFT, FLD and trainings the Kendra has undertaken other extension activities such field days, participation in exhibitions, method demonstrations, radio talks, soil health camps, field visits, ex trainee's samelan, seminars etc. Mass media coverage of the important activities was also done timely. In addition KVK celebrated world soil day, conducted programmes under CFLD pulses and oil seeds.

Revolving Fund: Under revolving fund various technological inputs were produced for distribution to farmers of Kollam district. The receipts from revolving fund activities amounted to Rs. 3773129/- for the year. The major share was contributed by Organic inputs, vegetable seedlings, grow bags, value added products, pheromone trap and TC

banana.

Externally Aided Projects:

Completed Projects

1. **State Plan 2020-21) Strengthening of Agro Processing Unit As Technology Demonstration and Facilitation Centre For Kollam District**

(PI: Shamsiya.A H, Assistant Professor, Community Science)

Objectives:

- Strengthening facilities of KVK's existing Agro processing unit with equipment's and machineries
- Training 10 Rural youth in value addition and food processing for 10 days
- Skill enhancement of farming community

Major Research Highlights:

- Purchased Fruit mill, Pulveriser, Fruit pulper, Electric griller, Steel storage cabins, S.S Steel table,
- Conducted Training for 10 rural youth in value addition and food processing for 10 days.
- Conducted seven trainings on various aspects of value addition and processing.(total number benefitted = 104nos)

2. **Establishing Mini Fish Processing Lab and conducting training cum demonstration programmes under SCSP programme**

(PI: Shamsiya.A H, Assistant Professor, Community Science)

Objectives:

1) To Establish Mini Fish Processing Lab
2) Conducting training cum demonstration programmesfor 40 rural women.

Major Research Highlights:

1. Mini fish processing unit was established with minimal facility for fish processing as Custom Hiring Centre (CHC) for small scale fishers, primary processors and entrepreneurs
2. Capacity building programmes on fish processing and value addition for two groups (comprising of 40 rural women) was given.

Ongoing Projects:

1. Strengthening of Agro Processing Unit as Technology Demonstration and Facilitation Centre for Kollam District -2020-2022

(PI: Shamsiya.A H, Assistant Professor, Community Science)

Objectives:

1) Strengthening facilities of KVK's existing Agro processing unit with equipment's, machineries andinfra-structure (extension of existing building-APU)
2) Training 5 batches (10 participants each) including rural youth, farmer, farm women and entrepreneurs in value addition and food processing for 10 days

Major Research Highlights:

- Construction of infrastructure is on progress.
- Purchased Visi cooler, Grinder, Mixer juicer, gas stove, Mannual liquid packing machine, Sealing and labelling equipment's, Hot air gun, Cling film wrapper, Freezer, Refrigerator, Fruit concentrator and data processing equipment's.
- Conducted one batch training for 10 rural women in value addition and food processing for 5 days.

District Agrometeorological Unit (DAMU) Under Gramin Krishi Mousam seva (GKMS) scheme, KVK Kollam

Gramin Krishi Mousam seva (GKMS) is the flagship programme of Govt of India for weather related services to the farmers aiding in decision making on day-to-day

agricultural operations. The scheme is extended to block level through District Agromet Unit (DAMU) with a joint effort of IMD and ICAR with multi-organizational collaborations. District Agromet Unit have been initiated in KVK Kollam in 2018.

The major service of this unit includes issuing of district and block level Agromet Advisory bulletins in every Tuesdays and Fridays which are disseminated to the farmers, Krishi Bhavans, Agricultural and IMD officials etc. along with feedback collection for the improvisations. Farmers Awareness Programmes, promotion of various weather based mobile applications, soil moisture analysis through gravimetric method etc. are being done in this unit. DAMU is also providing assistance to the Installation of Agro-AWS by IMD in KVK Kollam.

Consolidated report of DAMU upto 20th December 2021

KVK	Agro advisories			Farmers awareness programmes		Videos developed	Articles Published
	No of Agro advisories generated upto December 20.12.2021	No of farmers registered for agro advisories	No of farmers benefitted	No of programmes	No of farmers benefitted	No of videos developed	No of Articles Published
KVK KOLLAM	1.District level AAS Bulletin-209 nos 2.Block level AAS Bulletin	8255	8255	27	3113	3	1

	– 2068 nos						

2. Establishment of 'Protein parks' in the rice growing tracts of Kollam district for food and nutritional security with special emphasis on soil health

(PI: Dr. PoornimaYadav. P.I, Assistant Professor, Agronomy)

Objectives :

1) Popularisation of important pulses including traditional varieties of horse gram in the district by forming 2 clusters in 2 panchayath through trainings and FLDs
2) Establishment of a post harvest processing unit at KVK Kollam
3) Enhancement of productivity of rice and pulses through FLDs and trainings

Major Research Highlights:

1. Conducted 3 FLDs

   Black gram variety VNB 8-10 farmers

   Green gram variety Co -8 – 10 farmers

   Grain cowpea variety VBN-3-10 farmers
2. Conducted one OFT in 5 farmers field and one trial in KVK farm
3. Purchased Mini Dal mill and rice mill and started small scale processing of pulses.
4. Salient Achievement under the project

   Identified local promising black seeded varieties from Poothakkulam Panchayath of Kollam district :

   During the implementation of OFT Assessment of grain cowpea varieties at the farmers field of Poothakkulam Panchayath, a Local variety Karimany (Poothakkulamlocal) was identified that is commonly cultivating one and was found to be the third best variety during 2019-20. During 2020-21 an evaluation trial on 7grain cowpea varieties was conducted along with Poothakkulam local variety. In addition to Karimony, some other local varieties with promising characters *viz*., early maturing, easy to thresh, high yield were identified. The seeds of these varieties were collected and multiplied at the KVK s farm which were

named as Poothakkulam Local I(Violet pod with black seeds), Poothakkulam local 2 (Karimony), Poothakkulam local3(Green pod with black seeds). Then Initial evaluation trials were conducted for 2 seasons at KVK Kollam (Kharif and Rabi) ie.,Evaluation of 3 local short duration grain cowpea varieties with black seed color for its performance along with 7 released varieties was conducted at KVK. The results revealed that the variety with violet pod and black seed (Poothakkulam Local I) yielded 896.30kg/ha with a short duration of 64.17 days when compared to other black seeded varieties. Poothakkulam Local 2 (Karimony) recorded a yield of 723.467 kg/ha with a duration of 62.5 days.

3. Drought management through control of soil erosion, *in situ* rain water harvest, organic waste utilization and crop diversification in coconut based mediculture systems of Kerala

(PI: Dr. PoornimaYadav. P.I, Assistant Professor, Agronomy)

Objectives:

To develop appropriate cost effective, ecofriendly techniques for ground water recharging, slope stabilization and waste management in coconut based mediculture systems of selected watersheds

Major Research Highlights:

Field experiment 1: Ground water recharging and slope stabilization through vegetative barrier technology utilizing vetiver systems – continuing

Experiment 2: Efficient utilization of natural resources and waste management through vertical farming- fabricated a vertical farming structure and started experiment on standardization of rooting medium and it is ongoing

4. Assessment of climate resilient protocol for sustainable rice production for the drought prone agroecological zones of southern districts with special emphasis on rhizosphere and phyllosphere engineering

(PI: Dr. PoornimaYadav. P.I, Assistant Professor, Agronomy)

Objectives :

- Assessment of short duration high yielding rice varieties for its suitability to the second crop season in the drought prone agro ecological zones of southern districts.
- Assessment of a climate resilient comprehensive production protocol in the drought prone agroecological zones of southern districts through rhizosphere and phyllosphere engineering.
- Promotion of climate resilient production protocol and creation of awareness on vulnerability of rice sector to climate variability and projected climate change among the rice farmers

Major Research Highlights:

Experiment 1

Assessment of short duration high yielding rice varieties for its suitability to the second crop season in the drought prone agro ecological zones of southern districts

Among the varieties highest yield was obtained for the variety Manuratna and least was recorded from the variety Raktasali from the experimental plots of Cherinniyur. From Vakkanadu the highest yield was recorded for the rice variety Manuratna which was on par with the variety Kanchana. Hence the variety Manuratna was selected for the field study on the development of climate resilient protocol for sustainable rice production for the drought prone agroecological zones of southern districts with special emphasis on rhizosphere and phyllosphere engineering

Experiment 2

Assessment of a climate resilient comprehensive production protocol in the drought prone agroecological zones of southern districts through rhizosphere and phyllosphere engineering

Status: The crop is at 30 DAT

5. Technology hub for safe and sustainablefood production in Kollam district

(PI: Dr. PoornimaYadav. P.I, Assistant Professor, Agronomy)

Objectives:

a. Construction of laboratory building for mass production of bio control agents to ensure the availability of bio control agents (bio agents, parasites etc)

b. Creating awareness on the importance of beneficial insects, conservation of natural enemies, ecological engineering and AESA.

Major Research Highlights:

- Established Apiculture units (10 units)
- Established floral sources for increased population of natural enemies, predators and parasites like marigold, ornamental passion fruit, honey suckle plants in the IFS plots and surrounding area of Apiculture units
- Collected the culture of EPN and started its multiplication
- Purchased the critical inputs for the mass production of PGPR Mix I and PGPR Mix II and Azospirillum due to the repeated queries from DoA, Kollam
- Ecological engineering using various flowering plants including cowpea
- Started AESA (rice and pulses) model plot in front of biocentre building

Conducted 4 trainings *viz* AESA in rice and pulse (Mylom and Chavara), Ecological Engineering, biocontrol of pests and diseases, use of EPN (Sooranadu north and Perinad). Total number of participants -62

Report of the Agricultural Knowledge Centres under RARS (SZ), Vellayani

Agricultural Knowledge Centres of Thiruvananthapuram District

1. **Name of AKC : Nedumangad Block, Thiruvananthapuram**

Name of the Nodal Officer : Dr.Meera, A. V.
Assistant Professor, IFSRS, Karamana

Date of start : 17.08.2020

Major activities:

- Technical consultancy services were provided in successful implementation of *Jaiva Griham* project.
- Meeting of agricultural officials were conducted on monthly basis.
- Service of *Karshaka Santhwanam* utilized in field level diagnosis of problems and proper guidance provided.
- Arrangements were made for supplying quality planting materials and bio-inputs of KAU, as and when needed.
- Planting materials *viz.* sweet potato and cassava from CTCRI were supplied for raising seedling village in Panavoor panchayath.
- Involved in plan project formulation, especially in developing project for managing wild boar attack.
- State plan project in developing climate smart banana based farming system was initiated in Vembayam panchayath, Nedumangad taluk (AEU 8).

2. **Name of the AKC : Nemom Block, Thiruvananthapuram**

Nodal Officer : Dr. Reji Rani O.P, Associate Professor,
Dept. of Agricultural Entomology, CoA, Vellayani

Date of start : 17.8.2020

Major activities :

Facilitating the implementation of various cemtral and state schemes of the Dept. Of Agriculture, Fallow land cultivation, Increasing area under pulses, Validation of ITK,

Equiping ecoshops, establishing seed village, Visting IFS plots, Diagnosis and recommendations for addressing filed problems, Demonstration of technologies, Supply of biopesticides, conduct of awreness programmes on biopesticides, Trainng to farmers on cultivation aspects, attending farm queries throughwhatsapp group of Plant Health Clinic etc

3. Name of the AKC : Parassala Block, Thiruvananthapuram

Name of the Nodal Officer : Dr.B.Sudha,
Assistant Professor, IFSRS, Karamana

Date of start : 17.8.2020

Major activities:

- Established rapport with the officials of the State Department of Agricultural Development and Farmers welfare and farmers of the block.
- Handled and arranged trainings for farmers, conducted field visits and helped solving of field problems.
- Agricultural information (short videos, e -posters, brochures etc) were made available to farmer groups
- Answered the various queries on agriculture through Whatsapp groups

4. Name of the AKC : Vamanapuram Block, Thiruvananthapuram

Name of the Nodal Officer : Dr.Sajeena A., Assistant Professor, IFSRS, Karamana

Date of start : 17-08-2020

Major activities:

- As part of the farmer participatory seed production programme undertaken in collaboration with the Department of Olericulture, College of Agriculture, Vellayani and Nanniyode grama panchayat, three varieties (Gitika, Vellayani Jyothika and Deepika) of yard long bean were planted in five farmer's fields at Nanniyode. A

total of 30 kg seeds of vegetable cowpea were produced by the farmers and supplied to the Department of Olericulture, COA.

- As part of the programme sanctioned by the Directorate of Extension on demonstration of proven technologies of Kerala Agricultural University in farmer's field, a trial was undertaken in the field of a farmer (Surendran) at Nanniyode panchayat in yard long bean (Gitika) for the management of biotic and abiotic stress as well as for yield improvement in the crop. The seeds were sown in pits applied with AMF @ 5g per seed. All the sanctioned inputs (KAU and ICAR technologies) were supplied to the farmer. Online demonstration was provided to the farmer for the soil application of *Trichoderma* capsules provided by the KVK at Santhampara, Idukki for the management of soil borne diseases of the crop.
- A bacterial wilt disease was identified in yard long bean in a farmer's field in Nanniyode panchayat as part of the seed production programme undertaken in the panchayat in collaboration with the Department of Vegetable Science, CoA, Vellayani. The disease resulted in severe crop loss for the farmer. Identification of the etiology and management of this disease was taken up as the topic of research of my M. Sc (Plant Pathology) student, Miss. Talla Sushmitha, this year.
- Supplied 5000 cabbage seedlings (NS 183) to Nanniyode Krishi Bhavan, 3000 vegetable seedlings to Krishi bhavan Vamanapuram and 320 kg paddy seeds (Uma) to KB Pullampara for planting in farmer's fields
- Field visits were undertaken in IFS plots of all the panchayats of the block and for identification of pest problems and recommended remedial measures.
- Meetings of all the agricultural Officers were conducted on monthly interval.
- Consultancy services were provided to the farmers of the block on different problems faced by them in consultation with other scientists of KAU.
- Classes were arranged to farmers and staffs of the Department of Agriculture on various topics including IFS, schemes available for farmers on animal husbandry, poultry and fisheries.

5.	**Name of the AKC**	**:**	**Athiyanoor Block, Thiruvananthapuram**
	Name of the Nodal Officer	:	Dr.N.V.Radhakrishnan, Professor & Head , CRS, Balaramapuram
	Date of start	:	17-08-2020

Objectives:

Identifying the fallow land and make it cultivable; production and productivity enhancement of all crops grown in the region; demonstration to be laid in connection with Integrated Farming System, INM, IPM, IDM etc.; Arranging market outlet to sale out farmer's produce; income through processing and value addition; training and field visit and involvement of other sister departments in all activities related to enhance the livelihood of farming community.

Major activities:

Fallow land cultivation and intercropping in coconut garden with tapioca, banana, other tuber crops and vegetables are being recommended wherever it is possible.

Monthly meeting of Agricultural Officers and Contact farmers at Office of Assistant Director of Agriculture, Neyyattinkaraare carried out and discussedthe current field problems.

Conducted KrishiPadasala in KrishiBhavans of Athiyanoor, Kottukkal, Kanjirankulam and Neyyattinkara on various topics viz., Plant health management, Coconut based Integrated farming System, biological control agents and biofertilizers in the crop production and crop protection, Challenges and opportunities in value addition of coconut for enhanced income and livelihood.

Field Visits to farmers plot for identifying their field problems were conducted mostly on Fridays. Identifying the problems in field, plantation crops and vegetables and giving solutions to overcome the problem.

Formation of Knowledge Hub at Vizhinjam, Thiruvallam Krishi Bhavans.

Formed a Whatsapp group and giving solutions to their field problems then and there through it.

Dissemination of the Agromet Advisory Bulletins (both in Malayalam and English) published by RARS (Southern zone), Vellayani and giving forecast related to Weather and crop conditions by every five days for Athiyanoor Block AKC.

Onachanda was conducted at KottukalKrishi Bhavan by procuring the produces from farmers and distributed to needy people. Best KerakarshakanatKottukalGrama Panchayath was given felicitation.

One session on Plant Health Management in coconut (Agro-clinic) was conducted at other AKCs, AnadGrama Panchayath, Nemunangad and Manamboor-KavalayoorGrama Panchayath at Varkala AKC in Kollam District in connection with the Keragramam Inauguration.

KrishiPadasala on Plant Health Management in coconut was taken to the farmers of Koduganoor (Vattiyoorkavu) and Kudicode (Kottarakkara) Coconut Producers Society.

6. Name of the AKC : Pothenkode, Kazhakkuttom Block, Thiruvananthapuram

Name of the Nodal Officer : Dr. R. Pramod, Assistant Professor, Department of Plant Pathology, CoA, Vellayani

Date of start : 17.08.2020

Objectives:

1) Impart timely technical knowledge to farmers and solve their field level problems
2) To help the local bodies and AKC for the preparation of production plans and recommend crops according to Agro ecological zone
3) Facilitating scientific production of seeds and planting materials of cereals, pulses, tubers, fruit trees, bio-inputs etc. through seed production initiatives like seed village or seed clusters
4) To conduct block level training programmes in production, processing, value addition, marketing and plant protection
5) Provide technical support to the schemes and projects related to 'Subhiksha Keralam' by the LSGI's and Department of Agriculture

Major activities and achievements

- Conducted Krishipadasala at Krishibhavans and handled different sessions and provide technical support to different areas of cultivation
- Two field visits are being conducted in each month based on need and provided technical supportto farmers
- Identified the barren land suitable for cultivation in each panchayat and necessary steps were taken for initiating cultivation
- Special importance given to terrace cultivation in urban areas and indoor cultivation like mushroom production
- Discussed the importance of soil less cultivation in Krishipadasala
- Need based trainings and demonstration programmes has been arranged.
- Special attention given to integrated farming system which include fish culture, poultry, livestock and other allied activities along with crop production
- Regular meetings have been conducted in every month for evaluating the works and also for planning works for the coming month
- Special attention given to Keragramam programme, consultancy and advisory services are being extended to coconut farmersof the block for the problems addressed by them.
- Conducted an exhibition in connection with the inaugural ceremony of Keragramam programme on 08/12/21.

7. Name of AKC : Varkala Block, Thiruvananthapuram

Name of Nodal Officer : Dr. Simi. S, Assistant Professor, Department of Fruit Science, CoA, Vellayani

Date of start : 17-8-2020

Objectives:

Provide technical assistance for development of agriculture and allied sectors to ensure food self- reliance as part of 'Subhiksha Keralam' project

Major activities :

Technical support is given to farmers and Agriculture officers of Varkala block and answers are given to the queries raised by them through the whatsapp calls, phone calls as well as during field visits. Agromet advisories are given through whatsapp group.

Field visits are conducted to the farmers' fields as and when they require our help. Karshaka Santhwanam facility is utilized for the same. Some of the problems addressed includes gall fly attack in mango, recurring incidences of rhinoceros beetle and red palm weevil in coconut, sucking pests in vegetables, bacterial wilt of brinjal and tomato, nutritional disorders in vegetables, coconut, pepper, banana, papaya and ginger, leaf rot of coconut, mosaic and powdery mildew of cowpea, die back of mango. Farmer participatory vegetable seed production was carried out. KAU Suruchi variety of cluster bean and Deepika variety of cowpea were distributed to two farmers at AKC, Varkala.

During COVID lock down period, distribution of vegetable seeds and biocontrol agents were supplied to farmers of Varkala AKC as per their requirement with the support of Karshaka Santhwanam team. Online training classes are organized on the topics which are relevant to the farmers viz., nutritional garden, vegetable seeds and planting material selection, IPM and IDM on vegetables, mushroom cultivation etc.

8. Name of AKC : Chirayankeezhu Block, Thiruvananthapuram District

Name of Nodal Officer : Dr Sheeba Rebecca Isaac, Professor,
Dept. of Agronomy, CoA, Vellayani

Date of start : 17.08.2020

Objectives:

- Facilitate the Local Self Govt. in preparation of AEU wise agriculture production programmes / scientific crop production practices
- Facilitate the establishment of seed villages and seed production clusters for the production of food grains, pulses, tuber crops, leafy crops, vegetables, fruits etc.
- Provide Block level technical advisories and trainings on agriculture production, post harvest processing, value addition and marketing
- Provide technical support to the schemes, projects of Local Self Govt as part of 'Subhiksha Keralam"
- Provide support to the activities requiring technical guidance with respect to the 'Krishipadasala" scheme of Krishi Bhavans.

Major activities:

Trainings : Organised10 trainings (7 off line and 3 on line) for the farmers of the block and facilitated participation in other training programmes through online platforms and FB live streaming programmes

- **AKC Meetings** –4
- **Soil health campaign**– 2
- **Soil testing services** – 60 farmers
- **Pesticide residue analysis in vegetables**- 2
- **Field visits** – 14farmers
- **Field problems identified and solutions provided**– 26 nos (through FV, over phone and online- whatsapp)
- **Agro advisories as Krishitips/ video clippings** -24
- **Mass media programmes/ publications on AKC**- 2 no.s
- **Dissemination of Agromet advisories** -20 no.s

9. Name of AKC : AKC, Perumkadavila, Thiruvananthapuram District

Name of Nodal Officer : Dr Rajasree G

Date of start : 17.08.2020

Objectives :

- To facilitate the Local Self Govt. in preparation of AEU wise agriculture production programmes / scientific crop production practices
- To facilitate the establishment of seed villages and seed production clusters for the production of food grains, pulses, tuber crops, leafy crops, vegetables, fruits etc.
- Provide Block level technical advisories and trainings on agriculture production, post harvest processing, value addition and marketing
- Provide technical support to the schemes, projects of Local Self Govt as part of 'SubhikshaKeralam"
- Provide support to the activities requiring technical guidance with respect to the 'Krishipadasala" scheme of Krishi Bhavans.

Major activities :

Trainings :

Trainings organized/facilitated for AKC- 4nos

i) Coconut cultivation-Nutrient management and pest and disease management-05.01.2021

ii) Natural Calamities- Compensation and Crop Insurance-26.05.2021
Organisedby : Dept. of Agronomy, COA Vellayani
Number of farmer participants from AKC: 15

iii) Fodder cultivation-22.05.2021
Organised by AICRP on Forage Crops

iv) Milch cow manage ment-22.05.2021
Organised by AICRP on Forage Crops, CoA, Vellayani

- Field visits – 17 Numbers
- Field problems identified and solutions provided – 15nos
- Dissemination of Agromet advisories - 36nos (including block level advisories) Number of farmers covered - 887 (from 8 panchayats of the block)
- AKC Meetings –5 nos.

10. Name of AKC : Kattakada Block, Thiruvananthapuram

Name of the Nodal Officer : Dr. Ambily Paul, Assistant Professor, PRRAL

Date of Start : 17/8/2020

Objectives:

1. To support the activities and scientific requirements of various activities under Subhikshakeralam project
2. Develop production plan based on AEZ characteristics in consultation with various stake holders
3. Develop production protocols of major crops in the constituent Grama panchayats in consultation with farmers, scientists and devt. Personnel
4. Co-ordinate research stations, KVKs and other agencies to provide training, planting materials and consultancy to farmer groups
5. Organise training programmes in connection with krishi padasala

Major activities:

1. AKC, Kattakada has inaugurated on 17/8/2020
2. Conducted 3 meetings and 10 field visits
3. Organised two trainings for Scheduled caste farmers at Kattakada and Aryanadu Krishi bhavans
4. To encourage the production of " Safe to eat food production of vegetables and fruits", 280 samples of vegetables and fruits were collected from 8 krishi bhavans underAKC for the analysis of pesticide residues and only 10 % contamination was reported
5. Agroclinic services are continuously given to Agrl.officers and farmers through WhatsApp group

Results of pesticide residue analysis of vegetable and fruit samples from AKC, Vellanadu

Name of Krishi bhavans	No:of samples analyzed	No: of samples with residue	Contamination (%)
Kattakada	69	4	5.79
Uzhamalakkal	31	0	0.00
Kuttichal	31	4	12.90
Poovachal	37	2	5.41
Aryanad	20	1	5.00
Tholicode	25	3	12.00
Vithura	45	9	2.00
Vellanad	22	5	22.72
Total	**280**	**28**	**10.00**

Documented activities

Field visit

Collection of samples for residue analysis

11. Name of the AKC : Pulimath Block, Thiruvananthapuram

Name of the Nodal Officer : Dr. G.S. Sreedaya,
Assistant Professor,
Dept. of Agrl. Extension, Vellayani

Date of Start : 17/08/2020

Objectives:

Provide technical assistance for development of agriculture and allied sectors to ensure food self- reliance as part of "Subiksha Keralam' project.

Major activities

1. Meetings attended:5 nos.
2. Farmer training attended: 8 Nos.

3. Field visits participated: 6 Nos.
4. Field problems identified:
5. Demonsatation conducted -2

Sl:No	Crop	Pest/disease
1	Mango	dieback
	chilli	Leaf curl virus
3	citrus	Leaf sucking pest
4	Banana	Leaf dry
5	Turmeric	Stem borer
6	Banana/bhindi	Fruit borer
7	banana	Ca deficiency

Field photos of identified problems were shared with subject matter specialists in Kerala Agricultural University and remedial measures were communicated to Agricultural Officers of respective KrishiBhavans. Santhwanam visits were arranged to three farmer plots. Drone application of Sampoorna was conducted in Nagaroor and Pulimath Panchayath of AKC Pulimath.

AGRICULTURAL KNOWLEDGE CENTRES OF KOLLAM DISTRICT

12. Name of AKC : Anchal Block, Kollam

Name of Nodal Officer : Dr. Nisha S. K., Assistant Professor, KVK Kollam

Date of start : 17. 08. 2020

Objectives :

Provide extension support in enhancing production and productivity of agriculture and allied sectors on the basis of Agro Ecological Units.

Assist line Departments in implementing Subhiksha Keralam project as a means to accomplish self reliance and increased livelihood option.

Major Activities :

Attended AKC meetings and pre MTA meetings convened by the Assistant Director of Agriculture Anchal. Participatory seed production of newly released yard long bean variety 'KAU Deepika' is being taken up at Anchal and Alayamon. Joint field visits (6 Nos) to IFS units and demonstration plots were done along with ADA, Agricultural Officers and LEADs field staff. Diagnostic visits were conducted to identify field problems at Eroor, Karavaloor and Thenmala. Weather Advisories prepared by DAMU was sent to farmers through whatsapp, weekly twice on Tuesday and Friday. Krishipadasalas on 'Organic Banana Cultivation' and 'Cool season vegetables' were conducted at Thenmala and Eroor Krishi Bhavans respectively. Online trainings through Google Meet on 'Cool season vegetable cultivation' and 'Cultivation of perennial vegetables' was conducted for Iravipuram AKC, Kollam and Vamanapuram AKC respectively.

Established demonstration units on newly released vegetable varieties Yard long bean KAU Deepika, Cluster bean KAU Suruchi and Amaranthus KAU Vaika. Two on farm trials on big onion was also done at Karavaloor and Eroor.

13. Name of AKC : Chadayamangalam Block, Kollam

Name of the Nodal Officer : Dr.Santhosh Kumar. T, Assistant Professor,
Dept. of Agricultural Entomology, CoA, Vellayani

Date of Start : 17-08-2020

Objectives:

- Preparation of Agro-ecological zone based projects and crop production techniques.
- Establish seed villages and input production units
- Impart technical advice and training to farmers about different aspects of agriculture.
- Provide technical advice for the schemes related to subhikaha Keralam Project.

- Provide technical assistance for the conduct of Krishipadasala.

Major Activities:

Conducted 32 krishipadasala in various Krishi bhavans of Chadayamangalam AKC and organized 10 online Krishipadsala from Department of Agricultural Entomology, COA, Vellayani for all AKC's of Kerala .Conducted one farmers Interface for Chdyamangalam AKC withFSRS Sadanantdapuram.Started field level demonstrations of proven technologies in agriculture. Four demonstration units established so far. Conducted field visits and given solutions for various field problems of Chadayamangalam, Kottarakkara, Chathannor, Kilimanoor and Nedumangad AKC's with the help of SANTWANAM unit of RARS(SZ)and taken classes for Krishipadasala for various AKC's of Kollam and Thiruvananthapuram Districts. Field level research has been taken up for the management of disease complex of betel vine at Kadakkal ,Kollam

14. Name of AKC : Chavara Block, Kollam

Name of Nodal officer : Dr. Lekha M, Assistant Professor, (Agrl Entomology)
Krishi Vigyan Kendra, Kollam

Date of start : 17.08.2020

Major Activities:

1. Field visits : 7 nos
2. MDDT Visits : 2 Nos (in two panchayaths)
3. Krishipadashala : 7no
4. AKC meetings : 7 nos (online and offline mode)
5. Number of trainings to rural youth : 1 Nos
6. Number of trainings to Extension personnel : 1 Nos
7. Demonstrations conducted : 10 numbers
8. Weather advisory : Weekly twice every Tuesday and Friday

- Mapping on Invasion of Giant African Snail in Kollam district was done
- Detailed report on Invasion of Giant African Snail in Kollam district was prepared and submitted to the Department of Agriculture for conducting mass awareness programme**.**

Awareness class for the panchayath members of Chavara Panchayath was conducted. Field visit and awareness campaign was conducted.

- Area expansion of pulse and introduction of black gram in cropping system was implemente3d in the block under the protein park project
- Farmers and Officials from AKC attended training programme at KVK, Kollam
- In order to promote self employment mushroom cultivation was promoted by implementing mushroom FLD and given trainings
- Farmer Scientist interface on coconut was conducted and choke out the problem and decided to implement the FLD on coconut at Chavara
- Agroclinic was organised at Chavara block by involving RAWE students of College of Horticulture Vellanikkara
- Under the Protein park project, AESA on Pulses was conducted in the Black gram plot of Haritham group SHG

15. Name of the AKC : Chittumala, Kollam District

Name of the officer : Dr. K. N. Anith, Professor & Head,
Dept. of Agricultural Microbiology, CoA, Vellayani

Date of Start : 17.08.2020

Objectives:

Overall development of Chittumala Block with activities of Department of Agriculture and KAU

Major activities:

Organization of Trainings. Field Visits were conducted and technical advise given.

16. Name of the AKC : Ithikkara Chathannur Block, Kollam

Name of the nodal officer : Dr. Susha S. Thara, Assistant Professor & Head,
Department of Plant Pathology

Date of start : 17.08.2020

Objectives:

1) To help in the preparation of production plans and protocols at for local bodies based on Agro ecological zone
2) To help in the establishment of seed production units of vegetables, fruits and other crops.
3) To conduct block level training programmes in production, processing, value addition, marketing and plant protection.
4) Provide technical support to the schemes and projects related to 'Subhiksha Keralam' at Krishibhavan
5) Provide technical support to the Krishipadasala conducting at Krishibhavan

Major activities:

- Demonstration plots were planned for the transfer of new technologies.
- Cultivation in the terrace of houses especially in urban areas. Measures have been taken for popularising soil less cultivation now initiated in the block which is found promising.
- Need based trainings and demonstration programmes has been arranged.
- Conduct field visit based on need and give recommendations.
- Conducted trainings at Krishibhavans and handled different sessions and provide other technical support.
- Conducted meetings in farmer group of vegetable growers.
- A group named as **'Yummy mushrooms'** has been registered including the mushroom farmers in the block. Follow up programmes are conducting for regular monitoring the working of the group.
- Monthly meetings are conducting with the farmers on online mode for discussing the problems in cultivation.
- Regular meetings were conducted in every month for evaluating the works and also for planning works for the coming month

17.. **Name of AKC : Kottarakara Block, Kollam**

Name of the Nodal Officer : Dr. R Narayana, Assistant Professor,
Dept. of Agricultural Entomology, CoA, Vellayani

Date of Start : 17.08.2020

Objectives:

- Identify fallow lands in the panchayat and facilitate cultivation of crops
- Facilitate the farmers to use the post- harvest handling and value addition facilities of the university
- Conduct training programmes for farmers and entrepreneurs
- Conduct demonstrations and other extension programmes
- Supply seeds and planting materials to local bodies and farmer groups
- Spare machineries for community level farming by local bodies
- Consult the Krishi Bhavan and other institutions and start the preparation of production plans and protocols at for local bodies at the block level in advance
- Establishing seed villages
- Release of videos and other documents/publications

Major activities:

Awareness Program on the management of giant African snail in Ezhukone and Veliyam panchayats. The Honorable Finance Minister inaugurated the program of the integrated management of giant African snail. Financial assistance was extended for the Ezhukone panchayat for containing the snail problem.

Conducted Demonstration plots incorporating new technologies of KAU for 6 Krishi Bhavan areas

- Krishipadasala conducted classes
- Brought fallow lands under cultivation
- Established fruit tree gardens
- Medicinal plant cultivation

- Promoted farming in polyhouses
- Field visits conducted and identified pest and diseases

Demonstration plot for Management of Fusarium root rot of cassava proved that application of carbendazim 50 wp @2g/l of water, by drenching it around the base of the cassava plant. Management of pest and diseases through farmer contact programme

18. Name of AKC : Mugathala Block, Kollam

Name of nodal officer : Shamsiya AH, Assistant Professor, KVK, Kollam

Date of start : 17.08.2020

Objectives:

- Provided technical support to the schemes, projects of Local Self Govt as part of 'Subhiksha Keralam, BPKP."
- Provided support to the activities requiring technical guidance with respect to the 'Karshakasabha- Njattuvelachantha" scheme of Krishi Bhavans.
- Facilitate the Local Self Govt. in preparation of AEU wise agriculture production programmes / scientific crop production practices
- Provided Block level technical advisories and trainings on agriculture production, post-harvest processing, value addition and marketing
- Provided support to the activities requiring technical guidance with respect to the 'Krishipadasala" scheme of KrishiBhavans.

Major activities:

Training : Organised trainings in connection with pre-MTA (on line) for the registered farmers of the block and facilitated participation in FB agriculture related live streaming programmes of kvk

- Field problems identified and solutions provided– 63, arranged concerned scientist for recommendations.)
- Dissemination of Agromet advisories – (KVK.Kollam, whats app group 10. Weekly twice every Tuesday and Friday)
- Arranged Organic inputs for controlling sucking pest attack in vegetables and Sampoorna vegetable (Micronutrient mix)

- **Karshakasabha- Njattuvelachantha**–Organised 27 Number of Karshakasabhasessions (3 in each KrishiBhavan) and Block level-1
- Arranged resource persons for Online trainings :8,Cool season vegetables, Organic input preparation, INM in coconut, INM in vegetables, Value addition, Importance of nutrigarden, Organic farming.
- **AKC Meetings** – 3nos.
- **BPKV**-input distribution-16/12/21.Inagutrated by Iravipuram MLA
- **Vegetable development programme**-Inauguration of nutri garden at TKM college kollam by Honourable Minister for Agriculture development and farmers welfare.

19. Name of the AKC : Ochira Block, Kollam

Name of the Nodal Officer : Dr. Jacob D, Assistant Professor, OFR, Vellayani

Date of Start : 17/08/2020

Objectives:

(a) Establishment of Frontline demonstration plots' under 'Krishipadashala' scheme
(b) Participation in, Surveillance of farmers' fields
(c) Participation in conduct of'Jaivagriham'

Major activities:

(a) Attended monthly AKC meetings at Ochira Block
(b) Participated in '*Krishipadasala'* and'*Jaivagriham'*
(c) Surveillance of farmers' fields were done for '*Bharatiya Prakrithi Krishi*'
(d) Participated in '*Karshakasabha'* and '*Njattuvela chanda*'

20. Name of the AKC : Pathanapuram Block, Kollam

Name of Nodal officer : Dr.Bindu.B, Assistant Professor (Horticulture), FSRS, Sadanandapuram

Date of start : 17.08.2021

Major Activities:

Seven block level meetings were conducted and fourteen Krishipadasala were organised. In the krishipadasala trainings on banana cultivation, rice cultivation, weed management of rice, ,organic farming ,INM in coconut, IPDM in vegetables, and banana etc were organised, Seven field visits were conducted for solving the nutrient deficiency disorders in banana and vegetables, pest and disease management of vegetables, banana and coconut. Twelve online classes on different topics like Coconut varieties and hybrids and importance of coconut cultivation, Scientific cultivation practices of coconut, Intercropping and different cropping systems in coconut garden , Pest management in coconut , Disease management in coconut Value addition of coconut , Vegetable cultivation – possibility of crop diversity and field management, Agronomic management of homesteads, Banana cultivation for sustainable income, Pest and disease management in vegetables, Mushroom cultivation, Recent advances in the cultivation of major spice crops.

21. Name of AKC : Sasthamcotta Block, Kollam

Name of the Nodal Officer : Dr. M. R Bindu,
Professor, FSRS, Sadanandapuram, Kottarakkara

Date of start : 17.08.2021

Major activities:

Seven block level meetings were conducted to review the progress of ongoing agricultural projects of the five panchayaths and the block. Visited IFS plots of farmers and imparted technical guidance. Identified fallow lands of Sasthamkotta block and provided technical advice on cultivation of rice, pulses, tuber crops, banana and vegetables. Handled training classes on cultivation rice, coconut ,vegetables, sesame etc., organic farming ,preparation of botanical pesticides etc in six Krishipadassalas in different Panchayats of Sasthamcotta block. Organized demonstration of newly released vegetable varieties of cowpea (KAU Deepika), cluster bean (KAU Suruchi) and amaranthus (KAU Vaiga) and supplied seeds. Supplied seeds & planting materials of vegetables, fruit plants and spices to local bodies and farmers. Production plans were prepared for different Panchayats of

Sasthamkotta block Farmers were selected for frontline demonstration of millets, trainings were organised and seeds were supplied. Eleven field visits were conducted covering all the five panchayats of Sasthamkotta block. In the visits, recommendations for crop management, pest and disease control in vegetables, rice, coconut etc were given. Fifteen online classes on different topics like cultivation aspects of major crops, integrated pest and disease management, value addition etc. were conducted. Whatsapp group was created and recommendations were given to the queries of farmers regularly.

22. Name of AKC : Vettikavala Block, Kollam District

Name of nodal officer : Dr Poornima Yadav P I, Assistant Professor (Agronomy), KVK. Kollam

Date of start : 17.08.2020

Major Activities:

Field visits	:	9 nos
MDDT Visits	:	5 Nos (in two panchayaths)
Krishipadashala	:	4 no
AKC meetings	:	7 nos (2 in online mode)
Number of trainings to rural youth	:	3 Nos
Number of trainings to Extension personnel	:	2 Nos
Demonstrations conducted	:	20 numbers
Weather advisory	:	Weekly twice every Tuesday and Friday

- Soil Health cards were issued to 25 rice farmers of Kulakkada Panchayath in connection with the world soil day celebration
- Mapping on Invasion of **Giant African Snail in Vettikavala Block** was done
- Detailed report on **Invasion of Giant African Snail in Vettikavala Block** was prepared and submitted to the Director of Extension KAU**.** Awareness class for the panchayath members of Vettikavala Panchayath (online mode) was conducted. Awareness class for households of ward II (Vettikavala Panchayath) was conducted
- A project was submitted to ADA Vettikavala for the integrated management of Weedy rice

- Intercropping in banana and Cassava with high yielding pulses was promoted (15 demonstrations were carried out)
- Farmers and Officials from AKC visited KVKs organic input production centres and Mini rice and pulse mill
- 3 Technical Bulletins were released on silicon nutrition in crops, drought management and weedy rice management
- A state plan project entitled '**Enhancement of productivity of rice –rice-pulse cropping system through scientific interventions of Agriculture Knowledge Centre Vettikkavala-a support to Government mission Subhiksha Keralam – Replication of 'Protein Park' for Rs 4 lakhs** was sanctioned by DoA, GoK and the same is started.
- In order to promote the concept of organic recycling Vermicomposting was promoted and Vermibeds and earth worms were given to farmers of Ummannoor, Vettikavala, Kulakkada and Mylom panchayaths under Swatchhta Action Plan 2021-22
- Farmer Scientist interface and Pre Kharif training programme on crop production and protection technologies for farmers and extension functionaries was organized (online mode)

AGRICULTURAL KNOWLEDGE CENTRES OF PATHANAMTHITTA DISTRICT

24. **Name of AKC** **:** **AKC, Konni, Pathanamthitta District**

Name of Nodal Officer : Dr Bindu Podikunju, Assistant Professor (Agricultural Extension), KVK Kollam

Date of start : 17.08.2020

Objectives :

- Facilitate the Local Self Govt. in preparation of AEU wise agriculture production programmes / scientific crop production practices
- Facilitate the establishment of seed villages and seed production clusters for the production of food grains, pulses, tuber crops, leafy crops, vegetables, fruits etc.

- Provide Block level technical advisories and trainings on agriculture production, post harvest processing, value addition and marketing
- Provide technical support to the schemes, projects of Local Self Govt as part of 'Subhiksha Keralam"
- Provide support to the activities requiring technical guidance with respect to the 'Krishipadasala" scheme of Krishi Bhavans.

Major activities:

- Field visits – 3 numbers
- Field problems identified and solutions provided– 20 nos (through FV, over phone and online- whatsapp)
- Dissemination of Agromet advisories -20 nos (Weekly twice every Tuesday and Friday)
- Facilitation of FLDs– Technical guidance for front line demonstrations
- Krishipadasala – Number of Krishipadasala sessions organized - 3 (2 panchayat)
- AKC Meetings – 3 nos.

25. Name of AKC : Parakkode Block, Pathanamthitta District

Name of Nodal Officer : Dr. Bini Sam, Professor and Head, KVK, Kollam

Date of start : 17. 08. 2020

Objectives:

- Provide technical support to the schemes, projects of Local Self Govt as part of 'Subhiksha Keralam"
- Provide support to the activities requiring technical guidance with respect to the 'Krishipadasala" scheme of Krishi Bhavans.
- Facilitate the Local Self Govt. in preparation of AEU wise agriculture production programmes / scientific crop production practices
- Facilitate the establishment of seed villages and seed production clusters for the production of food grains, pulses, tuber crops, leafy crops, vegetables, fruits etc.

- Provide Block level technical advisories and trainings on agriculture production, post harvest processing, value addition and marketing
- Provide support to the activities requiring technical guidance with respect to the 'Krishipadasala" scheme of Krishi Bhavans.

Major Activities:

A Capacity Development Programme on "Operation, Repair and Maintenance of Farm Machinery " was conducted for the technicians of Karshika Karma sena of Kodumon Krishi Bhavan under Parakode Block for one week at KVK, Kollam. A Capacity Development Programme on "Value addition of Banana with special reference to different varieties " was conducted for SC women farmers of Parakode Block in collaboration with Banana Research Station Kannara, Thrissur with the help of Mobile Processing Unit of BRS, Kannara. An awareness Programme on "Giant African Snail Invasion- Problems and Management " was conducted for farmers, panchayat officials and Agriculture Officers of Parakode block. Organised trainings (on line) for the registered farmers of the block and facilitated participation in Face book and Google Meet live streaming programmes of KVK Kolam in Agriculture and allied sectors. Four block level meetings with members of AKC were conducted to plan the activities to be taken up in the Parakode Block. Three field visits were conducted for problem identification and recommendations and 10 Krishi Padasalas were organized in Parakode Block and technical guidance for front line demonstrations was provided.

Farm Trial Proposal - 1			
1.	Station	:	RARS (SZ), Vellayani
2.	Season	:	September – October 2022
3.	Test Crop	:	Brinjal
4.	Name of the trial	:	Multi nutrient tablets for vegetable cultivation in home gardens
5.	Officer proposing & Official address	:	Dr.R.Gladis Assistant Professor(SS&AC) ARS,Thiruvalla
6.	Objective	:	To evaluate multi nutrient tablets (MNT) in container / grow bag grown vegetables in home gardens.
7.	Justification	:	Kerala depends upon its neighboring states for bulk of its vegetable requirements. Most of these are heavily treated with pesticides which can cause serious health issues. Of late there has been an emphasis on the intensification of vegetable cultivation in our state. Rather than conventional farmers, the general public has started coming forward in a big way for vegetable cultivation in kitchen gardens, terrace gardens and homesteads. Grow bag / container cultivation is becoming popular among these groups. One of the important constraints faced by such farmers is the absence of precise nutrient management for grow bag grown vegetables to avoid deficiency / toxicity of nutrients as the plant roots have a very limited soil / medium for nutrient exploitation. So it is important to provide fertilizers in a form that can be easily applied to the soil in exact amounts. In this context multi nutrient tablets gain importance. Moreover, it ensures the availability of a combination of various essential nutrients in forms that is easily plant available. It also facilitates slow release of

			nutrients which increases the nutrient use efficiency. As the nutrients are applied in exact quantities, wastage and environmental pollution can also be prevented.
8.	Location	:	10 locations Thiruvananthapuram – 3 Kollam – 3 Pathanamthitta - 4
9.	Number of trails	:	1
10.	Plot size	:	24 grow bags / containers per farmer
11.	Treatments	:	Number of treatments – 3 **1.** MNT@ 6 tablets / plant in two splits as basal and 1 MAP **2.** MNT@ 8 tablets / plant in two splits as basal and 1 MAP **3.** Farmer's practice
12.	Instructions for conducting the trail	:	Placement of multi nutrient tablets 5 cm away from the plant at 5 cm depth. Other management practices as per KAU POP recommendations.
13.	Observations to be recorded	:	1. No. of fruits per plant 2. Yield per plant
14.	Budget estimate	:	Rs. 10000
15.	Information required to be furnished	:	Date of planting, dates of application of multi nutrient tablets, dates of harvest and details of pest and disease incidence if any

Farm Trial Proposal -2			
1.	Station	:	RARS (SZ), Vellayani
2.	Season	:	2022-23
3.	Crop	:	Ginger
4.	Name of the trial	:	Bio-intensive management of root-knot nematode in ginger
5.	Officer proposing & Official address	:	Dr.Nisha.M.S. Assistant Professor, AICRP on nematodes in Agriculture, RARS (SZ), Vellayani
6.	Objective	:	Bio intensive nematode management in ginger using bioagent and mulching with green leaves
7.	Justification	:	Based on the results of field experiments conducted in three consecutive years rhizome treatment with *Purpureocillium lilacinum* @3%w/w +green leaf mulching with glyricidia@1kg/m^2 was best in suppressing nematode population and increasing yield in ginger
8.	Location	:	Thiruvananthapuram, Kollam
9.	Number of trails	:	One each for two districts
10.	Plot size	:	25 cents
11.	Treatments	:	T1- Rhizome treatment with *Purpureocillium lilacinum* 3%w/w + mulching with green leaves of glyricidia @1kg/m^2 T2-Untreated
12.	Instructions for conducting the trail	:	To be decided
13.	Observations to be recorded	:	Initial nematode population/200 cc soil Final nematode population in soil (200cc)

			Nematode population in root (5g) Root-knot index
14.	Budget estimate	:	15,000/-
15.	Information required to be furnished	:	Date of planting

Farm Trial Proposal - 3			
1.	Station	:	FSRS,Sadanandapuram
2.	Season	:	July-December
3.	Crop	:	Brinjal
4.	Name of the trial		Evaluation of brinjal lines for high yield
5.	Officer proposing & Official address	:	Dr.M.R.Bindu Professor(Plant Breeding & Genetics) FSRS,Sadanandapuram
6.	Objective	:	To develop high yielding variety of purple long fruited brinjal
7.	Justification	:	KAU FSRS SM -1 is a high yieding purple coloured long fruited brinjal line developed by pure line selection from Alapadampu local. Fruits are large and oblong in shape, glossy purple in colour. Plant is 90 cm height with 10-12 branches. Pricks are present in the stem, petiole and leaf lamina. Flowers are purple in color with solitary bearing habit. Weight of a single fruit is 250-300 g , 23-25 cm length and 19-22 cm girth.Bitterness is absent and cooking quality is very good. Tolerant to leaf spot, and epilachna beetle.Yields about 40-45 tonnes/ha in a crop duration of 170-180 days.High yield and suited to homestead cultivation .Considering its superiority, this promising line was included as an entry in the AICVIP from 20018-21. The pooled mean of the last three years was highest for KAU-FSRS-SM-1 (6.43kg per plant) compared to the variety Haritha (5.06kg per plant).
8.	Location	:	Thiruvananthapuram,Kollam and Pathanamthitta districts of South Kerala
9.	Number of trails	:	10
10.	Plot size	:	200 m^2

11.	Treatments	:	T1-KAU FSRS SM-1,T2-Ponni ,T3-Local check
12.	Instructions for conducting the trail	:	As per POP
13.	Observations to be recorded	:	Duration,Yield per plant, Fruit weight, incidence of pests and diseases
14.	Budget estimate	:	5000/-
15.	Information required to be furnished	:	This promising lines was identified based on the yield trials conducted at FSRS,Sadanandapuram as part of station trials and AICVIP trial. Yield per plant and per hectare will be recorded in the farm trial

Farm Trial Proposal - 4			
1.	Station	:	FSRS,Sadanandapuram
2.	Season	:	May-January
3.	Crop	:	Turmeric
4.	Name of the trial	:	Evaluation of turmeric and kacholam accessions in the homesteads
5.	Officer proposing & Official address	:	Dr.M.R.Bindu Professor (Plant Breeding & Genetics) FSRS,Sadanandapuram
6.	Objective		To develop high yielding variety of turmeric suited to the homesteads
7.	Justification	:	Twenty eight turmeric accessions collected as part of the back to lab project "Empowerment of rural women for cultivation of economically viable medicinal plants through agro-biotechnological interventions" conducted during 2016-19 and Sadanandapuram(SDPM) local was evaluated in the homesteads of FSRS, Sadanandapuram during 2017-21. Pooled mean for three years revealed that highest yield was for SDPM local in turmeric (582g per plant) and 5.5 tonnes per hectare.
8.	Location	:	Thiruvananthapuram ,Kollam and Pathanamthitta districts of South Kerala
9.	Number of trails	:	10
10.	Plot size	:	200 m^2
11.	Treatments	:	T1-SDPM local,T2-Sobha ,T3-Local check
12.	Instructions for conducting the trail	:	As per POP
13.	Observations to be recorded	:	Yield per plant,yield per hectare, incidence of pests and diseases

14.	Budget estimate	:	5000/-
15.	Information required to be furnished	:	High yielding promising line of turmeric Sadanandapuram(SDPM) local was selected from the germplasm and yield trials were conducted as part of ongoing station trials.Yield per plant and yield per hectare will be recorded during farm trial

Farm Trial Proposal - 5			
1.	Station	:	FSRS Sadanandapuram
2.	Season	:	
3.	Crop	:	Papaya
4.	Name of the trial	:	Organic nutrient management of papaya (*Carica papaya* L.)
5.	Officer proposing & Official address	:	Dr. Bindu B. Assistant Professor (Horticulture) FSRS Sadanandapuram
6.	Objective	:	To study the effect of organic nutrient management on growth, yield and quality of papaya
7.	Justification	:	Conducted two year trial in FSRS Sadanandapuramin "Organic nutrient management of papaya (*Carica papaya* L.)", under station wise project "Strengthening of research at FSRS". Basis of this study was the M. Sc. student work. The selected management strategy was found to increase the growth, fruit yield and quality of papaya
8.	Location	:	Farmers field
9.	Number of trails	:	10
10.	Plot size	:	5 cent
11.	Treatments	:	3 treatments T_1- 100% of recommended dose of N as organic + PGPR Mix-I+ AMF T_2- 75% of recommended dose of N as organic + PGPR Mix -I+ AMF T_3- POP of KAU
12.	Instructions for conducting the trail	:	

13.	Observations to be recorded	:	Yield per plant, yield per hectare, Incidence of pests and diseases
14.	Budget estimate	:	Rs 5000/-
15.	Information required to be furnished	:	-

FARM TRIAL PROPOSAL - 6			
1.	Name of the Station	:	College of Agriculture, Vellayani and FSRS Sadanandapuram
2.	Season	:	2022-23
3.	Crop	:	Banana
4.	Name of the trial	:	Field performance of *P. indica*-colonised banana plants against natural incidence of fungal, bacterial and viral diseases
5.	Officer proposing & Official address	:	Dr. Joy M., Professor (Plant Pathology) and Head, Farming Systems Research Station, Sadanandapuram, Kottarakkara, Kollam
6.	Objective	:	Evaluation of *P. indica*-colonised banana plants against the natural incidence of fungal diseases including panama wilt, bacterial and viral diseases
7.	Justification	:	The results of KSCSTE project on "Synergism in Defense and Growth: Exploration of a root endophytic fungus *Piriformospora indica* for the management of *Fusarium* wilt in banana with enhanced crop production", and PhD project of Ms. Sinijadas K. on "Management of *Banana bract mosaic virus* using the beneficial fungal root endophyte, *Piriformospora indica*" revealed that the *P. indica*-colonised plants had increased root and shoot biomass; and yield and quality of fruits, and reduced incidence and intensity of fungal, bacterial and viral diseases in banana var. Nendran compared to the non-colonised plants under field condition. Two independent field studies were carried out to confirm the results.
8.	Locations	:	Trivandrum, Kollam and Pathanamthitta
9.	No. of Trials	:	6
10.	Plot size	:	20 cents (100 plants each for two treatments)
11.	Treatments	:	T1: *P. indica*-colonised plants T2: Control (non-colonised plants)
12	Instructions for	:	The crop will be raised in farmer's field in the beginning of 2022

	conducting the trail		and two farmers from each district will be selected. *P. indica*-colonized banana suckers/plants will be used to raise the crop along with control plants. All field operations will be done as per POP 2019 of KAU.
13.	Observations	:	Biometric observations including number of leaves, length and breadth of leaves, plant height, time for bunch emergence, number of fruits per bunch and bunch weight; and incidence and intensity of fungal, bacterial and viral diseases will be recorded.
14.	Budget estimate	:	Rs. 60,000/-
15.	Information required to be furnished	:	The proposal is based on the results of the following projects. KSCSTE Project "Synergism in Defense and Growth: Exploration of a root endophytic fungus *Piriformospora indica* for the management of *Fusarium* wilt in banana with enhanced crop production" Year of starting the project – 2016-17 and Year of completion of the project - 2020-21 And also based on the results of PhD project on "Management of *Banana bract mosaic virus* using the beneficial fungal root endophyte, *Piriformospora indica*" (Now in Fourth year) Technology: Efficacy of *Piriformospora indica* on production and protection of banana In the 37th ZRAEC, the house has informed that once the field studies are over and show positive results on crop production and protection, then the technology can be further tested in the farmer's field.

FARM TRIAL PROPOSAL - 7			
1.	Name of the Station	:	College of Agriculture, Vellayani and FSRS Sadanandapuram
2.	Season	:	2022-23
3.	Crops	:	Vegetable crops viz. tomato, chilli, bhindi and vegetable cowpea
4.	Name of the trial	:	Field performance of *P. indica*-colonised vegetable crops *viz.*, tomato, chilli, bhindi and vegetable cowpea against natural incidence of fungal, bacterial, phytoplasmal and viral diseases
5.	Officer proposing & Official address	:	Dr. Joy M., Professor (Plant Pathology) and Head, Farming Systems Research Station, Sadanandapuram, Kottarakkara, Kollam
6.	Objective	:	Evaluation of *P. indica*-colonised vegetable crops *viz.*, tomato, chilli, bhindi and vegetable cowpea against the natural incidence of fungal, bacterial, phytoplasmal and viral diseases
7.	Justification	:	The results of the Plan Project, and PG & PhD projects revealed that the *P. indica*-colonised plants had increased root and shoot biomass with enhanced yield and yield attributes, and reduced incidence and intensity of fungal, bacterial, phytoplasmal and viral diseases in vegetable crops *viz.*, tomato, chilli, bhindi and vegetable cowpea. All these crops were raised under field condition at least for 2 season s to validate the results.
8.	Locations	:	Trivandrum, Kollam and Pathanamthitta
9.	No. of Trials	:	12 (4 crops, 3 districts)
10.	Plot size	:	10 cents
11.	Treatments	:	T1: *P. indica*-colonised plants T2: Control (non-colonised plants)
12	Instructions for conducting the trial	:	The crops will be raised in farmer's field in 2022 and 4 farmers from each district will be selected. *P. indica*-colonized vegetable seedlings of tomato, chilli, bhindi and vegetable cowpea will be used to raise the crop along with control plants. All field operations will be done as per POP 2019 of KAU.
13.	Observations	:	Biometric observations including number of leaves, length and breadth of leaves, leaf area, plant height, time for flowering, , number of fruits per plant, fruit weight and yield. Incidence and intensity of fungal, bacterial, phytoplasmal and viral diseases
14.	Budget estimate	:	Rs. 72,000/-
15.	Information required to be furnished	:	Plan Project ""Growth and Defense trade-off in unstable continuum: Exploration of root endophytes including

			Piriformospora indica & their biomolecules for enhanced yield and management of biotic and abiotic stress in tropical fruit and vegetable crops" (Started in 2019-20 and continuing) - Management of *Blackeye cowpea mosaic virus* using natural products from botanicals and the fungal root endophyte *Piriformospora indica* (PG; completed in 2019) - Management of *Bhendi yellow vein mosaic virus* using beneficial fungal root endophyte *Piriformospora indica* (PG; completed in 2020) - Evaluation of beneficial fungal root endophyte, *Piriformospora indica* for the management of *Tomato leaf curl virus* (PG; completed in 2021) - *Piriformospora indica* and new generation fungicides for the management of anthracnose incited by *Colletotrichum gloeosporioides* (Penz.) Sacc. in vegetable cowpea. (PhD; will be completed in 2021-22; Field studies in two seasons are over). - *Piriformospora indica* and its water diffusible exudates for the management of chilli anthracnose incited by *Colletotrichum capsici* (Syd.) Butler and Bisby. (PhD; will be completed in 2021-22; Field studies in two seasons are over). Technology: Efficacy of *Piriformospora indica* on production and protection of vegetable crops *viz.*, tomato, chilli, bhindi and vegetable cowpea. In the 37th ZRAEC, the house has informed that once the field studies are over and show positive results on crop production and protection, then the technology can be further tested in the farmer's field.

Farm Trial Proposal - 8			
1.	Station	:	Krishi Vigyan Kendra, Kollam
2.	Season	:	July to December
3.	Crop	:	Yard Long Bean
4.	Name of the trial	:	Assessment of Cashew Nut Shell Liquid based botanical pesticide for pest management in yard long bean.
5.	Officer proposing & Official address	:	Dr. Lekha M Assistant Professor(Agrl Entomology) Krishi Vigyan Kendra, Kollam
6.	Objective	:	To develop an organic pest management option for vegetable cowpea
7.	Justification	:	Yard long bean, (*Vigna unguiculata* subsp. *sesquipedalis* (L.) Verdc is one of the most widely cultivated commercial vegetable crops of Kerala. Green pods are harvested at short intervals fetch high returns to the farmers. But the quality of the produce is at risk due to heavy use of insecticides to tackle the insect pests. Sucking pests *viz*., cowpea aphid, *Aphis craccivora* Koch and pod bug, *Riptortus pedestris* Fabricius cause serious loss, affecting both quantity and quality of the produce forcing farmers to use synthetic insecticides at frequent intervals. Indiscriminate use of insecticides leads to ecological and health hazards which necessities the need for a safe botanical alternative. Cashew nut shell liquid (CNSL) an agro waste from cashew processing industry which is available in plenty in Kollam district and possessed to

			have insecticidal activity. The results of the WGDP project at FSRS (2015-17) PhD thesis (2016-2020) and the experiment done at KVK during 2020-2021 showed that CNSL 20% EC formulation at 0.3 percent was found superior in controlling the sucking pests like aphids and pod bugs. Hence this need to be evaluated with the existing practice in the field.
8.	Location	:	Thiruvananthapuram,Kollam and Pathanamthitta districts of South Kerala
9.	Number of trials	:	10
10.	Plot size	:	$4x4m^2$
11.	Treatments	:	T1- Cashew nut shell liquid 20 % EC @0.3% T2- Neem oil garlic soap(Raksha) 1% **T3- Chemical check**
12.	Instructions for conducting the trial	:	As per POP
13.	Observations to be recorded	:	Pest and disease incidence and yield
14.	Budget estimate	:	10,000/-
15.	Information required to be furnished	:	The insecticidal property of CNSL was confirmed based on the WGDP project conducted at FSRS, Sadanandapuram (2015-2017), PhD work (2016-2020) and the OFT (2020-21) conducted at KVK, Sadanandapuram.

കർഷകർക്ക്/ സംരംഭകർക്ക് പ്രാവർത്തികമാക്കാവുന്ന സാങ്കേതിക വിദ്യ

പൂമ്പൊടി ശേഖരണി

അഖിലേന്ത്യാ സംയോജിത തേനീച്ച പരാഗണ ഗവേഷണ പദ്ധതിയുടെ ഭാഗമായി തേനീച്ചകളുടെ പിൻകാലുകളിൽ നിന്നും പൂമ്പൊടി ശേഖരിക്കുന്നതിനായി തേനീച്ചപ്പെട്ടി യുടെ പ്രവേശന കവാടത്തിൽ എളുപ്പത്തിൽ സ്ഥാപിക്കാൻ കഴിയുന്നതും കൂടുതൽ കൃത്യതയുള്ളതു മായ പൂമ്പൊടി ശേഖരണി പുതുതായി രൂപകൽപ്പന ചെയ്തു. അക്രിലിക് ഷീറ്റ് ഉപയോഗിച്ച് നിർമ്മിച്ചി രിക്കുന്ന പൂമ്പൊടി ശേഖരണിയിൽ പ്രധാനമായും ര ു ഭാഗങ്ങളാണ് ഉള്ളത്; പ്രവേശന കവാടവും ശേഖരണ അറയും. പ്രവേശനകവാടത്തിലുള്ള ചെറു ദ്വാരങ്ങളിലൂടെ തേനീച്ച കടന്നുപോകുമ്പോൾ അവയുടെ പിൻകാലുകളിൽ ശേഖരിക്കപ്പെടുന്ന പൂമ്പൊടി നീക്കം ചെയ്യപ്പെടുകയും തൊട്ടു താഴെ യുള്ള ശേഖരണ അറയിൽ നിക്ഷേപിക്കപ്പെടുകയും ചെയ്യുന്നു. ഇപ്രകാരം 50 – 60 ശതമാനം വരെ പൂമ്പൊടി ശേഖരിക്കാം. ഉത്തരേന്ത്യയിൽ രൂപകൽപ്പന ചെയ്തു ഇന്ത്യൻ തേനീച്ച കോളനികളിൽ ഉപ യോഗിച്ച് വരുന്ന പൂമ്പൊടി ശേഖരണിയേക്കാൾ താരതമ്യേന കാര്യക്ഷമത കൂടിയതും എളുപ്പത്തിൽ കൈകാര്യം ചെയ്യാൻ കഴിയുന്നതുമാണ് വെള്ളായണി അഖിലേന്ത്യാ സംയോജിത തേനീച്ച പരാഗണ ഗവേഷണ
കേന്ദ്രത്തിൽ രീപകൽപ്പന ചെയ്ത പുതിയ പൂമ്പൊടി ശേഖരണി.

അക്വാകൾച്ചർ യൂണിറ്റ്

പുരയിടകൃഷി അധിഷ്ഠിത സംയോജിത കൃഷി സമ്പ്രദായ മാതൃകയിൽ തീവ്ര മത്സ്യ കൃഷിക്ക് അനു യോജ്യമായ റീസർക്കുലേറ്ററി അക്വാകൾച്ചർ യൂണിറ്റ് സ്ഥാപിക്കാനുള്ള സാങ്കേതിക വിദ്യ നൽകുന്ന താണ്.

മിത്രകുമിളിന്റെ കയറ്റിൻ സമ്പുഷ്ടിത ദ്രവ രൂപിക

നീരൂറ്റികുടിക്കുന്ന കീടങ്ങൾക്കെതിരെയുള്ള ലോകാനിസിലിയം എന്ന മിത്രകുമിളിന്റെ രൂപത്തിലുള്ള ഓയിൽ ഫോർമുലേഷൻ വളരെ ഫലപ്രദമാണെന്ന് 2013-2020 വരെ നടന്നിട്ടുള്ള കൃഷിയിട പരീക്ഷ ണങ്ങൾ തെളിയിച്ചു. നിലവിലുപയോഗിച്ചു വരുന്ന പൊടി രൂപത്തിലുള്ള ഉൽപന്നത്തേക്കാൾ മേന്മയു ള്ളതാണ് ഈ പുതിയ രൂപിക. ചെടികളിലുള്ള മികച്ച പ്രവർത്തന ശേഷിയും ഉപയോഗിക്കാനുള്ള സൗകര്യവും കീടങ്ങളിൽ രോഗം ഉളവാക്കുവാനുള്ള കഴിവും ഇതിനെ ഒരു മികച്ച ഉൽപന്നമാക്കുന്നു.

സേവനങ്ങളും സന്ദേശങ്ങളും

പ്രാദേശിക കാർഷിക ഗവേഷണകേന്ദ്രം, കാർഷിക കോളേജ് വെള്ളായണി

കാർഷിക മേഖലയിൽ പ്രശ്നാധിഷ്ഠിത ഗവേഷണ പരിപാടികൾ ഫലപ്രദമായി നടപ്പിലാക്കുന്നതിനും കർഷകരുടെ പ്രശ്നങ്ങൾ പരിഹരിക്കുന്നതിനും കാർഷിക സർവ്വകലാശാലയുടെ ദക്ഷിണ മേഖലാ പ്രാദേശിക കാർഷിക ഗവേഷണ കേന്ദ്രവും അനുബന്ധ സ്ഥാപനങ്ങളും എക്കാലവും നിലനിന്നിട്ടു ്. ഈ സ്ഥാപനങ്ങളിൽ നിന്നും പുതുതായി ലഭ്യമാകുന്ന വിവിധ ഗവേഷണ ഫലങ്ങളുടേയും സേവനങ്ങളുടേയും വിവരണങ്ങൾ താഴെ നല്കിയിരിക്കുന്നു. ഇവ പരമാവധി പ്രയോജനപ്പെടത്തുവാൻ കർഷക സുഹൃത്തുക്കൾ ശ്രദ്ധിക്കുക.

കർഷക സാന്ത്വനം

കാർഷിക പ്രശ്നങ്ങൾക്ക് പരിഹാരം കെ ത്തുവാൻ കർഷകരുടെ ആവശ്യ പ്രകാരം കാർഷിക ശാസ്ത്രജ്ഞർ കൃഷിയിടങ്ങൾ സന്ദർശിക്കുകയും പരിഹാരമാർഗ്ഗങ്ങൾ സൗജന്യമായി നിർദ്ദേശിക്കുകയും ചെയ്യുന്നതാണ്.

ബന്ധപ്പെടുക 8075735657

ജൈവകൃഷി

ജൈവകൃഷിയിൽ സാങ്കേതിക സഹായവും പരിശീലനവും ലഭ്യമാണ്.

ഒരു മാതൃക ജൈവ കൃഷിത്തോട്ടം

ജൈവവളങ്ങളായ മണ്ണിരകമ്പോസ്റ്റ്, ചകരിച്ചോർ കമ്പോസ്റ്റ്, ഇ.എം കമ്പോസ്റ്റ്, മിനറൽ കമ്പോസ്റ്റ്, കൂടാതെ പരിപോഷിപ്പിച്ച ജൈവവളങ്ങൾ തുടങ്ങിയവയുടെ നിർമ്മാണവും ജൈവ കൃഷി രീതികളും കുമനസ്സിലാക്കി പ്രാവർത്തികമാക്കുന്നതിന് ഒരു മാതൃക ജൈവ കൃഷിത്തോട്ടം നിലവിലു ്.

ദ്രാവക ജൈവവളങ്ങളായ പഞ്ചഗവ്യം, ദശഗവ്യം, ഫിഷ് അമിനോ ആസിഡ് (മത്തി – ശർക്കര മിശ്രിതം), ജീവാമൃതം, വെർമിവാഷ് തുടങ്ങിയവയുടെ നിർമാണത്തിനും ഉപയോഗത്തിനുമുള്ള സാങ്കേതിക പരിശീലനവും കർഷകർക്ക് നൽകുന്നു്. ഗുണമേന്മയേറിയ ജൈവവളങ്ങളും സൂക്ഷ്മമൂലക മിശ്രിതവും സെയിൽസ് കൗ റിൽ കൂടി വിതരണം ചെയ്യുന്നു ്.

മണ്ണിന്റെ ആരോഗ്യത്തിനും സുസ്ഥിരതയ്ക്കും പരിപ്പോഷിപ്പിച്ച ജൈവവളങ്ങൾ

മണ്ണിന്റെ ആരോഗ്യം വർദ്ധിപ്പിക്കുന്നതിനും സ്ഥായിയായി നിലനിർത്തുന്നതിനും വേ ിയുള്ള സമഗ്രമായ സാങ്കേതിക പരിശീലനം. മണ്ണിര കമ്പോസ്റ്റ്, ചകിരിച്ചോർ കമ്പോസ്റ്റ്, മിനറൽ കമ്പോസ്റ്റ്, ഇ.എം. കമ്പോസ്റ്റ്, പരിപ്പോഷിപ്പിച്ച ജൈവവളങ്ങൾ തുടങ്ങിയവ കുറഞ്ഞ ചിലവിൽ ഉല്പാദിപ്പിക്കുന്നതിനുള്ള സാങ്കേതിക പരിശീലനം. വിപണിയിൽ ലഭ്യമാകുന്ന വിവിധയിനം ജൈവവളങ്ങളുടെ ഗുണമേന്മ നിർണ്ണയം.

ഡിപ്ലോമ ഇൻ ഓർഗാനിക് അഗ്രികൾച്ചർ

ഡിപ്ലോമ ഇൻ ഓർഗാനിക് അഗ്രികൾച്ചർ എന്ന 2 വർഷത്തെ കോഴ്സ് വഴി കുട്ടികൾക്ക് കൃഷിയെ കൂടുതൽ അറിയാനും അതുവഴി കൃഷിയുടെ നൂതന ആശയങ്ങൾ സമൂഹത്തിൽ പ്രചരിപ്പിക്കുവാനും കഴിയുന്നു. ഡിപ്ലോമ ഇൻ ഓർഗാനിക് അഗ്രികൾച്ചർ കോഴ്സ് പഠിച്ചിറങ്ങുന്നവർക്ക് ബി എസ് സി അഗ്രികൾച്ചർ കോഴ്സിന് 6 സീറ്റുകളിലേക്ക് നീറ്റുവഴി മുൻഗണന ലഭിക്കുന്നു.ഡിപ്ലോമ കോഴ്സ് പഠിച്ചിറങ്ങുന്നവർക്ക് അസിസ്റ്റന്റ് അഗ്രികൾച്ചർ ഓഫീസർ എന്ന തസ്തികയിലേക്ക് കേരള പി എസ് സി വഴി നിയമന സാദ്ധ്യതയും ഉ ്.

ജൈവ കൃഷിയും നല്ലമുറ കൃഷിയും

ജൈവ കൃഷിയിലും നല്ലമുറ കൃഷിയിലുംപരിശീലനവും സാങ്കേതിക സഹായവും കർഷകർക്ക് കാർഷിക കോളേജിലും കർഷകരുടെ കൃഷിയിടങ്ങളിലും നൽകുന്നു.

ബന്ധപ്പെടുക -9633100344

ഹോർട്ടികൾച്ചർ തെറാപ്പി - ഭിന്നശേഷിക്കാരായ സ്കൂൾ വിദ്യാർത്ഥികളുടെ ഉന്നമനം

ഹോർട്ടികൾച്ചർ തെറാപ്പി എന്ന നൂതനചികിത്സാരീതിയിലെ പൂന്തോട്ട നിർമിതികളും മറ്റു പ്രവർത്തനങ്ങളും ഭിന്നശേഷിക്കാരായ സ്കൂൾ വിദ്യാർത്ഥികളുടെ (എഡി.എച്ച്.ഡി, ഓട്ടിസം, കാഴ്ച്ച പരിമിതിയുളളവർ, സംസാരകേൾവി പരിമിതിയുളളവർ, ബുദ്ധിപരമായ വെല്ലുവിളികൾ നേരിടുന്നവർ) ഉന്നമനം ലക്ഷ്യമാക്കിയുളളതാണ്. സ്പെഷ്യൽസ്കൂളുകളിലും പുനരധിവാസകേന്ദ്രങ്ങളിലുമാണ് ഈ ഹോർട്ടികൾച്ചർ തെറാപ്പി നടപ്പിലാക്കാൻ സാധിക്കുന്നത്.

ബന്ധപ്പെടുക 9846103127

മാലിന്യസംസ്കരണ സാങ്കേതിക വിദ്യകളും ജൈവവളനിർമ്മാണവും

ഖര മാലിന്യങ്ങൾ സംസ്കരിച്ച് കൃഷിക്ക് ഉപയുക്തമാക്കുന്ന വിധം സംപുഷ്ടീകരിച്ച ജൈവ വളമാക്കി കുറഞ്ഞ സമയം കൊ ് ലഭ്യമാക്കുന്ന സാങ്കേതിക വിദ്യകൾ വികസിപ്പിച്ചെടുത്തിട്ടു ് (Patent No. 321857).

അതിവേഗ മാലിന്യ സംസ്കരണത്തിലൂടെ ജൈവവള ഉൽപാദനത്തിനായി രൂപകൽപന ചെയ്ത് വികസിപ്പിച്ചെടുത്ത യന്ത്രമാണ് ''ശുചിത''. വൻതോതിൽ ജൈവ മാലിന്യം ഉറവിട ത്തിൽതന്നെ ദ്രുതഗതിയിൽ സംസ്കരിച്ച് ജൈവവളമാക്കാൻ ഏറ്റവും ഉത്തമമായ മാർഗമാണിത്. കേരളത്തിൽ പലയിടത്തും മാലിന്യ സംസ്കരണത്തിനുവേ ി ശുചിത മിഷൻ സ്ഥാപിച്ചിട്ടു ്.

ബന്ധപ്പെടുക -9447501346

മണ്ണു പരിശോധനയും വളപ്രയോഗ നിർദ്ദേശങ്ങളും

മണ്ണുസാമ്പിളുകൾ. സസ്യസാമ്പിളുകൾ, രാസവളങ്ങൾ, ജൈവ വളങ്ങൾ, കുമ്മായ വസ്തു ക്കൾ, ജലസാമ്പിളുകൾ എന്നിവ പരിശോധിച്ച് കൊടുക്കുന്ന സൗകര്യം നിലവിലു ്.

കർഷകരുടെ മണ്ണുസാമ്പിളുകൾ പരിശോധിച്ച്, അതിലടങ്ങിയിരിക്കുന്ന പോഷകമൂലകങ്ങ ളുടെയും അമ്ള - ക്ഷാരവസ്ഥയുടെയും അടിസ്ഥാനത്തിൽ ഓരോ കൃഷിക്കും വേ കുമ്മായ വസ്തുക്കളുടെയും വളത്തിന്റെയും അളവ് ചുരുങ്ങിയ ചെലവിൽ നിർദ്ദേശിച്ച് കൊടുക്കുന്നു. സഞ്ച രിക്കുന്ന മണ്ണുപരിശോധനശാല കർഷകരുടെ കൃഷിയിടത്തിലെത്തി മണ്ണു പരിശോധിച്ച് നൽകപ്പെടു ന്നു. കർഷകർ ഉൽപാദിപ്പിക്കുന്ന ജൈവവളങ്ങളുടെയും വിപണിയിൽ ലഭ്യമാകുന്ന വിവിധയിനം ജൈവവളങ്ങളുടെയും കുമ്മായ വസ്തുക്കളുടേയും ഗുണമേന്മ ചുരുങ്ങിയ ചെലവിൽ നിർണ്ണയിച്ച് നൽകുന്നു.

ബന്ധപ്പെടുക 9633100344

സസ്യ /മണ്ണു പരിശോധന ലബോറട്ടറി

അഗ്രോണമി വിഭാഗത്തിന്റെ ആഭിമുഖ്യത്തിൽ കേരള കാർഷിക സർവ്വകലാശാല റിവോൾവിംഗ് ഫ ് പദ്ധതിയുടെ ഭാഗമായി സസ്യ / മണ്ണ് പരിശോധന ലബോറട്ടറി പ്രവർത്തിച്ചു വരുന്നു. മണ്ണു സാമ്പിളു കളും സസ്യ സാമ്പിളുകളും നിശ്ചിത ഫീസ് ഈടാക്കി, പരിശോധിച്ച് പോഷക മൂലകങ്ങളുടെയും വളങ്ങളുടെയും തോത് നൽകേ സമയം, രീതി തുടങ്ങിയവയെക്കുറിച്ചുള്ള ശുപാർശ നൽകി വരു ന്നു.

ബന്ധപ്പെടുക 9495121213

നടീൽ വസ്തുക്കളുടെ ഉല്പാദനവും വിതരണവും

വെള്ളായണി കാർഷികകോളേജിലെ വിദ്യാർത്ഥികൾക്കും ഗവേഷകർക്കും പഠനത്തിനും ഗവേഷണത്തിനുമുള്ള സൗകര്യം നൽകുക എന്നതാണ് ഈ ഫാമിന്റെ പ്രധാന ചുമതല. ഇതോടൊപ്പം നടീൽവസ്തുക്കളുടെ ഉത്പാദനവും മറ്റു വിജ്ഞാനവ്യാപന പ്രവർത്തനങ്ങളും നടത്തി വരുന്നു. തദ്ദേശ സ്വയംഭരണ സ്ഥാപനങ്ങളും മറ്റ് സർക്കാർ സ്ഥാപനങ്ങളുമായി ചേർന്ന് കൃഷിക്കാർക്കുള്ള പരിശീലന പരിപാടികളും ഇവിടെ നടത്തി വരുന്നു.

അത്യുല്പാദന ശേഷിയുള്ള വിവിധയിനം പഴവർഗ്ഗങ്ങൾ, പച്ചക്കറികൾ, അലങ്കാരസസ്യങ്ങൾ, സുഗന്ധവ്യജ്ഞനങ്ങൾ, കിഴങ്ങ്വർഗ്ഗവിളകൾ എന്നിവയുടെ നടീൽവസ്തുക്കൾ ഉത്പാദിപ്പിച്ച് ഇവിടെ നിന്നും കർഷകർക്ക് വിതരണം ചെയ്യുന്നു. ജൈവകൃഷിയ്ക്ക് ആവശ്യമായ ജൈവവളങ്ങൾ, ജൈവ രോഗകീട നിയന്ത്രണത്തിനുള്ള ഉപാധികൾ എന്നിവയും ഇവിടെ നിർമ്മിക്കുന്നു. ഫാമിന്റെ ഭാഗമായി പ്രവർത്തിക്കുന്ന വാല്യൂ അഡിഷൻ സെന്ററിൽ വിവിധ മൂല്യവർദ്ധിത ഉത്പന്നങ്ങൾ തയ്യാറാക്കിവരുന്നു. വാഴയ്ക്കും തെങ്ങിനും ഉപയോഗിക്കുന്ന ഉപസൂക്ഷമമൂലക മിശ്രിതങ്ങൾ ഇവിടെ തയ്യാറാക്കുന്നു.

വിവിധയിനം കൂണുകൾ, കൂൺ വിത്ത്. കൂൺ കൃഷി പരിശീലനം എന്നിവ ഫാമിൽ നിന്ന് ലഭ്യമാണ്. ഇൻസ്ട്രക്ഷണൽ ഫാമിൽ ഉത്പാദിപ്പിക്കുന്ന എല്ലാ നടീൽവസ്തുക്കളും കാർഷികഉത്പന്നങ്ങളും മൂല്യവർദ്ധിത വസ്തുക്കളും ഫാമിന്റെ കീഴിൽ പ്രവർത്തിക്കുന്ന വില്പനകേന്ദ്രത്തിൽ നിന്ന് പ്രവൃത്തി ദിവസങ്ങളിൽ രാവിലെ 10 മുതൽ 12.30 വരെയും ഉച്ചയ്ക്ക് 1.30 മുതൽ 4.00 മണിവരെയും പൊതുജനങ്ങൾക്ക് വാങ്ങാവുന്നതാണ്.

ബന്ധപ്പെടുക 04712383573

തീറ്റപ്പുൽ ഉല്പാദനം

ക്ഷീരകർഷകന്റെ ലാഭനഷ്ട കണക്കിൽ മുഖ്യപങ്കും ഗുണമേന്മയുള്ള കാലിത്തീറ്റയുടേതാണ്. വീട്ടാവശ്യത്തിനായാലും, വാണിജ്യാടിസ്ഥാനത്തിലായാലും കന്നുകാലികളെ വളർത്തുന്ന കർഷകർക്ക് തീറ്റപ്പുൽ കൃഷിയെ ഒഴിവാക്കാൻ സാധ്യമല്ല.

ഭാരതീയ കാർഷികഗവേഷണ കൗൺസിലിന്റെ ധനസഹായത്തോടുകൂടി അഖിലേന്ത്യ സംയോജിതതീറ്റപ്പുൽ ഗവേഷണ പദ്ധതി കേരളകാർഷികസർവ്വകലാശാലയുടെ വെള്ളായണി കോളേജിൽ 1971-ൽ പ്രവർത്തനമാരംഭിച്ചു. ഈ പദ്ധതിയിൽ വിളപരിപാലനം, സസ്യപ്രജനനം എന്നീ വിഭാഗങ്ങളിലുള്ള ഗവേഷണ പ്രവർത്തനങ്ങളും പ്രധാനമായി നടന്നുവരുന്നു. ഈ പദ്ധതിയിലൂടെ ക്ഷീരകർഷകർക്ക് ആവശ്യമായ സേവനങ്ങൾ താഴെപ്പറയുന്ന രീതിയിൽ ലഭ്യമാണ്.

വിത്തുൽപ്പാദനം

ദീർഘകാല ഗവേഷണ ഫലമായി വികസിപ്പിച്ചെടുത്ത സങ്കരനേപ്പിയർ ഇനമായ സുഗുണയും തീറ്റപ്പയറിനമായ ഐശ്വര്യയും ഉൽപ്പാദിപ്പിക്കുകയും ഇത് ആവശ്യാനുസരണം കർഷകർക്ക് ലഭ്യമാക്കുകയും ചെയ്തു വരുന്നു.

കുറച്ചു സ്ഥലത്ത് നിന്നും പശുവിന് കൂടുതൽ പോഷകമൂല്യമുള്ളതീറ്റ ലഭ്യമാക്കുന്നതിനായി മിശ്രവിളകൾ കൃഷിചെയ്യാം. പുല്ലിനത്തിൽ മാംസ്യത്തിന്റെ അളവ് കുറവും (8-9%), നാരിന്റെ അളവ് കൂടുതലുമാണ് (24-28%). എന്നാൽ പയറിനത്തിൽ മാംസ്യത്തിന്റെ അളവ് കൂടുതലും (16-18%), നാരിന്റെ അളവ് കുറവുമാണ് (20%). ആയതിനാൽ ഇവ രണ്ടും മിശ്രിതരീതിയിൽ കൃഷിചെയ്യുന്നത് നല്ലതാണ്. പശുവിന്റെ തീറ്റയിൽ പുല്ലും പയറും ചേർത്ത് ഉൾപ്പെടുത്തിയാൽ ആവശ്യമായ മാംസ്യവും, നാരും ലഭിക്കുന്നതിലൂടെ പോഷക സമൃദ്ധമായ പാലും നമുക്ക് ലഭിക്കും.

വൃക്ഷവിളകളായ അഗത്തി, മുരിങ്ങ, മുരുക്ക്, ഡെസ്മാന്തസ് എന്നിവയുടെ ഗവേഷണങ്ങളും ഇവിടെ നടത്തിവരുന്നു. വേനൽ കാലങ്ങളിൽ പുല്ലിന്റെ ലഭ്യത കുറയുമ്പോൾ ഈ മരങ്ങളും, ശാഖകളും, ഇലകളും മുറിച്ച് കന്നുകാലികൾക്ക് തീറ്റയായി കൊടുക്കാവുന്നതാണ്. ഇവയിൽ മാംസ്യത്തിന്റെ അളവ് 20% കൂടുതലാണ്. ഗിനിപ്പുല്ല്, സങ്കരനേപ്പിയർ എന്നീ പുല്ലിനങ്ങളുമായി കലർത്തി വൃക്ഷവിളകൾ മിശ്രവിളയായും കൃഷി ചെയ്യാവുന്നതാണ്.

അത്യുൽപാദന ശേഷിയും ഗുണമേൻമയുള്ള സങ്കരനേപ്പിയറിന്റെ ഇനമായ സുസ്തിര പുറത്തിറക്കുക യു ായി. ഹെക്ടറൊന്നിന് ഒരു വർഷം ഏകദേശം 300 ടൺ വരെ പച്ചപ്പുല്ല് ഈ ഇനത്തിൽ ലഭി ക്കുന്നു.

ഫോറേജ്ടെക്നോളജി ഡെമോൺസ്ട്രേഷൻ

കേരളത്തിലെ തിരഞ്ഞെടുത്ത ജില്ലകളിൽ നിന്നും മികച്ച കർഷകരുടെ കൃഷിയിടത്തിൽ നല്ല ഉൽപ്പാദ ന ശേഷിയുള്ള തീറ്റപ്പുല്ലിനങ്ങളായ സുഗുണയും, ഹരിതശ്രീയും, പയറിനമായ ഐശ്വര്യയും ശാസ്ത്ര ജ്ഞരുടെ മേൽനോട്ടത്തിൽ കൃഷി ചെയ്തു വരുന്നു. ഇതിനോടൊപ്പം നടീൽവസ്തുക്കളും, വളവും സൗജന്യമായി നൽകുകയും ചെയ്യുന്നു.

ബന്ധപ്പെടുക 9496301170

തേൻ ഉല്പാദനം

- അഖിലേന്ത്യാ സംയോജിത തേനീച്ച പരാഗണ ഗവേഷണ കേന്ദ്രത്തിൽ വികസിപ്പിച്ചെടുത്ത ശാസ്ത്രീയമായ തേനീച്ച വളർത്തലിന്റെ നൂതന സാങ്കേതിക വിദ്യകൾ കർഷകരിൽ എത്തി ക്കുന്നതിലേക്കായി പരിശീലന പരിപാടികൾ നടത്തുന്നു.
- തേനീച്ച കർഷകർക്ക് തേനീച്ച വളർത്തലിൽ ആവശ്യമായ മാർഗ്ഗ നിർദ്ദേശം നൽകി വരുന്നു.
- ശുദ്ധമായ തേനും രോഗവിമുക്തമായ തേനീച്ച കോളനികളും ഈ കേന്ദ്രത്തിൽ നിന്നും വിതരണം ചെയ്യുന്നു.
- ഒരു വീട്ടിൽ ഒരു ചെറു തേനീച്ച കോളനി എന്ന ലക്ഷ്യം കൈവരിക്കുന്നതിന്റെ ഭാഗമായി ചെറു തേനീച്ച വളർത്തൽ പ്രോത്സാഹിപ്പിക്കുവാനുള്ള പ്രവർത്തനങ്ങൾ നടത്തിവരുന്നു.

റബ്ബർ തേൻ - 1 കി.ഗ്രാം - 360/- രൂപ

ചെറു തേനീച്ച കോളനി - 2200/-

തേനീച്ച വളർത്തലിലെ സംശയങ്ങൾക്ക് ഫോണിലൂടെയും നേരിട്ടും സമീപിക്കുന്ന കർഷകർക്ക് ആവ ശ്യമായ സഹായം നൽകി വരുന്നു.

ബന്ധപ്പെടുക 9447428656

അഖിലേന്ത്യാ കൂൺ ഗവേഷണ പദ്ധതി

- കൂൺ വിത്തുൽപ്പാദനം കൃഷി രീതികളും
- അത്യുൽപ്പാദന ശേഷിയുള്ള ചിപ്പി കൂൺ, പാൽ കൂൺ ഇനങ്ങളെ കെ ത്തി പ്രചരിപ്പിച്ചു വരുന്നു
- വിവിധ ഇനം ചിപ്പി കൂൺ ഇനങ്ങളായ പ്ലൂറോട്സ് ഫ്ലോറിഡ, പ്ലൂറോഡ്സ് ഈയോസ്, പ്ലൂറോഡ്സ് സജോർ സാജു, ഹൈപ്സീസയ്ഗ്സ് ആൽമരിയൂസ് എന്നിവയുടെ വിത്തും കൂണും ഉൽപ്പാദിപ്പിച്ചു വരുന്നു.
- കൂൺ വിത്ത് - ഒരു പാക്കറ്റിന് 45 രൂപ, മാതൃവിത്തിന്റെ വില - 225 രൂപ
- കൂൺ കൃഷിയിൽ കർഷകർക്കും വിദ്യർത്ഥികൾക്കും, അഭ്യസ്തവിദ്യരായ യുവതി യുവാക്കൾക്കും, സ്ത്രീകൾക്കും, താൽപ്പര്യമുള്ളവർക്കും പരിശീലനം നൽകി വരുന്നു.
- കൂൺ കൃഷിയിലെ സംസയങ്ങൾക്കു ഫോണിലൂടെയും നേരിട്ടും, ഇമെയിൽ വഴിയും സഹായം നൽകി വരുന്നു.
- ബന്ധപ്പെടുക 9895839660

അത്യുൽപ്പാദന ശേഷിയുള്ള പച്ചക്കറി ഇനങ്ങൾ

വെള്ളായണി കാർഷിക കോളേജിലെ പച്ചക്കറി ശാസ്ത്ര വിഭാഗത്തിൽ നിന്നും അത്യുൽപ്പാദന ശേഷിയുള്ള പച്ചക്കറി ഇനങ്ങൾ വികസിപ്പിച്ചെടുത്തിട്ടു ്.

1. വള്ളിപ്പയർ- കെ.എ.യു. ദീപിക

   അത്യുല്പാദന ശേഷിയുള്ള ഇനം, നീ ഇളം പച്ച നിറത്തിലുള്ള കായ്കൾ.

   വിളവ് - 30 ടൺ/ഹെ. കായ്കളുടെ നീളം - 66 സെ.മീ. നല്ല പാചക നിലവാരം

2. ചീര - കെ.എ.യു. വൈക

   അത്യുല്പാദന ശേഷിയുള്ള ഇനം, ചുവന്ന ത ും ഇലയും, നീ കായിക വളർച്ചാ കാലം, താമസിച്ചു പൂക്കുന്ന ഇനം

   വിളവ് - 35 ടൺ/ഹെ.

3. ചീനിയമര - കെ.എ.യു. സുരുചി

   അത്യുല്പാദന ശേഷിയുള്ള ഒറ്റ ത ുള്ള ഇനം, നീ പച്ച നിറത്തിലുള്ള കായ്കൾ.

   വിളവ് - 21 ടൺ/ഹെ. കായ്കളുടെ നീളം - 13 സെ.മീ. നല്ല പാചക നിലവാരം

4. ചതുരപ്പയർ - കെ.എ.യു. നിത്യ

   അത്യുല്പാദന ശേഷിയുള്ള ഇനം, വർഷം മുഴുവൻ കായ്ഫലം തരുന്നു.

   വിളവ് - 30 ടൺ/ഹെ. കായ്കളുടെ നീളം - 20 സെ.മീ. നല്ല പാചക നിലവാരം

പച്ചക്കറി ശാസ്ത്ര വിഭാഗത്തിൽ നിന്നും മേൽപ്പറഞ്ഞ ഇനങ്ങളുടേയും മറ്റു പച്ചക്കറികളുടേയും വിത്തുകളും തക്കാളി, മുളക്, വഴുതന എന്നിവയുടെ പ്രോട്രേ തൈകളും പോളി ബാഗ് തൈകളും ഉത്പ്പാദിപ്പിച്ച് വിതരണം ചെയ്തുവരുന്നു. പച്ചക്കറി കൃഷിയെക്കുറിച്ച് സന്ദർശകരുടെ സംശയങ്ങൾക്ക് മറുപടിയും നൽകി വരുന്നു.

ബന്ധപ്പെടുക 9495974675

കീടനിയന്ത്രണം

1. ബിവേറിയ ബസിയാന (Beaveria bassiana)

   (കീടനിയന്ത്രണത്തിനുള്ള മിത്രകുമിൾ) വില-43/- രൂപ / 500 ഗ്രാം

   - പയറിന്റെ മുഞ്ഞ, ചാഴി, വാഴയുടെ തടപ്പുഴു, ഇലതീനി പുഴുക്കൾ എന്നിവയ്ക്കെതിരെ ഫലപ്രദം.
   - 20 ഗ്രാം പൊടി ഒരു ലിറ്റർ വെള്ളത്തിൽ ലയിപ്പിച്ച് കീടാക്രമണം ക ുതുടങ്ങുമ്പോൾ തളിക്കുക.
   - തടപ്പുഴുവിനെ നിയന്ത്രിക്കാൻ ഇലക്കവിളിൽ ഒഴിക്കണം.

2. ലെക്കാനിസീല്യം ലെക്കാനി (Lecanicillium lecanii) വില- 43/- രൂപ / 500 ഗ്രാം

   - മുഞ്ഞ, മീലിമൂട്ട, വെള്ളീച്ച, തുള്ളൽ പ്രാണികൾ, ശൽക്ക കീടങ്ങൾ എന്നിവയെ നിയന്ത്രിക്കുന്ന മിത്രകുമിൾ
     ഉപയോഗരീതി : 20 ഗ്രാം പൊടി ഒരു ലിറ്റർ വെള്ളത്തിൽ ലയിപ്പിച്ച് 10 ഗ്രാം ശർക്കരയും ചേർത്ത് അരിച്ച് വൈകുന്നേരങ്ങളിൽ ഇലയുടെ ഇരുവശവും നനയുന്ന രീതിയിൽ തളിക്കുക.

3. മെറ്റാറൈസിയം അനൈസോപ്ലിയെ (Metarhizium anisopliae) വില- 43/- രൂപ / 500 ഗ്രാം

- തെങ്ങിനെ ആക്രമിക്കുന്ന കൊമ്പൻചെല്ലിയെ നശിപ്പിക്കാൻ ഫലപ്രദം.
  ഉപയോഗരീതി : 30 ഗ്രാം പൊടി ഒരു ലിറ്റർ വെള്ളത്തിൽ ചേർത്ത് വളക്കുഴികളിൽ തളിച്ച് കൊമ്പൻചെല്ലിയുടെ പുഴുക്കളെ നശിപ്പിക്കുക.
- മാണ വ ിനെതിരെയും ഫലപ്രദം: 30 ഗ്രാം ഒരു ലിറ്റർ വെള്ളത്തിൽ ചേർത്ത് വാഴക്കുഴി യിൽ ഒഴിച്ചു കൊടുക്കുക.

4. Methyl Euginol trap (മാമ്പഴയീച്ചക്കെണി) മാവ്, പേര, സപ്പോട്ട, എന്നിവയ്ക്ക് വില- 110/- രൂപ

ശ്രദ്ധിക്കേ കാര്യങ്ങൾ

- ഉപയോഗിക്കുന്നതിന് തൊട്ടുമുമ്പുമാത്രം കവർ പൊട്ടിക്കുക.
- കായപിടിത്തത്തിന്റെ ആരംഭത്തിൽ തന്നെ ഉപയോഗിക്കുക.
- 25 സെന്റിന് ഒരു കെണി എന്ന തോതിൽ ഉപയോഗിക്കാം.
- 2.5 മാസത്തിനുശേഷം പുതിയ ബ്ലോക്ക് സ്ഥാപിക്കുക.
- അധികം വെയിലും മഴയും ഏൽക്കാത്ത സ്ഥലത്ത് വേണം സ്ഥാപിക്കാൻ.
- ഇതോടൊപ്പം തുളസി, കീടനാശിനി, എന്നിവ ചേർത്ത് ചിരട്ടക്കെണി ഉപയോഗിക്കുക.
- കുട്ടികൾ എടുക്കാതെ ശ്രദ്ധിക്കുക.

5. Cue lune trap (കായീച്ചക്കെണി) പാവൽ, പടവലം, വെള്ളരി എന്നിവയ്ക്ക് വില- 160/- രൂപ

ശ്രദ്ധിക്കേ കാര്യങ്ങൾ

- ഉപയോഗിക്കുന്നതിന് തൊട്ടുമുമ്പുമാത്രം കവർ പൊട്ടിക്കുക.
- കായപിടിത്തത്തിന്റെ ആരംഭത്തിൽ തന്നെ ഉപയോഗിക്കുക.
- 15 സെന്റിന് ഒരു കെണി എന്ന തോതിൽ ഉപയോഗിക്കാം.
- 2.5 മാസത്തിനുശേഷം പുതിയ ബ്ലോക്ക് സ്ഥാപിക്കുക.
- അധികം വെയിലും മഴയും ഏൽക്കാത്ത സ്ഥലത്ത് വേണം സ്ഥാപിക്കാൻ.
- ഈ കെണിയോടൊപ്പം പഴം, ശർക്കര, കീടനാശിനി, എന്നിവ ചേർത്ത ചിരട്ടക്കെണി ഉപയോ ഗിക്കുക.
- കുട്ടികൾ എടുക്കാതെ ശ്രദ്ധിക്കുക.

ബന്ധപ്പെടുക 9946477741

മണ്ണു പരിശോധന നിമവിരനിയന്ത്രണത്തിന്:

അഖിലേന്ത്യാ നിമവിര ഗവേഷം പദ്ധതിയുടെ ഭാഗമായി മണ്ണിലും ചെടികളുടെ വേരുപടലത്തിലും കാണപ്പെടുന്ന സൂക്ഷ്മ സസ്യപരാദങ്ങളായ നിമവിരകളെ തിരിച്ചറിയുന്നതിനും നിയന്ത്രിക്കുന്നതിനു മുള്ള പരിശീലന പരിപാടികൾ നൽകുന്നു. കർഷകരുടെ കൃഷിസ്ഥലത്തിലുള്ള മണ്ണ്, വേര് സാമ്പിളു കൾ പരിശോധിച്ച് നിമവിരകളുടെ സാന്ദ്രത തിട്ടപ്പെടുത്തുന്നു. പർപ്ൂറിയോസിലിയം ലൈലാസിനം, പോക്കോണിയ ക്ലാമിഡോസ്പോറിയ എന്നീ ജീവാണുക്കൾ ഉപയോഗിച്ച് സമ്പുഷ്ടീകരിച്ച ജീവാണു വളം, ജൈവ ധൂമീകരണം എന്നീ ശുപാർശകൾ നിമവിരകളെ നിയന്ത്രിക്കാൻ നൽകുന്നു. മിത്ര നിമ വിരകൾ ഉപയോഗിച്ച് കീടനിയന്ത്രണത്തിനുള്ള പരിശീലനവും നൽകി വരുന്നു.

ബന്ധപ്പെടുക - 8547432308

മിത്രസൂക്ഷാമാണു ഉത്പന്നങ്ങളും സേവനങ്ങളും

ക്രമ നമ്പർ	ഉത്പന്നങ്ങൾ	വില (രൂപ)
1.	സൂഡോമോണാസ് ഫ്ളൂറസെന്സ്	75
2.	ട്രൈക്കോഡർമ	105
3.	അസോസ്പൈറില്ലം	75
4.	അസ്റ്റോബാക്ടർ	50
5.	ഭാവക ലായക സൂക്ഷാമാണുക്കൾ (ബാസില്ലസ്സ് മെഗാതീരിയം)	75
6.	പി.ജി.പി.ആർ. മിക്സ് 1	70
7.	പി.ജി.പി.ആർ. മിക്സ് 2	70
8.	മൈക്കോറൈസ	75
9.	മാലിന്യ സംസ്ക്കരണത്തിന് (കമ്പോസ്റ്റിംഗ് ഇനോകുലം)	80

മിത്രസൂക്ഷാമാണു ഉത്പന്നങ്ങളെക്കുറിച്ചുള്ള സംശയങ്ങൾക്ക് നേരിട്ടോ ഫോൺ നമ്പറിലോ ബന്ധപ്പെടാവുന്നതാണ്.

ബന്ധപ്പെടുക 9400329295

ട്രയിനിംഗ് സർവ്വീസ് സ്കീം

കേരള കാർഷിക സർവ്വകലാശാലയുടെ മണ്ണുത്തിയിലുള്ള സെൻട്രൽ ട്രയിനിംഗ് ഇൻസ്റ്റിറ്റ്യൂട്ടിന്റെ കീഴിൽ പ്രവർത്തിക്കുന്ന ദക്ഷണ മേഖലയിലെ കർഷകർ, യുവാക്കൾ, വിജ്ഞാന വ്യാപന പ്രവർത്തകർ എന്നിവർക്കായുള്ള കാർഷിക അനുബന്ധ മേഖലകളിലെ പരിശീലന പരിപാടികൾ സംഘടിപ്പിക്കുന്നു. കൂടാതെ പൊതുമേഖലാ സ്ഥാപനങ്ങൾ, കുടുംബശ്രീ, കാർഷിക മേഖലയിലെ മറ്റു സ്ഥാപനങ്ങൾ, അവരുടെ ആവശ്യാനുസരണം താല്പര്യപ്പെടുന്ന വിഷയങ്ങളിലും വിദഗ്ധ പരിശീലനം നൽകുന്നു.

ബന്ധപ്പെടുക 9447495778

ഐ. എഫ്.എസ്. ആർ എസ്, കരമനയിൽ നൽകി വരുന്ന സേവനങ്ങൾ

- സംയോജിത കൃഷി സമ്പ്രദായം, മട്ടുപ്പാവ് കൃഷി, മാലിന്യനിർമ്മാർജനം, ജൈവകൃഷി, മണ്ണിര കമ്പോസ്റ്റ് നിർമ്മാണം, പരിസ്ഥിതി സൗഹൃദ്ദ രോഗകീട നിയന്ത്രണം, മണ്ണിന്റെ ആരോഗ്യ പരിപാലനം, വിഷരഹിത പച്ചക്കറികൃഷി എന്നീ വിഷയങ്ങളിൽ പരിശീലനവും വിദഗ്ദ്ധ സഹായവും
- കർഷകർക്കും കൃഷിയിൽ തല്പരരായ സ്കൂൾ/കോളേജ് വിദ്യാർത്ഥികൾക്കും ഫാം സന്ദർശിക്കുന്നതിനുള്ള സൗകര്യവും പരിശീലനവും
- കൃഷി സംബന്ധമായ വിഷയങ്ങളിൽ സംശയനിവാരണവും വിദഗ്ദ്ധ ഉപദേശവും
- അത്യുത്പാദന ശേഷിയുള്ള 'ഉമ' നെൽവിത്തിന്റെ വിപണനം
- നെല്ല് (ഇനം: ഉമ), നെൽക്കതിർ, പയർ, പച്ചക്കറികൾ, കരിക്ക്, വാഴക്കുല, പാൽ, മുട്ട (കോഴി, കാട, താറാവ്), മീൻ, കൂൺ, കൂൺ വിത്ത്, വയ്ക്കോൽ, ഇറച്ചി (കോഴി, താറാവ്) എന്നിവയുടെ വിപണനം
- ജൈവവളങ്ങളായ ചാണകം, മണ്ണിര കമ്പോസ്റ്റ്, അസോള എന്നിവയുടെ വിപണനം
- മണ്ണിരയുടെ വിപണനം
- മൂല്യവർദ്ധിത ഉത്പന്നങ്ങളായ അരിപ്പൊടി, ചമ്പാപച്ചരി, മഞ്ഞൾപ്പൊടി, തുടങ്ങിയവയുടെ വിപണനം
- 'ക്രോപ്പ് ബസാറി'ലൂടെ പച്ചക്കറി തൈകളുടേയും (വെ , വെള്ളരി, മുളക്, വഴുതന, കുമ്പളം, പാവൽ, കാബേജ്, കോളീഫ്ളവർ) വളർച്ചാമാധ്യമം നിറച്ച കൂടകളുടേയും വിപണനം
- പുരയിട കൃഷിക്കും മട്ടുപ്പാവ് കൃഷിക്കും അനുയോജ്യമായ വിവിധ തരം ലംബഘടനകൾ വികസിപ്പിച്ചെടുത്തു. തിരനന സംവിധാനമുള്ള ഘടന വളരെ കാര്യക്ഷമമാണെന്ന് ക ു.

- പുരയിട കൃഷി മാതൃകയിൽ ചുരുങ്ങിയ സ്ഥലത്തേക്ക് അനുയോജ്യമായ അക്വാപോണിക്സ് യൂണിറ്റ് രൂപകല്പന ചെയ്തു. ഇതിൽ, തക്കാളി, മഞ്ഞൾ എന്നിവ വിജയകരമായി കൃഷി ചെയ്യാമെന്ന് കണ്ടെത്തി.
- മണ്ണില്ലാ കൃഷിയിലൂടെ ധാന്യങ്ങൾ മുളപ്പിച്ച് കന്നുകാലികൾക്ക് ആവശ്യമായ തീറ്റ ഉൽപ്പാദിപ്പിക്കുന്നതിനായി ഹൈഡ്രോപോണിക്സ് യൂണിറ്റ് രൂപകല്പന ചെയ്തു. ഇതിൽ, ചോളം വളരെ ഫലപ്രദമായി വളർത്താൻ കഴിയുമെന്ന് കണ്ടു.
- പപ്പായ ഇലച്ചാറ് നേർപ്പിച്ച ഗോമൂത്രവുമായി ചേർത്ത് (1:1:5 അനുപാതം), നാല് പ്രാവശ്യം (വിതച്ച് 30,45,60,75 ദിവസങ്ങൾക്കു ശേഷം) തളിക്കുന്നത് ഉമ ഇനം നെല്ലിൽ കൂടുതൽ വിളവ് ലഭിക്കുന്നതിനും തവിട്ടു പുള്ളിക്കുത്ത് രോഗം കുറയുന്നതിനും സഹായിക്കുന്നു എന്ന് കണ്ടെത്തി.

ബന്ധപ്പെടുക 9847022929, 9446104347

നാളികേരഗവേഷണകേന്ദ്രം, ബാലരാമപുരം

കേരളകാർഷിക സർവ്വകലാശാലയുടെ പ്രാദേശിക കാർഷിക ഗവേഷണ കേന്ദ്രം (തെക്കൻ മേഖല) വെള്ളായണിയുടെ കീഴിൽ തെങ്ങ് കൃഷി പരിപോഷിപ്പിക്കുന്ന ദൗത്യം വിജയകരമായി നടത്തിവരുന്ന തെക്കൻ കേരളത്തിലെ പ്രമുഖസ്ഥാപനമാണ് ബാലരാമപുരം നാളികേരഗവേഷണകേന്ദ്രം. തെങ്ങ് അധിഷ്ഠിത സംയോജിതകൃഷി, വിവിധ ഇടവിളകൃഷികൾ, ജൈവകൃഷി എന്നിവയുടെ നൂതന സാങ്കേതിക വിദ്യകളെക്കുറിച്ച് നിരവധി ഗവേഷണങ്ങൾ ഇവിടെ നടന്നുവരുന്നു.

അത്യുൽപ്പാദന ശേഷിയുള്ളതുംമൂന്നര നാല്വർഷം കൊണ്ട് കായ്ഫലം നൽകുന്നതുമായ കേരശ്രീ, കേരസങ്കര, കേരഗംഗ എന്നീസങ്കരയിനം തെങ്ങിൻ തൈകളും നാടൻ (പശ്ചിമ തീരനെടിയൻ/WCT) തെങ്ങിൻ തൈകളുംതികച്ചുംശാസ്ത്രീയമായരീതിയിൽഇവിടെഉൽപാദിപ്പിക്കുന്നുണ്ട്. പ്രതിവർഷം 30000 തെങ്ങിൻ തൈകൾ ഉൽപാദിപ്പിച്ച് വിതരണം ചെയ്തു വരുന്നു.

ആധുനികരീതിയിലുള്ള ഒരു മണ്ണ് പരിശോധന ലാബും തെങ്ങ് അധിഷ്ഠിത സംയോജിതകൃഷിയുടെ ഒരു യൂണിറ്റും ഇവിടെ വിജയകരമായി പ്രവർത്തിച്ചു വരുന്നു. സംയോജിതകൃഷി യൂണിറ്റിന്റെ ഭാഗമായി ഒരു കന്നുകാലി പരിപാലന യൂണീറ്റും (പശു, ആട്), പൗൾട്രിയൂണിറ്റും മാതൃകാപരമായി പ്രവർത്തിക്കുന്നു. ഗ്രാമപ്രിയ, ഗ്രാമലക്ഷ്മിഎന്നീ ഇനങ്ങളിലെ കോഴിക്കുഞ്ഞുങ്ങളും, മലബാറി ഇനത്തിലെ ആട്ടിൻ കുട്ടികളും, മുട്ട, പാൽ എന്നീ ഉൽപ്പന്നങ്ങളും വിതരണം ചെയ്തു വരുന്നു. ഇവ കൂടാതെ അത്യുൽപ്പാദനശേഷിയും ഉയർന്ന ഗുണ നിലവാരവുമുള്ള കുരുമുളക്, അടയ്ക്ക, വാഴ എന്നിവയുടെ തൈകളും, പച്ചക്കറി വിത്തുകളും ഉൽപ്പാദിപ്പിച്ച് വിതരണം ചെയ്യുന്നു.

നാളികേരം അടിസ്ഥാനമാക്കിയുള്ള മൂല്യവർദ്ധിത ഉൽപ്പന്നങ്ങളുടെഒരു നിർമ്മാണ യൂണീറ്റും ഇവിടെ പ്രവർത്തിക്കുന്നു. ഗുണമേൻമയുള്ള ഉരുക്കുവെളിച്ചെണ്ണ, തേങ്ങാച്ചമ്മന്തിപ്പൊടി, തീയൽക്കൂട്ട്, ഇഞ്ചിച്ചമ്മന്തിപ്പൊടി, എന്നിവ ഉപഭോക്താക്കളുടെ പ്രശംസ പിടിച്ചു പറ്റിയ ഉൽപ്പന്നങ്ങളാണ്.

നാളികേരാധിഷ്ഠിത വിജ്ഞാന നൈപുണ്യവികസനം, നാളികേര ഉൽപന്നങ്ങളുടെ വൈവിധ്യവൽക്കരണം, നാളികേരകർഷകർക്ക് ഈ അറിവുകൾ പകരുക, കാർഷികമേഖലയിൽ വിദ്യാർത്ഥികൾക്ക് സംരഭകത്വ വികസനത്തിനുള്ള സാങ്കേതിക അറിവുകൾ, കഴിവുകൾ എന്നിവ ആർജ്ജിപ്പിക്കുന്നതിന് സഹായിക്കുക, തെങ്ങ് കർഷകരുടെ അഭിവൃദ്ധിക്കായി തെങ്ങ് മുഖ്യവിളയാക്കി സംയോജിത ശാസ്ത്രീയ കൃഷിരീതികൾ അവലംബിച്ച് നിരവധി മൂല്യവർദ്ധിത ഉത്പന്നങ്ങൾ ഉണ്ടാക്കി വ്യാവസായിക യൂണിറ്റുകൾ സ്ഥാപിക്കുന്നതിനുള്ള നൂതന സാങ്കേതികവിദ്യകൾ, അറിവുകൾ പകരുക തുടങ്ങീ ലക്ഷ്യങ്ങളോട് കൂടി ICAR-NAHEP-CAAST Project ഇവിടെ നടന്നുവരുന്നു.

കാർഷിക സർവ്വകലാശാലയുടെ അവസാന വർഷ ബിരുദ വിദ്യാർത്ഥികൾ ഗ്രാമീണകാർഷിക പ്രവൃത്തി പരിശീലന പരിപാടിയുടെ ഭാഗമായി ഒരാഴ്ചവീതം നീ ് നിൽക്കുന്ന പരിശീലനം (ഗവേഷണ കേന്ദ്രവുമായി ബന്ധപ്പെട്ടവ) നടത്തിവരുന്നു.

കാർഷിക ബിരുദാനന്തര ബിരുദ വിദ്യാർത്ഥികളുടെയും, ഗവേഷണ വിദ്യാർത്ഥികളുടെയുംഗവേഷണ പഠനങ്ങൾ ഈ കേന്ദ്രത്തിൽ നടന്നുവരുന്നു.

കുള്ളൻ തെങ്ങുകളുടെ (ഡ്വാർഫ്) ഇടയകലം ചിട്ടപ്പെടുത്തുന്നതിനും, രാസവളപ്രയോഗത്തിന്റെ അളവു തിട്ടപ്പെടുത്തുന്നതിനുള്ള ഗവേഷണങ്ങളും പുരോഗമിക്കുന്നു.

നാളികേരാധിഷ്ഠിത ഇടവിളകൃഷിയായി കരനെൽകൃഷി, ഭക്ഷ്യസുരക്ഷ, പോഷക സുരക്ഷ എന്നിവയെ മുൻനിർത്തിറാഗി (കൂവരക്) പോലുള്ള ചെറുധാന്യ കൃഷി ഗവേഷണങ്ങളും വിജയകരമായി നടപ്പിലാക്കിവരുന്നു.

തെങ്ങുകളുടെ രോഗകീട നിയന്ത്രണം, സംയോജിതകൃഷിയുടെ നൂതന സങ്കേതങ്ങൾ, മൂല്യ വർദ്ധിത ഉൽപ്പന്ന നിർമ്മാണം, സങ്കരയിനം തെങ്ങിൻ തൈകളുടെ ഉൽപ്പാദനം, യന്ത്രം ഉപയോഗിച്ചുള്ള തെങ്ങു കയറ്റം എന്നിവയിൽ വിദ്യാർത്ഥികൾക്കും, കർഷകർക്കും തൊഴിൽരഹിതരായ യൂവതീയുവാക്കൾക്കും ഇവിടെ പരിശീലനം നൽകിവരുന്നു. ഇതു കൂടാതെ തൊഴിലധിഷ്ഠിതഹയർസെക്കന്ററി (OJT), കൃഷി ബിരുദവിദ്യാർത്ഥികൾക്ക്തൊഴിലധിഷ്ഠിത ഗ്രാമവാസ (RAWE) പരിശീലന പരിപാടികളും നൽകിവരുന്നു.

ബന്ധപ്പെടുക 04712400621

കൃഷി സമ്പ്രദായ ഗവേഷണ കേന്ദ്രം, സദാനന്ദപുരം

പ്രവർത്തന മേഖലകൾ

- പുരയിടങ്ങൾ കേന്ദ്രീകരിച്ച് സർവ്വേകളും വിലയിരുത്തലുകളും നടത്തുക.
- പുരയിടകൃഷിക്ക് അനുസൃതമായി വിവിധ മോഡലുകൾ വികസിപ്പിക്കുകയും അവയുടെ വിശദമായ സാമ്പത്തിക വിലയിരുത്തലുകൾ നടത്തുക.
- വിവിധങ്ങളായ ദീർഘകാല വിളകൾ ഉൾക്കൊള്ളിച്ചുകൊ ുള്ള സംയോജിത കൃഷി രീതികൾ : വിള-കന്നുകാലികൾ/ വിള - കോഴി/ വിള - കന്നുകാലി- മത്സ്യം എന്നിവ ഉൾപ്പെടുന്ന സംയോജിത കൃഷി രീതിക്ക് അനുശ്രിതമായി സാങ്കേതിക വിദ്യകൾ വികസിപ്പിച്ചടുക്കുക.
- പുരയിടത്തിൽ കാണപ്പെടുന്ന പ്രധാന കളയിനങ്ങളെ തിരിച്ചറിയുകയും അവയെ നിയന്ത്രിക്കുന്നതിനാവശ്യമായ ഗവേഷണങ്ങൾ നടത്തുക.
- കർഷകരുടെ വരുമാനം വർദ്ദിപ്പിക്കുന്നതിന് കൃഷി അനുബന്ധ സംരഭങ്ങൾ തിരിച്ചറിയുക.
- പുരയിട കൃഷിക്ക് അനുയോജ്യമായ മണ്ണ്-ജല സംരക്ഷണ പദ്ധതികൾ വികസിപ്പിക്കുക.
- പച്ചക്കറി, കിഴങ്ങുവർഗ്ഗങ്ങൾ, ഫലവൃക്ഷങ്ങൾ, സുഗന്ധവിളകൾ എന്നിവയുടെ വിളവർദ്ധനവിനായുള്ള ഗവേഷണ പ്രവർത്തനങ്ങൾ നടപ്പാക്കുക.
- ഗുണ നിലവാരമുള്ള വിത്തുകളും തൈകളും ഉല്പ്പാദിപ്പിക്കുക.

ഇപ്പോൾ നടന്നുകൊ ിരിക്കുന്ന ഗവേഷണ പദ്ധതികൾ

1. തെക്കൻ ജില്ലകളിൽ ക ുവരുന്ന നാടൻ മാവിനമായ കർപ്പൂരത്തിന്റെ വിവിധ ഇനങ്ങൾ കെ ത്തുന്നനായി സർവ്വേയും വിവരശേഖരണവും നടത്തുകയും മുന്തിയ ഇനത്തിന്റെ ജനിത കശേഖരം ഉ ാക്കുകയും ചെയ്യുക.
2. മികച്ച ഇനം വഴുതനകൾ കെ ത്തുന്നതിനായിട്ടുള്ള ഗവേഷണ പദ്ധതി.
3. മഞ്ഞൾ, കച്ചോലം എന്നിവയിലെ മികച്ച ഇനങ്ങൾ കെ ത്തുന്നതിനായിട്ടുള്ള ഗവേഷണ പദ്ധതി.
4. നെല്പാടത്തെ ചൊവ്വരി പുല്ലിന്റെ (വഞ്ചി) നിയന്ത്രണം.
5. പപ്പായയുടെ ജൈവവള പ്രയോഗം
6. ഗ്രാമീണ കാർഷിക സാങ്കേതിക പരിശീലന പാർക്ക് സ്ഥാപിക്കുന്ന പദ്ധതി

പരിശീലനങ്ങൾ

29 ഏകദിന പരിശീലന പരിപാടികൾ 8 തൊഴിൽ അധിഷ്ഠിത പരിപാടികൾ വൊക്കേഷണൽ ഹയർസെക്കന്ററി വിദ്യാർത്ഥികൾക്കായി 12 ദിവസം നീ ു നിൽക്കുന്ന 6 പരിശീലന പരിപാടികൾ എന്നിവ നടത്തുകയു ായി.

വിജ്ഞാന വ്യാപന പ്രവർത്തനങ്ങൾ

റേഡിയോ പ്രഭാഷണങ്ങൾ, ടെലിവിഷൻ പരിപാടി, ഗവേഷണ കേന്ദ്രത്തിന്റെ പ്രധാനപ്പെട്ട പ്രവർത്തനങ്ങളും ഗവേഷണ ഫലങ്ങളും പത്രമാധ്യമങ്ങളിലൂടെ പ്രചരിപ്പിക്കുക തുടങ്ങിയ പ്രവർത്ത നങ്ങൾ നടത്തി.

റിവോൾവിംഗ് ഫ ് ഉപയോഗിച്ചുള്ള പ്രവർത്തനങ്ങൾ

ജീവാണു കീടനാശിനികൾ, ദ്വിതീയ സൂക്ഷ്മ മൂലകവളം, ജീവാണുവളങ്ങൾ, കമ്പോസ്റ്റ്, ഫല വർഗ്ഗങ്ങളിൽ നിന്നുള്ള മൂല്യവർദ്ധിത ഉൽപ്പന്നങ്ങൾ, കൂൺ, കൂൺ വിത്ത്, തെങ്ങിൻ തൈകൾ, നഴ്സറി ചെടികൾ, സിന്ദൂർ, വരിയ്ക്ക, മുട്ടം വരിയ്ക്ക എന്നീ പ്ലാവിനങ്ങളുടെ ഒട്ടുതൈകളും അത്യുൽപാദനശേഷിയുള്ള മാവ്, കശുമാവ്, സപ്പോട്ട മറ്റു ഫലവിളകളുടെ ഒട്ടു തൈകൾ ഉൽപ്പാദി പ്പിച്ചു വിതരണം ചെയ്തുവരുന്നു.

ബന്ധപ്പെടുക 9447595912

കൃഷിവിജ്ഞാന കേന്ദ്രം, കൊല്ലം കർഷകർക്ക് ലഭ്യമാക്കുന്ന സേവനങ്ങൾ

1. പരിശീലനങ്ങൾ

കൊല്ലംജില്ലയിലെകർഷകരുടെയുംകാർഷികമേഖലയിൽ പ്രവർത്തിക്കുന്ന വിജ്ഞാന വ്യാപന പ്രവർത്തകരുടെയും പരിശീലകരുടെയുംആവശ്യാനുസൃതംകെ.വി.കെ. കൊല്ലംസാങ്കേതിക വിദ്യകൈമാറുന്നതിനുള്ള പ്രധാന പരിപാടിയായിഓൺ ക്യാമ്പസ് ഓഫ് ക്യാമ്പസ് രീതികളിൽ പരിശീ ലനം സംഘടിപ്പിക്കുന്നു. കൂടാതെ, കൃഷിവകുപ്പ്, റബ്ബർബോർഡ്,വ്യവസായവകുപ്പ്, സാമൂഹ്യ നീതിവകുപ്പ്, നാഷണൽ ബാങ്ക്ഫോർ അഗ്രികൾച്ചർ ആന്റ്റൂറൽഡെവലപ്പ്മെന്റ്, മറ്റ്കാർഷിക അനു ബന്ധ സംഘടനകൾ എന്നിവസംഘടിപ്പിക്കുന്ന നിരവധി പരിശീലനപരിപാടികളിൽകെ.വി.കെ യുടെവിഷയ വിദഗ്ദ്ധർ റിസോഴ്സ് പേഴ്സണായി പ്രവർത്തിക്കുന്നു. 1 മുതൽ 20 ദിവസംവരെദൈർഘ്യമുള്ളവിവിധതൊഴിലധിഷ്ഠിത പരിശീലന പരിപാടികൾ നടത്തിവരുന്നു.

പരിശീലന വിഷയങ്ങൾ

- പച്ചക്കറികൾ, വാഴ, നാളികേരം, നെൽകൃഷിഎന്നിവയുടെസംയോജിത പോഷക പരിപാലനം.
- സംയോജിതകീടനിയന്ത്രണം

- ജൈവ ഉപാധികളുടെഉത്പാദനവും പ്രയോഗരീതികളും
- ചെടിയുടെകായിക പ്രവർത്തന രീതികൾ
- പച്ചക്കറി തൈഉത്പാദനം
- കൂൺ കൃഷി
- മട്ടുപ്പാവ്കൃഷി
- പോഷകഉദ്യാനത്തോട്ടം
- പഴങ്ങളുടെയും പച്ചക്കറികളുടെയും മൂല്യവർദ്ധനവ്
- സംരംഭകത്വവികസന പരിശീലനങ്ങൾ
- കാർഷിക യന്ത്രവത്കരണം
- മൃഗപരിപാലനം
- കോഴിവളർത്തൽ
- ആടു വളർത്തൽ
- ഉദ്യാന കൃഷിതുടങ്ങിയവ

2. കാർഷിക ഉപദേശകസേവനങ്ങൾ

ജില്ലയിലെ കാർഷികസമൂഹത്തിന്റെ ഉന്നമനത്തിനായി വിവിധ മേഖലകളിലെ ശാസ്ത്രജ്ഞർ ഒരുമിച്ച് പ്രവർത്തിക്കുന്നു. കൃഷിക്കാർക്കും കാർഷിക സംരംഭകർക്കും അനുബന്ധ ഡിപ്പാർട്ട്മെന്റിലെ ഉദ്യോഗസ്ഥർക്കും അവരുടെ കാർഷികമേഖലയിലെ പ്രശ്നപരിഹാരത്തിനായി ഫോണിലൂടെ യോവ്യക്തിഗത സന്ദർശനത്തിലൂടെയോ കേന്ദ്രത്തെ സമീപിക്കാം.

3. വിൽപ്പനയ്ക്ക്ലഭ്യമായ ഉൽപ്പന്നങ്ങൾ ഇവയാണ്

കൊല്ലം ജില്ലയിലെ കർഷകർക്ക് ഗുണനിലവാരമുള്ള നടീൽവസ്തുക്കൾ, ജൈവ ഉപാധികൾ, വളങ്ങൾ, മറ്റ്കാർഷിക ഇൻപുട്ടുകൾ എന്നിവ ന്യായമായ നിരക്കിൽ നൽകാൻ കേന്ദ്രം ശ്രമിക്കുന്നു. സ്യൂഡൊമൊണാസ്, ട്രൈക്കോടെർമ, ബിവേറിയബാസിയാന, വെർട്ടിസീലിയം, പാസിലോമൈസിസ്, മെറ്റാറൈസിയം അനൈസോപ്ലിയേ, പി.ജി.പി.ആർമിക്സ് I, പി.ജി.പി.ആർമിക്സ് II, പയർ, സമ്പൂർണ്ണ മൾട്ടിമിക്സ് നെല്ല്, സമ്പൂർണ്ണ മൾട്ടിമിക്സ് വാഴ, സമ്പൂർണ്ണ മൾട്ടിമിക്സ് പച്ചക്കറി, മാവ്, വേപ്പെണ്ണ സോപ്പ്, കെ.എ.യു രക്ഷ, നന്മ, ശ്രേയ, മാമ്പഴക്കെണി, പച്ചക്കറികെണി, ബയോകിറ്റ്, ഐ.സി.എം കിറ്റ്, മത്തി കഷായം, കൂൺ വിത്ത്, ഗ്രോ ബാഗ്, അത്യുൽപാദന ശേഷിയുള്ള പച്ചക്കറി തൈകൾ, അസോള, മുട്ടക്കോഴികുഞ്ഞുങ്ങൾ, ആട്, പഴങ്ങളുടെയും പച്ചക്കറികളുടെയും മൂല്യ വർദ്ധിത ഉൽപ്പന്നങ്ങൾ എന്നിവകൃഷിവിജ്ഞാനകേന്ദ്രത്തിൽ നിന്നുംവിപണനം ചെയ്യുന്നു.

4. ഇതരസേവനങ്ങൾ

1. യന്ത്രസാമഗ്രികളും ഉപകരണങ്ങളും
2. മണ്ണ്, ജല പരിശോധന ലാബ്
3. പ്ലാന്റ് ഹെൽത്ത് ക്ലിനിക്
4. അനിമൽ ഹെൽത്ത് സർവീസസ്
5. അഗ്രോ പ്രൊസസ്സിംഗ് ലാബ്
6. കസ്റ്റംഹയറിംഗ്സെന്റർഫോർ ഫിഷ് പ്രോസസിംഗ്
7. എഗ്ഗർ നഴ്സറിയൂണിറ്റ്
8. ആട് വളർത്തൽ യൂണിറ്റ്
9. ജൈവ ഉത്പാദനോപാധികൾക്ക് ഏകജാലക സംവിധാനം
10. ബയോകൺട്രോൾ ലാബ്
11. കൂൺ വിത്ത് നിർമ്മാണ യൂണിറ്റ്
12. തേനീച്ച വളർത്തൽയൂണിറ്റ്
13. ഹൈഡ്രോപോണിക്സ് ഡെമോൺസ്ട്രേഷൻ യൂണിറ്റ്

14. അക്വാപോണിക്സ് ഡെമോൺസ്ട്രേഷൻ യൂണിറ്റ്
15. പോളിഹൗസ് ഹാർഡനിംഗ് യൂണിറ്റ്
16. മണ്ണ് ജല സംരക്ഷണത്തിനായി സൂക്ഷ്മജലസേചന യൂണിറ്റും രാമച്ചം ഉപയോഗിച്ചുള്ള കയർ ഭൂവസ്ത്രവും
17. നെല്ല് പയറുവർഗ്ഗ വിളകൾക്ക് വേ ി മിനി റൈസ് പൾസ്മില്ലുകൾ
18. ഡിസ്ട്രിക്ട് അഗ്രോമെറ്റ് യൂണിറ്റ്

ബന്ധപ്പെടുക 9447525264

കൊമേഷ്യലൈസേഷൻ ഓഫ് വാല്യൂ ആൻഡ് ഫുഡ് പ്രൊഡക്ട്സ് എന്ന റിവോൾവിംഗ് ഫ ് സ്കീം 2016 മുതൽ നടപ്പിലാക്കി വരുന്നു.

കമ്മ്യൂണിറ്റി സയൻസ് ഡിപ്പാർട്ട്മന്റിൽ വികസിപ്പിച്ചെടുത്ത് മൂല്യ വർദ്ധിത ഉൽപ്പന്നങ്ങലെ വിതരണത്തിനായി ഈ പദ്ധതിയിൽ ഒരുക്കുന്നു കൂടാതെ ഫാമിൽ അധികമായി ഉൽപ്പാദിപ്പിക്കുന്ന വിളകളെ ഉൽപ്പന്നങ്ങളാക്കി മാറ്റാനും ഈ പദ്ധതിയിൽ ശ്രദ്ധിക്കുന്നു. ര ് വനിത കൾക്ക് ദിവസവേതനത്തിൽ വരുമാനം നൽകാനും ഇതിലൂടെ സാധിക്കുന്നു.

ബന്ധപ്പെടുക 9446578578

Minutes of the XXXVII Zonal Research Extension Advisory Council Meeting & Interface conducted on 07.01.2021 & 08.01.2021 at RARS (SZ), Vellayani

The meeting commenced at 10.00 AM with the invocation song by College choir.

Dr. Roy Stephen, Associate Director of Research in his welcome address mentioned the importance of the ZREAC. He also emphasized the importance of Karshakasanthwanam for resolving the problems faced by farmers.

This was followed by the Presidential Address in which Dr. Madhu Subramanian, Director of Research, KAU briefed the research highlights of 2019-2020. As a part of the organisation of Agriculture Knowledge Centre (AKC) in connection with the Agricultural Department, the service of 150 scientists has been rendered from KAU. He also opined that the outputs from the University *viz*., KAU fertilizer mixture (18:9:18), micronutrient formulation, biocontrol agents, precision farming, etc. have gained momentum in Kerala during the last year. He also stressed that the farmers have to be made available the facilities of censor based technology like mobile apps, robotics, precision farming, etc. Apart from these, the problems faced by farmers as an agrientrepreneur and rehabilitation of NRIs in Agriculture need to be resolved.

Dr. A. Anilkumar, Faculty Dean, KAU inaugurated the function. He acknowledged the service of Agricultural Officers during the covid time and pointed the importance of the Local Self Government in Agriculture. He also emphasized the development of new technologies which are of organic and with ecological balance so that its acceptance should be ensured in future. He also announced the commencement of new course programmes in this year which include B.Tech. Biotechnology of four year duration, PG Diploma in Horticultural Therapy and Landscape also.

Dr. Jiju P. Alex, the Director of Extension, KAU in his special address highlighted the importance of more collaborative work with Department of Education, Department of Social Welfare, etc. He mainly emphasized on six topics *viz*., Productivity enhancement, secondary Agriculture, Input Production, Market Intelligence, Climate Resilient practice in Agriculture and sustained productivity.

Sri. S. S. Nagesh, Chief (Agriculture), State Planning Board, Kerala, Dr. Pradeep Kumar T., the Director of Planning, KAU and General Council Member, KAU, Dr. Thomas George, Professor & Head (PRRAL) & General Council Member, KAU and Mr. George Alexander, PAO of Thiruvananthapuram District felicitated the workshop.

Sri. S. S. Nagesh, Chief (Agriculture), State Planning Board, Kerala during the felicitation address elaborated that the need of the hour is to improve laboratory facilities for genome editing, molecular biology, nanotechnology, etc. He also stressed out that the research findings of KAU has to be considered in policy decision making.

Dr. Pradeep Kumar T., the Director of Planning, KAU and General Council Member, KAU mentioned that the release of new varieties as well as the technology to farmers was found to be cost effective and also increased the crop production. He also stated that Instructional Farms need to be modernised in future for production of new grafts and seedlings.

Dr. Thomas George, Professor & Head (PRRAL) & General Council Member, KAU highlighted the importance in effective utilization of wastelands and fallow lands for increased crop production.

Finally, Dr. B. Seema, Associate Director of Extension proposed the vote of thanks.

In the inaugural session, Dr. Meenakumari K. S., Professor & Head, Department of Agricultural Microbiology was honoured for generating the highest income in Revolving Fund Scheme through Biotech Keralam Project.

The following publications were also released in the workshop:

One proceedings by Dr. Roy Stephen & Dr. Sreekala G. S., one leaflet on Grow bag farming by Dr.Ameena M. and three leaflets by Dr. Usha C. Thomas on Tree Fodders, Azolla and Golden Jubilee Fodder Museum were released from the College of Agriculture, Vellayani.

Two DVDs on salient activities of the IFSRS, Karamana (in English and Malayalam) and seven leaflets were released from the IFSRS. Karamana.

Four leaflets under AICRP on Integrated farming system of Homestead, banana, coconut and paddy; three leaflets under SHM Project on important pests and diseases of vegetables and their management were also released from the Karamana centre.

Technical Session I – Farmer's Interface

Chairperson:Dr. Madhu Subramanian, Director of Research, KAU and
Dr. Jiju P Alex, Director of Extension, KAU
Co-chairman:Mr. George Alexander,Principal Agrl. Officer, Thiruvananthapuram

Field level problems pertaining to pests, diseases and nutrient imbalance in major crops *viz*., coconut, rice, banana, mango, jack fruit, citrus cassava and vegetables were presented by the selected farmers and Agrl. Officers of three districts.

Mr. Dajish Mohan, Chirayinkeezhu, Mr. Madhu from Aryankodu, Mr. Chandrasekharan Pillai from Parassala and Mr. Pradeep from Pathanamthitta were the selected farmers.

The Agricultural Officers, Mr. Manivarnan from Pallichal, KrishiBhavan, Mrs. Niya Celina from Manambur Krishi Bhavan, Dr. Thushara T Chandran from Vizhijam, KrishiBhavan of Thiruvananthapuram District, Mr. Pramod from Chathanoor KrishiBhavan of Kollam district and Mr. Sreenath of Pathanamthitta district summarized the various issues faced by the farmers at field level.

The solutions for problems were presented by Dr. N. Anitha, Dr. Mani Chellappan, Dr. ManoramaThampatti, Dr. Jacob John, Dr. Shalini Pillai, Dr. Ameena M., Dr. M Joy and Dr. Sajeena.

Sl. No.	Crop	Problems raised	Solutions suggested
1.	Coconut	1. Rhinoceros beetle	Dwarf varieties are more prone to attack. Application of *M. anisoplea* @1 Kg per 10 m^3cowdung pit/ incorporation of clerodendron leaves Cleaningof the crown Application of Fipronil 20 g + 200 g sand 4 times in an year
		2. Button shedding	Confirm the actual reason of button shedding then take necessary action accordingly
2.	Paddy	Earthworm attack	Entrusted Karkashasanthwanam for the field visit and for suitable recommendations
3.	Mango/Jack	Die back	Cut the mango branch just below the dried part and apply Bordeaux paste or the mixture of Tilt 5 ml in rubber coat (one coconut shell). Prophylactic application of micronized Copper oxychloride at two leaf stage.
4.	Papaya	Ring spot virus	Apply individual or mixed extract of *Phyllanthusniruri*/ *Boerhaviadiffusa*/ *Andrographispaniculata*@ 10 g per 1 litre of water
5.	Guava	Fruit fly attack	Similar measures of that of mango fruit fly can be done
6.	Jack	Fruit rot	Apply Copper oxychloride 2 g per litre of water In the initial stage can go for the application of Akomin 4 ml per litre of water
7.	Banana	1. Whitefly incidence	Neemoil 2 per cent or *Lecanicilliumlecanii* 20 g per litre
		2. Nutrient deficiency	Calcium deficiency-Apply 1 kg at the time of soil preparation. If needed, foliar spray of Calcium chloride 1 per cent can be done. Boron deficiency – Apply 10 kg per ha Sulphur deficiency-Apply Calcium sulphate 25 kg per ha
8.	Vegetables-Cowpea	Pod borer attack	Spraying of chlorantraniliprole 2-3 ml per litre of water

9.	Amaranthus	Mealy bug infestation	*Lecanicilliumlecanii* 20 g per litre
10.	Bittergourd	Virus disease	Use yellow traps Apply extract of *Phyllanthusneruri*/ *Boerhaviadiffusa*@ 10 g per 1 litre of water
11.	Tapioca	Fungal attack	Mostly seen in fields where solanaceous and cucurbitaceous vegetables are grown. Apply *P. fluorescence* @ 20 g per litre at the time of tuber formation. Apply Bavistin 1 g per litre near to the stem at soil level after moistening the soil.
12.	Betel vine	Water soaked	*Pseudomonas fluorescence* 20 g per litre can be used prophylactically against bacterial wilt. Apply streptocycline 250 mg per litre of decanted cowdung water
13.	General	Wild boar attack	Chain link fence (Rs. 400 per metre) Solar fencing Rs. 35000 per unit can be used upto 50 ha. Integrating Borep with nylon net fencing effective upto 4 months and is more effective

Technical Session II – Farm Trials

Chairman: Dr. Jiju P. Alex, Director of Extension, KAU and
Dr. Jyothi M. L., Dean, College of Agriculture, Vellanikkara
Co-chairman: Mr. George Alexander, Principal Agrl. Officer, Thiruvananthapuram

Three Farm trials and 13 farm trial proposal were presented in this session.

Farm Trial Result

The results of farm trials were presented by Dr. Narayana R., Dr. Susha S.Thara and Dr. Bindhu J.S.

Suggestions:
The committee suggested to conduct trial on screening of new variety of Oyster mushroom in the AICRP also. The variety may be released at the earliest by strictly adhering to all the procedures. A final demonstrational trial has also be conducted.

With regard to the nutrient requirement of Grand Nain banana by Dr. Bindhu J, S,, it was suggested to consult with Banana Research Station, Kannara also. Next field trial has to be conducted at KVK and the results has to be submitted to the Director of Research, KAU.

Farm Trial Proposal:

1. Management of root knot nematode infesting cowpea using bioagents: Dr. Nisha M. S.

Suggestion: Interaction study of nematode with *Fusarium* should be included. The crop may be mentioned as Yard long bean instead of cowpea.

2. Management of root knot nematode on okra by biofumigation and bioagents: Dr. Nisha M. S.

Suggestion: Availability of cauliflower leaves should be ensured. Impact of root disease and nematode infestation, has to be evaluated separately and in combined form.

3. Screening of new accession of fodder cowpea : Dr. Gayathri G

Suggestion: Farm trials should be conducted at five locations each of three districts. A project proposal has to be submitted to the Director of Research, KAU before the farm trial.The place where the accession is collected should be acknowledged.

4. Management of nematodes infecting cabbage/ cauliflower : Dr. R. Narayana

Suggestion: Treatments, observations and period of taking observation should be properly mentioned.

5. Integrated Nematode Management in Cardamom: Dr. R. Narayana.

Suggestion: The AEU in which the management is feasible has to be specified.

6. Evaluation of the PGPE (Plant Growth Promoting Entophytic) fungus *Piriformospora indica* for plant growth promotion in black pepper: Dr. K. N. Anith

Suggestion: Farm trial proposal is approved and is considered as Multi locational trial since the crop is a perennial one.

7. Farm trial with one promising hybrid of tomato LE16 x Vellayani Vijai: Dr. S. Sarada

Suggestion: One more CYT (Comparative Yield Trial) has to be conducted.

8. Field performance of *P. indica* colonized banana plants against natural incidence of fungal, bacterial and viral diseases : Dr. Joy M.

Suggestion: Field trial result has to be made available before the farm trial. For extension of experiments in hot spots, front line demonstration can be conducted.

9. Field performance of *P. indica* colonized vegetable crops against natural incidence of fungal, bacterial, phytoplasmal & viral disease : Dr. Joy M.

Suggestion: Field trial of vegetables other than cowpea has to be completed for performing the farm trials.

10. Management of blood grass in rice field : Dr. Renjan B.

Suggestion: Extension trial has to be conducted with four treatments in State Seed Farm for the first season. After that, farm trial can be conducted in the second season.

11. Intensive forage production through agase based cropping system : Dr. Usha C. Thomas

Suggestion: Agase being a perennial crop and the practice has already been recommended by ICAR, it can be taken up as demonstration trial rather than as a farm trial.

12. BN hybrid based quality fodder production systems : Dr. Usha C. Thomas

Suggestion: Demonstration trial can be done instead of the farm tiral.

13. Evaluation of brinjal in AIVIP : Dr. M. R.Bindu.

Suggestion: Conduct one more CYT before the farm trial.

On the second day the workshop started by 9.00 a.m.

Technical Session III – Station Presentations

Chairman: Dr. Jiju P. Alex, Director of Extension, KAU
Co-chairman: Dr. Jyothi M. L., Dean , CoA, Vellanikkara and
Dr. Jayalakshmi V. G., Research Co-ordinator

The activities and progress of the research projects being implemented at three satellite stations(IFSRS, Karamana, CRS, Balaramapuram& FSRS, Kottarakkara station), On Farm Research Centre, Vellayani and KVK, Kollam were presented by the respective Station heads.

Suggestion/recommendations raised by the panel:

1. FSRS, Sadanadapuram,
   Rare type of mango accessions should be conserved. Public tree planting programmes along road sides and in schools can be encouraged.
2. IFSRS, Karamana
   Farm tourism may be encouraged by collaboration with the Tourism Department.

Technical Session 1V - All India co-ordinated Research Projects

Chairperson: Dr. K.C.ManoramaThampatti, Prof & Head, SS&AC
Co-chairman: Dr. N.V.Radhakrishnan, Prof. & Head, Coconut Research station, Balaramapuram

The salient achievements and progress of the research work conducted in the five AICRPs and two All India Network Projects were presented in this session by the respective Principal Investigators.

Suggestion/recommendations raised by the panel:

AICRP on Nematodes

It was suggested to propose new projects for the newly emerged nematode pests.

AICRP on Mushrooms

It was asked to make success stories on Mushroom Cultivation by Farmers.

AICRP on Biological Control of Crop Pests

It was suggested to submit a proposal for fixing the price of oil based formulation of biocontrol agents.

AINP on Pesticide Residues

It was suggested to disseminate the results of the "safe to Eat programme" which are useful to the farmers through the Directorate of Extension.

Technical Session V - CropImprovement

The technical session on Crop Improvement Started after the lunch break.

Chairperson: Dr. K. Arya, Professor& Head, Dept. of Plant Breeding & Genetics

Co-chairman: Dr. Bindu M. R., Professor& Head, FSRS, Sadanandapuram

Dr. Jayalekshmi V.G, Research Co-ordinator, Professor & Head of Seed Technology and Dr. Sarada, Assistant Professor & Head Department of Vegetable Science Presented the salient findings of their respective projects.

Suggestion/recommendations raised by the panel:

In the case of breeding vegetable crops for resistance to biotic and abiotic stress, it was suggested to inoculate nematode infections along with the bacterial wilt diseases. Observations on quality attributes has to be rewarded for both chili & tomato before going for the farm trials.

Technical Session VI - Crop Protection

Chairperson: Dr. N.Anitha, Prof. & Head, Dept. of Agricultural Entomology

Dr. Joy M, Prof, & Head, (Plant Pathology) presented the research report of two projects on root endopg hytic fungus, *P. indica*.

Technical Session VII - Crop Production
Chairperson: Dr. Jacob John, Professor & Head, IFSRS, Karamana

Co-chairman: Dr. Shalini Pillai, P, Prof. & Head, Dept. of Agronomy

The salient achievements and progress of two projects were presented in this session by the Principal Investigators, Dr. Mini C. and Dr. R. Gladis.

Technical Session VIII - Social Sciences
Chairperson: Dr. Seema B, Associate Director of Extension

Co-chairman: Dr. T Sajitha Rani, Professor & Head, Instructional farm

The research achievements and progress of two projects were presented by Dr. Beela G.K, Assoc. Prof., Community Science Department.
Suggestions:

It was suggested that it will be better if the project is supported with data.

This was followed by the plenary session. The Director of Extension, Dr. Jiju P. Alex delivered the presidential address. He commented that the ZREAC was a meaningful deliberation where we can come up with landmark inventions in bringing lots of glory to KAU. He also stressed that the problems faced by the farming community can be resolved by robust technology intervention. Apart from these, our technology should cater to the needs of the plethora of stakeholders of various categories other than the producers. Dr.Amritha, V.S. presented a brief report of the 37th ZREAC meeting and interface and Dr.M.S.Hajilal, Professor (Agrl. Engineering) proposed the vote of thanks.

Meeting came to an end by 5.00 pm.

ASSOCIATE DIRECTOR OF RESEARCH

LIST OF ONGOING RESEARCH PROJECTS

Sl. No	Title of the Project	Principal Investigator	Budget Provision (Lakh)	Date of start
1.	Development of and rographolide based biopesticide formulations against sucking pests of commonly cultivated vegetables in Kerala.	Dr. Santhoshkumar T., Assistant Professor, Agricultural Entomology	2	2020
2.	Annual Plan Project 2020-21"Centre of Excellence in Microbial Technology at College of Agriculture Vellayani.	Dr.K.N.Anith, Professor & Head, Agricultural Microbiology.	10.00	19.12.2020
3.	SHM "Establishment of Advanced Referral plant clinic at CoA, Vellayani for diagnosing pests, diseases and nutritional problems of crops of Kerala"	Dr.Radhika.N.S, Assistant Professor, Plant Pathology	25	02.2021
4.	KSSM Project "Providing Horticultural Therapy and Establishing Community Garden for differently abled".	Dr.Beela.G.K, Associate Professor, Community Science	22.8	2020
5.	Annual Plan 2018-19- "Multidisciplinary Diagnosis Support to address field problems of farmers in Kerala(Karshaka Santhwanam)" .	Dr. Santhoshkumar T., Assistant Professor, Agricultural Entomology.	3	2018
6.	Annual Plan 2019-20 – CIB & RC Registration of Biocontrol Agents.	Dr.K.N.Anith, Professor & Head, Agricultural Microbiology.	57.2	10.09.2021
7.	Annual Plan 2017-18 –"Evolving GAP for control of pest and diseases-An Advanced Research Centre for crop disease diagnosis and management".	Dr.Ayisha.R, Assistant Professor, Plant Pathology	2	2018
8.	Plan project "Centre of Excellence in Postharvest technology: Component III-Establishment of centre for post harvest management and value addition for under exploited fruits and vegetables of Southern Kerala"	Dr.Mini.C, Professor & Head, Post Harvest Technology	2	01.11.2019
9.	Chitosan mediated elicitation of plant growth and alleviation of biotic stress in black pepper (Piper nigrum L.).	Dr. Deepa S Nair, Assistant Professor & Head, Plantation Crops& Spices	2	04.02.2021

Sl. No	Title of the Project	Principal Investigator	Budget Provision (Lakh)	Date of start
10.	Network project on Soil lose estimation, monitoring and management in the high land eco systems of Kerala.	Dr. Gladis R, Assistant Professor, Soil Science & Agricultural Chemistry	4.048	18.12.2020
11.	Development of nanoparticle incorporated edible coating for extending shelf life of Nendran banana.	Smt.Athulya S Kumar, Assistant Professor, Post Harvest Technology	3	20.12.02021
12.	Development and evaluation of bio-organic ready to use	Dr. Nishan M A, Assistant Professor, Agronomy	3	2020
13.	Strengthening of Lead Centre for Organic Farming at College of Agriculture, Vellayani.	Dr. Aparna B., Assistant Professor, Soil Science & Agricultural Chemistry	3	01.02.2021
14.	Development and evaluation of polyploids and superior genotypes in ginger (*Zingiber officinale* Rosc.) for yield and resistance to rhizome rot.	Dr.Sreekala G.S., Assistant Professor, Plantation Crops & Spices	2	17.12.2020
15.	Scaling up of processing technologies in Jackfruit standardized at KAU.	Dr. Suma Divakar, Professor & Head, Community Science	7	29.01.2021
16.	Development of value chain in banana and pineapple for post harvest loss reduction and enhanced farmer income.	Dr. Geetha Lekshmi PR, Assistant Professor, Post Harvest Technology	1.5	02.2021
17.	Network project on development of high yielding short duration rice varieties tolerant to abiotic stress through marker assisted breeding and mutagenesis.	Dr. Beena R, Assistant Professor Physiology.	12	17.12.2020
18.	Development of production protocol for Dwarf Red Banana (Musa acuminata cv. Dwarf Red Banana).	Dr. Sheeja K Raj, Assistant Professor, Agronomy	2	02.2021
19.	Artificial intelligence and predictive analysis for the development of decision support system for crop pest surveillance for rice farmers of selected agro ecological units	Smt. Linitha Nair, Assistant Professor & Head, Agricultural Meteorology.	5	2020
20.	Estt. of Techno-incubation centre for the commercialization of value added products from under exploited fruits and vegetables	Dr.Mini.C, Professor & Head, Post Harvest Technology	99.85	01.02.2018

Sl. No	Title of the Project	Principal Investigator	Budget Provision (Lakh)	Date of start
21.	Establishment of centre for formulation of convenient foods	Dr.Mini.C, Professor & Head, Post Harvest Technology	105	01.07.2016
22.	Upgradation of technoological facilities at Regional Agricultural Research Station (Southern Zone), College of Agriculture, Vellayani.	Dr. Geetha Radhakrishnan, Assistant Professor, Computer Science, RARS(SZ), Vellayani	6.5	12.2021
23.	Demonstration unit of Rosarium and Hydroponics System.	Dr. Rafeekher M, Assistant Professor & Head, Fruit Science	1.5	19.02.2021
24.	Establishment of mother plamnt blocks of spice plants.	Dr.Sreekala G.S., Assistant Professor, Plantation Crops & Spices	2.5	21.12.2020
25.	Development and quality analysis of beverages fortified with botanicals.	Dr. Suma Divakar, Professor & Head, Community Science	1	2020
26.	Strengthening tissue culture unit for commercial and medicinal plants.	Dr. M.M Viji, Professor & Head, Plant Physiology.	2	25.02.2021
27.	Strengthening the breeder seed production of selected newly released varieties of vegetables.	Dr. Simi S, Assistant Professor Vegetable Science	1.5	21.12.2020
28.	Growth and defence trade off in ustable continuum: Exploitation of root, endophytes including piriformospora indica & their biomolecules, for enhanced yield and management of biotic and abiotic stress in tropical fruits and vegetable crops.	Dr. Joy M., Associate Professor & Head, Plant Pathology, FSRS, Sadanandapuram	5.5	2019
29.	Performance Evaluation of Promising Fodder Varieties in Different AEUs in Kerala.	Dr. Usha C Thomas, Assistant Professor, AICRP on FC & U.	4	18.12.2020
30.	Annual State Plan project 2020-21-NewProject-"Network project on fruit development and planting material propagation protocols and cataloguing of minor fruits"Sub	Dr. Simi S, Assistant Professor, Vegetable Science	2	12.02.2021

Sl. No	Title of the Project	Principal Investigator	Budget Provision (Lakh)	Date of start
	project 3: Characterisation of mango genotypes grown in southern Kerala and development of field gene bank of superior types'			
31.	Development of Biologically Intensified Disease Management Strategy of Leaf Rot of Coconut.	Dr.Susha S.Thara, Assistant Professor & Head, Plant Pathology	14.92	07.07.2018
32.	Characterization in Vitro Culturing and in Vitro Manipulation for enhanced Production of Secondary Metabolites of Medicinal Orchids and Aloevera.	Dr. M.M Viji, Professor & Head, Plant Physiology	3	14.11.2019
33.	Extraction and Utilization of Plant Based Natural Colours for Safe to Eat Food Production.	Dr.Mini.C, Professor & Head, Post Harvest Technology	2	01.11.2019
34.	Investigation on Etiology of Root (wilt) and Yellowing Disease in Coconut	Dr. Joy M., Associate Professor & Head, Plant Pathology, FSRS, Sadanandapuram	23.00	2019-20
35.	Product Formulation and Standardization of Secondary and Micronutrient Fertilizer Mixtures for Southern Kerala.	Dr.Rani B, Professor & Head, Soil Science & Agricultural Chemistry	2	2019
36.	Productivity Enhancement of Coconut Based Cropping System through Vertical Intensification.	Dr. Shalini Pillai P, Professor & Head, Agronomy	2	03.2020
37.	Standardization of Ago Techniques for Protected Cultivation of Leafy Vegetables.	Dr. Sheeba Rabecca, Professor, Agronomy	2	01.2020
38.	Development and evaluation of Anthurium Hybrids.	Dr.Beena Thomas, Assistant Professor , Plant Breeding & Genetics	1	2019
39.	Drought management through control of soil crosion, in siturain water harvest, organic waste utilization and crop diversification in coconut based mediculture systems of Kerala.	Dr.Poornima Yadav, Assistant Professor, KVK Kollam.	2	2019
40.	Development of hybrid rice technology for the State of Kerala.	Dr.V.G.Jayalekshmi, Professor & Head, Seed Technology	3	09.08.2019

Sl. No	Title of the Project	Principal Investigator	Budget Provision (Lakh)	Date of start
41.	Role of nutrients in the management of viral disease in vegetables.	Dr.N.S.Radhika, Assistant Professor, Plant Pathology	3	2019
42.	Comparative yield trial of the promising tomato and cherry tomato hybrids.	Dr.V.G.Jayalekshmi, Professor & Head, Seed Technology	1	09.08.2019
43.	Product development on functional ready to serve beverages, refinement and protocol development.	Dr. Geetha Lekshmi PR, Assistant Professor, Post Harvest Technology	1.5	2019
44.	Annual State Plan Project - Identification of stylosanthes species for yield and quality suited for cultivation in Kerala.	Dr.Gayathri G., Assistant Professor, Forage Crops & utilization	2	2020
45.	Annual State Plan Project - Network project on Utilization of beneficial endophytes for plant growth promotion and management of plant diseases in important crops of Kerala.	Dr.K.N.Anith, Professor & Head, Agricultural Microbiology	7.5	09.02.2021
46.	Annual State Plan Project - Technological interventions for productivity enhancement in wet land rice.	Dr. Ameena M, Associate Professor, Agronomy	2	01.2021
47.	Annual State Plan Project - Breeding Yard longbean for yield and anthracnose resistance.	Dr. Sarada S., Assistant & Head, Vegetable Science	2.5	18.12.2020
48.	DOECC Project - Development of drought tolerant cardamom hybrids through pollen selection and selective fertilization	Dr. Roy Stephen, Professor, Plant Physiology	24	15.03.2021
49.	Agro meteorology Advisory Service	Smt. Linitha Nair, Assistant Professor & Head, Agricultural Meteorology.	12.62	21.03.1997
50.	Network Project on Potential impact of climate change and flood on Kerala Soils: AEU wise mitigation and adaptive strategies	Dr.Rani B, Professor & Head, Soil Science & Agricultural Chemistry	10	2020
AICRP and AINP RESEARCH PROJECTS				
51.	AICRP on Nematodes in Agriculture	Dr. Nisha M.S., Assistant & Head Professor, Nematology	14.74	1977

Sl. No	Title of the Project	Principal Investigator	Budget Provision (Lakh)	Date of start
52.	AICRP on Forage Crops & Utilization	Dr.Usha C. Thomas, Associate Professor & Officer i/c AICRP on Forage Crops & Utilization	72.80	2003
53.	AICRP on Honeybees and Pollinators	Dr. Amritha V.S., Associate Professor, AICRP onHoney Bees and Pollinators, Vellayani Centre	50.00	1/3/1994
54.	AICRP on Mushrooms	Dr. Heera. G., Assistant Professor, AICRP on Mushrooms	60.00	2001
55.	AICRP on Biological Control of Crop Pests	Dr. Reji Rani O.P., Associate Professor Agricultural Entomology	12.90	03/09/2018
56.	AINP on Soil Biodiversity - Biofertilizers - Integration of biofertilizer technology with farming practices of tribal farmers of Attappady	Dr.K.N.Anith, Professor & Head, Agricultural Microbiology	22.40	28/03/2015
REVOLVING FUND				
57.	RF on Honey Bees and Pollinators	Dr. Amritha V.S., Associate Professor, AICRP onHoney Bees and Pollinators, Vellayani Centre	2.50	8/11/2006
58.	Soil Testing (SSTL & MSTL)	Dr. R.Gladis, Assistnat Professor, Soil Science & Agricultural Chemistry	2.5	30/10/2012
59.	Solid Waste Management	Dr. Naveen Leno, Assistant Professor, Soil Science & Agricultural Chemistry	1.00	2015-16
60.	RF Biotech Keralam	Dr.Chithra.N, Assistant Professor, Agricultural Microbiology	0	2005
61.	Integrated Management of Fruit Flies Infesting Fruits & Vegetable Crops - concluded project -	Dr. Reji Rani O.P., Associate Professor Department of	3.15	30/3/2015

Sl. No	Title of the Project	Principal Investigator	Budget Provision (Lakh)	Date of start
	Sustenance Programme	Agricultural Entomology		
62.	RF-Establishment of Leaf/Tissue Analytical Lab at CoA, Vellayani	Dr.Shalini Pillai.P, . Professor & Head, Agronomy	1.25	03.2012
63.	RF on Vegetable seed production	Dr. Sarada S., Assistant & Head, Vegetable Science	7	2012
64.	Commercialization of value added products	Dr. Suma Divakar, Professor & Head, Community Science	1	2016
65.	Planting material production in Fodder crops	Dr.Usha C. Thomas, Associate Professor & Officer i/c AICRP on Forage Crops & Utilization	1.00	2019

LIST OF CONCLUDED RESEARCH PROJECTS

Sl. No	Title of the Project	Principal Investigator	Total Outlay/ Budget Provision (Lakh)	Date of start
1.	Productivity enhancement of coconut based cropping system through vertical intensification	Dr.Shalini Pillai.P, . Professor & Head, Agronomy	2.0	March, 2020
2.	Elucidation of high temperature stress tolerance in rice and development of suitable management strategies.	Dr. Beena R, Assistant Professor Physiology.	2.5	05.11.2019
3.	Germplasm Collection, Evaluation and Evolving Management Practices for Regular Bearing in Clove Accessions.	Dr. Sreekala G.S., Assistant Professor, Plantation Crops & Spices	2	07.08.2019
4.	Development and Evaluation of Multi Nutrient Tablets for Vegetable Grown in Home Garden.	Dr. R.Gladis, Assistnat Professor, Soil Science & Agricultural Chemistry	2	2019
5.	Standardization of agro techniques for protected cultivation of leafy vegetables	Dr. Sheeba Rabecca, Professor, Agronomy	2.0	January 2020
6.	Feasibility of low cost Hydroponics fodder production system in Kerala –Quantitative and Qualitative study.	Dr.Usha C. Thomas, Associate Professor & Officer i/c AICRP on Forage Crops & Utilization	2	08.2019
7.	Product development on functional ready to serve beverages: refinement and protocol development	Dr. Geetha Lekshmi PR, Assistant Professor, Post Harvest Technology	1.5	August 2019
8.	Refining Technologies for Byproduct Utilization of Major Crops: Jackfruit, Pineapple, Banana and Nutmeg.	Dr. Geetha Lekshmi PR, Assistant Professor, Post Harvest	1.5	08.2019

Sl. No	Title of the Project	Principal Investigator	Total Outlay/ Budget Provision (Lakh)	Date of start
		Technology		
9.	Horticultural therapy –a tool to Rehabilitate the Differently abled children at schools	Dr.Beela.G.K, Associate Professor, Community Science	26.8 Lakhs	2018
10.	Establishment of centre for post harvest management and value addition for under exploited fruits and vegetables of Southern Kerala	Dr.Mini.C, Professor & Head, Post Harvest Technology	2.0 lakhs	01.11.2019
11.	State Plan Project-Development of improved formulations of biopesticides	Dr. Reji Rani O.P., Associate Professor Department of Agricultural Entomology	2.0 lakhs	29.08.2019

LIST OF NEW RESEARCH PROJECTS

Sl. No.	Name of the Project	Name and Designation of PI	Total (lakhs)
1	Nano bio-formulations using allelopathy - based bio-synthesized nano particles for the management of aquatic weeds	Dr. Susha V.S. Assistant Professor, Agronomy	1
2	Development of pesticide decontamination protocol in vegetables	Dr. Malini Nilamudeen Assistant Professor, PRRAL, Agricultural Entomology	1
3	Strengthening the breeder seed production of newly released varieties of vegetables	Ms. Rakhi R. Assistant Professor, Vegetable Science	1
4	Production and quality evaluation of freeze dired coconut	Dr. Sreekala G.S., Assistant Professor, Plantation Crops & Spices	1.5
5	Characterisation and categorization of Indian bee honeys in Kerala based on their origin	Dr. Amritha V.S. Associate Professor & PI, AICRP on Honey Bees & Pollinators, Agricultural Entomology	1
6	Demonstration unit for hydroponics	Dr. Roy Stephen Professor, Plant Physiology	1
7	Optmisation of low cost ripening technology for major fruit varieties of Kerala	Dr. P.R. Geetha Lekshmi, Assistant Professor, Post harvest Technology	1
8	Technology integration in tribal village	Dr. Sreekala G.S., Assistant Professor, Plantation Crops & Spices.	1
9	AI and loT based plant management system	Dr. Geetha Radhakrishnan Assistant Professor, (Computer Science) RARS(SZ), Vellayani	1
10	Creation facilities for Research and transfer of technology	ADR, RARS(SZ), Vellayani	12
11	Karshaka Santhwanam	Dr. Santhoshkumar T. Assistant Professor, Agricultural Entomology	1
12	Growth and defence trade-off in unstable continuum: Exploration root endophytes including *Piriformspora indica* & their biomolecules for enhanced yield and management of biotic and bliotic stress in tropical fruit and vegetable crops (Network Mode)	Dr. Joy M. Professor and Head, FSRS, Kottarakkara	2

List of Scientists in charge of Agricultural Knowledge centres as on 31.12.2021

Sl No.	Name of Block / Panchayath	Name of Nodal Officer	Designation and address
THIRUVANANTHAPURAM			
1.	Athiyanoor	Dr.Radhakrishnan NV	Professor(Agronomy), Coconut Research Station, Balaramapuram
2.	Chiravinkeedru	Mr. ShafeerM	Assistant Professor, COA Vellavani
3.	Pothenkode	Dr.Pramod	Asst. Professsor (Pl.Path.),CoA, Vellayani, Thiruvananthapuram
4.	Kilimanoor	Dr. G.S. Sreedaya	Asst. Professor (Exten.), CoA, Vellavani
5.	Nedumangadu	Dr. SmijaK,	Assistant Professor, Extension COA, Vellavani
6.	Nemom	Dr.NishanMA	Assistant Professor, (Agronomy) COA, Vellavani
7.	Parassala	Dr.Sudha B.	Asst. Professor (Agronomy), IFSRS, Karamana, Thiruvananthapuram
8.	Perumkadavila	Dr. Rajimol R T	Assistant Professor, (SS and AC). COA Vellayani
9.	Vamanapuram	Dr.Sajeena A	Asst. Professor (Pl. Path.), IFSRS, Karaman
10.	Varkala	Dr Smitha Bhasi	Assistant Professor, (Biotechnolory), COA Vellavani
11.	Vellanadu	Dr. Malini Nilamudeen	Assistant Professor, (Entomolory), COA Vellayani
KOLLAM			
12.	Anchal	Dr Sarooj Kumar	Asst Professor (Hort) KVK Kollam
13.	Chadayamangalam	Dr.Santhoshkumar T	Asst. Professor(Agrl.Ento.), CoA. Vellavani
14.	Chavara	Dr.Lekha.M	Asst. Professo(Agrl.Ento.) KVK.Kollam
15.	Chittumala	Dr Ranjan B	Asst. Professor (Agron), FSRS Kottarakkara
16.	Ithikkara	Dr Asha S	Assistant Professor, (Biotechnolory), COA Vellavani

17.	Kottarakkara	Dr.Narayana	Asst. Professo (Agrl. Nematology), CoA, Vellayani
18.	Mughathala	Smt.Shamsiya.A.H	Asst. Professor(Home Science) KVK.Kollam
19.	Oachira	Dr Shanas S	Assistant Professor, Plant Pathology COA Vellavani
20.	Pathanapuram	Dr.Bindu.B	FSRS, Asst. Professor, (Horticulture).
21.	Sasthamkotta	Dr. M.R. Bindu	Professor (Pl. breeding) FSRS Kottarakkara
22.	Vettikavala	Dr.PoornimaYadav	Assistant Professor (Agronomy). KVK. Kollam
PATHANAMTHITTA			
23.	Konni	Dr.Bindu Podikunju	Asst. Professor (Extension), KVK. Kollam
24.	Parakode	Dr.Bini Sam	Programme Coordinator, KVK, Kollam