TAMIL NADU AGRICULTURAL UNIVERSITY

PROCEEDINGS

12th Scientists Meet on Non-Crop Specific Projects
(24th June 2024)

LEAD CENTRE

Directorate of Natural Resource Management &
Directorate of Crop Management
Tamil Nadu Agricultural University
Coimbatore – 641 003

Directorate of Research
Tamil Nadu Agricultural University
Coimbatore 641 003

2024

PROCEEDINGS

12th Scientists Meet on Non-Crop Specific Projects

The 12th Scientists Meet on Non-Crop Specific Projects was conducted on 24.06.2024 at Rasi Seeds Conference Hall, TNAU in which more than 170 scientists participated from all Colleges, Research Stations and KVKs.

Dr. V. Geethalakshmi, Vice Chancellor, TNAU, Coimbatore chaired the meeting and offered opening remarks. Madam emphasized the importance of Soil Resource Inventory, commercialization of Nanoproducts, Wastewater treatment technology and Microbial repository maintenance. It was suggested to popularize the TNAU-AAS Web cum Mobile App, STCR technology, IFS models & Bee keeping to reach more beneficiaries. Research projects on management of weeds through organics, addressing livestock issues may be given priority. Catalogue of Non Apis bee species in different cropping systems may be prepared.

Dr. M. Raveendran, Director of Research welcomed the gatherings and offered introductory remarks. It was suggested to popularize the recently released technologies to the farmers and stakeholders. IFS models developed at TNAU may be compared with that of farmers and location specific recommendations may be given. It was insisted to take up research projects on management of weeds through organics and formulation of botanicals for pests and diseases.

Dr. P. Balasubramaniam, Director (NRM), **Dr. M.K. Kalarani**, Director (CM), **Dr. S. Pazhanivelan**, Director (CWGS) and **Dr. M. Shanthi,** Director (CPPS) presented Action Taken Report on the recommendations of 11th Scientists Meet on Non-Crop Specific Projects, Research Highlights 2023-24 & Action Plan 2024-25 for their respective directorates.

The proceedings of the 12th Scientists Meet on Non-Crop Specific Projects are furnished under the following headings for the Directorates given below:

I. Directorate of Natural Resource Management
II. Directorate of Crop Management
III. Directorate of CWGS
IV. Directorate of CPPS

A. Technologies/Products for Adoption / OFT/ Information
B. Action Plan 2024-2025
C. Research Projects and Remarks for the following Directorates
D. Remarks
E. List of Participants

DIRECTORATE OF NATURAL RESOURCE MANAGEMENT

DEPARTMENT OF SOIL SCIENCE AND AGRICULTURAL CHEMISTRY

A1. For Adoption: Nil

A2. For OFT : 01

Title : Evaluation of TNAU Micronutrient Mixture for the management of micronutrient deficiency and increasing productivity and starch content in Cassava under irrigated condition

Objective

To test verify the recommendation of micronutrient mixture for Cassava under irrigated condition.

Treatments

T_1 : STCR - NPK
T_2 : STCR - NPK + 20 kg S ha^{-1} as Gypsum + 25 kg $ZnSO_4$ ha^{-1} + 10 kg Borax ha^{-1} as basal
T_3 : STCR-NPK + 20 kg TNAU MN mixture as basal (1: 10 ratio as enriched FYM)
T_4 : Farmer's practice

Observations and Analysis

- ✓ Growth and yield attributes
- ✓ Tuber Yield
- ✓ Starch content
- ✓ Micronutrient content & Uptake

Lead centre & Scientists In-charge

Dept. of SS&AC, TNAU, Coimbatore : Dr. S. Suganya, Assoc. Prof. (SS&AC)

Co-ordinating Centres & Scientists In-charge

TCRS, Yethapur	: Dr. M. Velmurugan, Assoc. Prof. (Hort.)
RRS, Paiyur	: Dr. M. Sangeetha, Assoc. Prof. (SS&AC)
KVK, Dharmapuri	: Dr. K. Sivakumar, Assoc. Prof. (SS&AC)

A3. For Information: 11

1. Fortification of TNAU-Water Soluble Fertilizers with Micronutrients

Laboratory experiment was conducted to fortify the TNAU water soluble fertilizers with micronutrients. Maximum zinc and iron contents were registered at higher levels of fortification of $ZnSO_4$ @ 2.0% and $FeSO_4$ @ 3.0% respectively.

2. Fertigation of TNAU-WSF for high value crops under protected cultivation

The results revealed that the fertigation of TNAU-WSF (19:19:19) @ 120 kg ha^{-1} recorded significantly higher fruit yield of Capsicum (85.2 t ha^{-1}) with B:C ratio of 2.86. Fertigation with 100% RDF through straight fertilizers recorded fruit yield of 53.2 t ha^{-1} with B:C ratio of 1.92. Similarly in Cucumber Fertigation of TNAU-WSF (19:19:19) @ 60 kg ha^{-1} recorded significantly higher fruit yield (73.9 t ha^{-1}) with B:C ratio of 2.23. Fertigation with 100% RDF through straight fertilizers recorded fruit yield of 49.5 t ha^{-1} with B:C ratio of 1.61.

3. Field Scale Evaluation of *Talinum fruticosum* on Sodic Soil

Initial growth performance (in terms of height) of *Sesuvium portulocastrum* was higher in sodic soil compared to *Talinum fruiticosum*. Application of fertilizer improved the growth of both crops (*T. fruiticosum* & *S. portulocastrum*) in sodic soil. Biomass production was higher in *S. portulocastrum* followed by *T. fruiticosum*. *T. fruiticosum* (underutilized plant) can be tried as alternative green fodder.

4. Assessment of soil carbon determination and carbon credit activities for facilitating Carbon farming Initiative in Agriculture

To initiate Carbon farming, documentation of the carbon credit activities and soil carbon measurement was carried out in the eight cropping system of Eastern block farm of TNAU. Among that, higher GHG emission was predicted with annual crops like sugarcane and maize when compared to perennial crops. High sequestration of Carbon in the surface and subsurface samples were observed in the Perennials. Using software tool, GHG emission were calculated and carbon credits was worked out. Totally 12 soil carbon credits can be credited in the Farm (only action based).

5. Effect of K fertilization on Na:K homeostasis, K acquisition efficiency and grain quality of crops in saline and alkali soils under rainfed condition

The results of the pot culture experiment showed that the higher levels of K application increased the availability of NPK in soils and the green gram grain and haulm yield. The highest yield was observed in 150% ST-K applied pot followed by the 125% ST-K in both saline and sodic soils. The increase in K levels increased grain 13-37% and straw 7-10% yield in alkali soil 125 & 150% K levels were on par.

6. Sustainable soil development for cultivation of Groundnut and soil quality of Theri land (Red sand dune)

The results revealed that the application of recommended NPK (25:50:75 kg/ha) along with Tank silt @ 100 t/ha and fly ash @ 20 t/ha improved the physico-chemical properties of soil *viz*., bulk density (1.32Mg m^{-3}), water holding capacity (173.8 mm/m), pH (6.9), EC (0.34 d Sm^{-1}), organic carbon (0.62%), available NPK (243, 17.5 and 194 kg/ha, respectively) and produced maximum haulm (6490 kg/ha) and pod yield (2530 kg/ha) of Groundnut.

7. Development of Spatial Variability Map for Soil Fertility of SRS Farm, Cuddalore using GIS

The results from the analysis of surface soil samples indicated that the SRS farm soil was neutral to slightly alkaline in reaction and non-saline in nature. Organic carbon content was low to medium; available N, P, K and S were low to medium, medium, medium to high, and medium to high, respectively. More than 80 % of the soil was sufficient in terms of available Cu, Fe and Mn content. With respect to available Zn, 58 % of the soil was below the critical level and 42 % of the soil was sufficient. The study indicated that it is necessary to replenish the farm soil with organics, green manures and inorganic sources of nutrients for enhancing nutrient use efficiency, maximizing crop productivity and sustaining soil fertility. Hence, the adoption of the STCR-IPNS nutrient management approach will provide balanced nutrition to crops, which in turn will be helpful in maintaining soil health and enhancing the yield of crops grown on the farm.

Irrigation water samples collected from bore well sources of motors no. 1, 3, 16, 25, 47 and 63 showed a neutral soil reaction. Water samples collected from motors no. 3, 16, 25, 47 and 63 falls under the good category (EC <2 dS m^{-1}; SAR <10; RSC <2.5 meq l^{-1}) and water samples collected from motor no. 1 was categorized under the marginally saline category (EC 2-4 dS m^{-1}; SAR <10; RSC <2.5 meq l^{-1}).

8. Development of electrochemical sensor tool for soil health analysis

A simple electrochemical sensor kit was developed in collaboration with the Central Electrochemical Research Institute, Karaikudi. The soil pH and EC were found equivalent in both the methods and showed less variance of 5 and 7 % respectively. Available potassium was found equivalent in both the methods and showed less variation of 8, 7 and 11 in neutral, acid and alkaline soils respectively. Available phosphorus showed a higher variation of 17 % in acid soil and needs to fine-tune the extractant. Available nitrogen showed a higher variation of 28, 31 and 21 percent in neutral, acid and alkaline soils respectively. The soil sample preparation and extractant needs to be adjusted for reducing the variation.

9. Hyperspectral reflectance and multi-nutrient extractant based rapid assessment of soil properties for sustainable soil health in India

A study on comprehensive assessment of various multi-nutrient extractants against the established standard method for soil nutrient analysis involving collection of 271 soil samples was carried out. The analysis of 243 surface soil samples (0 to 15 cm depth) obtained from different districts of Tamil Nadu and Kerala showed that, pH ranged from 3.70 to 9.09, EC values from 0.01 to 2.32 dS m^{-1}, free $CaCO_3$ ranged from 0.5 to23.0 % and organic carbon ranged from 0.02 to 5.44 %. The available N levels ranged 68 to 596 kg ha^{-1}, available P from 4 to 350 kg ha^{-1}, and available K from 12 to 1998 kg ha^{-1} were recorded. The available S, Zn, Fe, Cu, Mn and B ranged,from 1.7 to 217.4 mg kg^{-1}, 0.01 to 4.35 mg kg^{-1}, 0.17 to 22.42 mg kg^{-1}, 0.16 to 9.13 mg kg^{-1}, 0.01 to 20.08 mg kg^{-1} and 0.01 to 3.9 mg kg^{-1}. The same soil samples were analysed using AB-DTPA extractant. The employment of the AB-DTPA extractant showed that

available P ranging from 5.4 to 102 kg ha^{-1}, available K: 34 to 1700 kg ha^{-1}, available Zn: 0.01 to 5.41 mg kg^{-1}, available Fe: 5.14 to 28.77 mg kg^{-1}, available Cu: 0.39 to 17.30 mg kg^{-1} and available Mn: 4.99 to 20.20 mg kg^{-1}.

10. ICAR - AICRP on "Micro and Secondary Nutrients and Pollutant Elements in Soils and Plants"-Delineation and reassessment of micro and secondary nutrients deficient areas and updating soil fertility maps of Tamil Nadu

The assessment of secondary and micronutrient status in the soils and plants of Salem and Namakkal districts showed no Ca and Mg deficiency with very high fertility rating and S deficiency to a tune of 24.8% in Salem district while in Namakkal district, the deficiency is only 1% with adequate to high soil fertility rating. As regards to the micronutrients, the soils of both the districts were predominantly deficient in B and Zn with low to marginal soil fertility rating. The deficiency of Fe, Mn and Cu is less than 10% in both the districts.

11. Survey and characterization of ground water of Coastal districts of Tamil Nadu for Irrigation

A study was undertaken to assess the groundwater quality of coastal district of Tamil Nadu . A total of 150 samples were collected based on a grid survey using portable GPS receiver from different blocks of the Kanchipuram district in Tamil Nadu. Out of 150 samples collected, it was found that 57 percentage of the samples of Kanchipuram districts comes under alkalinity problem which warrants the application of Gypsum either through irrigation water or through soil application based on the RSC of irrigation water.

B. Remarks of the individual Non - Crop Specific Projects (NCSP) – 2024

S. No.	Project No. and Title	Project leader(s) / Co-Project Leader(s)	Duration	Remarks
Action Plan Projects				
1.	Development and evaluation of TNAU Micronutrient Mixtures for major fruits	**Dr. M. Elayarajan,** Prof. (SS&AC), Dept. of SS&AC, TNAU, Coimbatore **Dr. S. Suganya** Assoc. Prof. (SS&AC), Dept. of SS&AC, TNAU, Coimbatore **Dr. S. Saraswathi** Prof. and Head, Dept. of Fruit Science, HC&RI, Periyakulam **Dr. K. Rajadurai,** Professor (Hort.) **Dr. M. Sangeetha,** Assoc. Prof. (SS&AC), RRS, Paiyur	September, 2023-August 2024	• The project is to be continued as per the technical programme
2.	NRM /CBE /SAC /Non crop/ 2023/ 242 Fortification of TNAU-Water Soluble Fertilizers with Micronutrients	**Dr. R.K. Kaleeswari** Professor & Head, Dept. of SS&AC HC & RI (W), Trichy **Dr. A. Renukadevi,** Assoc. Prof. (SS&AC), KVK, Pongalur	June, 2023 - May 2024	• Findings may be given for information • The project may be closed and completion report is to be submitted for approval
3.	Fertigation of TNAU-WSF for High Value Crops Under Protected Cultivation	**Dr. R.K. Kaleeswari** Professor & Head, Dept. of SS&AC HC & RI (W), Trichy **Dr. M. Sangeetha** Assoc. Prof. (SS & AC), RRS, Paiyur **Dr. K. Sivakumar** Assoc. Prof. (SS & AC), Dept. of SS&AC TNAU, Coimbatore **Dr. Srividhya** Assoc. Prof. (Hort.)	June, 2023 - May 2024	• Findings may be given for information. • The project is to be continued for one more year as confirmation trial
4.	Field Scale Evaluation of *Talinum fruticosum* on Sodic soil	**Dr. K. Manikandan** Assistant Prof. (SS&AC), Killikullam **Dr. S. Suresh**	April, 2022 to March, 2024	• Findings may be given for information • The Project may be closed

S. No.	Project No. and Title	Project leader(s) / Co-Project Leader(s)	Duration	Remarks
		Prof. (SS&AC), KVK, Thirupathisaram **Dr. V. Dhanuskodi** Asst. Prof. (SS&AC), ADAC&RI, Trichy **Dr. T. Balaji,** Asst. Prof. (SS&AC), KVK, Arappukottai		and completion report may be submitted
5.	Assessment of soil carbon determination and carbon credit activities for facilitating Carbon farming Initiative in Agriculture	**Dr. K. Sathiya Bama** Professor (SS&AC), Dept of SS & AC TNAU, Coimbatore **Dr. S.P. Sangeetha,** Asst. Prof. (AGR), Dept. of Agronomy, TNAU, Cbe **Dr. Raju,** Professor (AGR), Dept. of Agronomy, TNAU, Coimbatore	May,2023 - April 2025	• Findings may be given for information • The project is to be continued as per the technical programme
	Validation Project			
6.	**NASF/ACRI/MDU/DSE/2020/R007** Development of electrochemical sensor tool for soil health analysis	**Dr. P. Kannan,** Associate Professor (SS&AC), CWGS, TNAU, Coimbatore **Dr. M. Vijayakumar** Assistant Professor (SS & AC) AC &RI, Kudumiyanmalai **Dr. G. Sridevi,** Asst. Professor (SS & AC), Dept. of SS&AC, TNAU, Cbe	2023-2024	• Findings may be given for information • Validation is to be continued
7.	**AICRP/NRM/CBE/SAC/002** Validation of Fertilizer Prescription Equations under IPNS for Bhendi under Drip Fertigation	**Dr. R. Rajeswari,** Assistant Professor (SS&AC), TNAU, Coimbatore **Dr. S. Maragatham,** Professor (SS&AC), TNAU, Coimbatore **Dr. P. Malathi,** Associate Professor (SS&AC) TNAU, Coimbatore	2023 to 2025	• Findings may be given for information • The project is to be continued • STCR technology is to be popularized
	OFT			

S. No.	Project No. and Title	Project leader(s) / Co-Project Leader(s)	Duration	Remarks
8.	Evaluation of Micronutrient Mixture for the management of micronutrient deficiency and increasing productivity and starch content in cassava under irrigated condition	**Dr. S. Suganya** Assoc. Prof. (SS&AC), Dept. of SS&AC TNAU, Coimbatore **Dr. M. Velmurugan** Assoc. Prof. (Hort.), TCRS, Yethapur **Dr. M. Sangeetha** Assoc. Prof. (SS&AC), RRS, Paiyur **Dr. K. Sivakumar** Assoc. Prof. (SS&AC), KVK, Dharmapuri	2023-2024	• The project is to be continued as per the technical programme
	University Research Projects			
9.	**NRM/CBE/SAC/2020/002** Effect of K fertilization on K^+: Na^+ homeostasis, K acquisition efficiency and grain quality of crops in saline and alkali soils under rainfed condition.	**Dr. P. Janaki** Professor (SS&AC), Dept. of SS&AC Nammazhvar Organic Farming Research Centre TNAU, Coimbatore	January, 2021 - December, 2023	• Findings may be given for information • The project is to be continued for one more year under partially irrigated conditions
10.	**NRM/KKM/SAC/2020/003** Sustainable soil development for cultivation of Groundnut (*Arachis hypogea* L.) and soil quality of Theri land (Red sand dune)	**Dr. M. Paramasivan** Asst. Professor (SS&AC), Dept. of SS & AC, AC & RI, Killikulam	April, 2021 – March, 2024	• Statistical analysis is to be completed and completion report is to be submitted
11.	Development of Spatial Variability Map for Soil Fertility of SRS Farm, Cuddalore Using GIS	**Dr. G. Porkodi,** Asst. Professor (SS&AC), SRS, Cuddalore **Dr. R. Jagadeeswaran** Professor (SS&AC), TNAU, Coimbatore	Jan,2023-Dec 2023	• The project may be closed and completion report is to be submitted
	TNAU Funded Project			
12.	Profiling selected bench mark soil series of Tamil Nadu	**Dr. K.M. Sellamuthu** Professor (SS & AC), TNAU, Coimbatore **Dr. R. Jagadeeswaran** Professor (SS & AC), Dept. of RS&GIS TNAU, Coimbatore	September 2022-March 2024	• Findings may be given for information • Completion report is to be submitted

S. No.	Project No. and Title	Project leader(s) / Co-Project Leader(s)	Duration	Remarks
		Dr. R. Santhi, Prof. and Head (SS&AC) Dept. of SS & AC, TNAU, Coimbatore **Dr. D. Selvi,** Professor & Head, Dept. of SS & AC, TNAU, Coimbatore **Dr. K. Sivakumar,** Assoc. Prof. (SS&AC), TNAU, Coimbatore		
	Externally Funded Projects			
13.	**NASF/NRM/CBE/SSAC/R001** Hyperspectral reflectance and multi-nutrient extractant based rapid assessment of soil properties for sustainable soil health in India	**Dr. S. Maragatham** Professor (SS&AC), Dept. of SS&AC TNAU, Coimbatore **Dr. M. Gopalakrishnan** Associate Professor (SS&AC), DNRM TNAU, Coimbatore	September 2022 to August 2025	• The project is to be continued as per the technical programme.
	All India Coordinated Research Projects (AICRP)			
14.	**AICRP/NRM/CBE/SAC/004** ICAR - AICRP on "Micro and Secondary Nutrients and Pollutant Elements in Soils and Plants" Program No.1: Delineation and reassessment of micro and secondary nutrients deficient areas and updating soil fertility maps of Tamil Nadu	**Dr. M. Elayarajan** Professor (SS&AC), Dept. of SS&AC TNAU, Coimbatore **Dr. S. Suganya** Assoc. Prof. (SS&AC), Dept. of SS&AC TNAU, Coimbatore	2020 – continuous	• Findings may be given for information • To be continued as per AICRP technical programme
15.	**AICRP/NRM/TRY/005** Survey and characterization of ground water of Coastal districts of Tamil Nadu for Irrigation.	**Dr. M. Baskar** Professor and Head, Dept. of Soil Science & Agrl. Chemistry, ADAC&RI, Trichy	April, 2022 - March, 2024	• Findings may be given for information • To be continued as per AICRP technical programme

AGRICULTURAL MICROBIOLOGY

A1. For Adoption: Nil

A2. For OFT: Nil

A3. For Information

1. Bio-Pellet formulation of NPK bio-inoculants and testing its bio-efficacy

Bio-pellets were prepared with beneficial bacteria (*Azospirillum brasilense* Sp7, Bacillus megaterium PB1 and *Rhizobium pusense* KSBKKM1) and the pellet formulation was standardized (Talc, compost, oil based degradable polymer, cyclodextrin, and bacteria). The bacterial load in the biopellets was assessed for eight months and the formulation is supporting a total bacterial count of 6x1010 CFU per gram dry weight of the bio pellet.

2. Development of thermotolerant *Bacillus* isolates for plant growth promotion

From compost and rice rhizosphere soil, 7 bacterial isolates were identified as *B. cereus*, *Pseudomonas stutzerii, B. altitudinis,* (ComB2, ComB3, ComB10, RRBN2, RRBN3, RRBPK1 and RRBPK2). The isolates from compost can survive between 40 to 65°C and rice rhizosphere isolate ranges between 40 to 55 °C. The isolates were also confirmed for the PGPR traits like IAA production, phosphorus solubilization, urease activity, ammonia and HCN production.

3. Development of Farmer-friendly on-site sensors for soil health assessment

Continuous application of organic manure with or without balanced chemical fertilizers significantly contributed to the carbon stock of topsoil under an intensive cropping system in 109-years old permanent manurial experimental soil. Organic nutrient management improved both the active and passive pool of carbon and quality of humic substances and subsequently the biological quality of the soil. Present study suggests that substrate-induced respiration, dehydrogenase, alkaline phosphatase, and mineralizable nitrogen could be the sensitive indicators that could be used to measure through sensors and probes.

4. Nano-formulated plant probiotic *Bacillus altitudinis* FD48 and their metabolites for induced drought protection, plant defense, and enhanced productivity in rice

Compatible polymers and surfactants such as Pectin, Glycerol, and Tween 20 were optimized for the preparation of suitable nano-formulation for FD48. Prepared nano-fomulation was assessed for their stability and characterization which revealed a particle size of 198.2 nm and PDI of 0.986 and it maintained stability. Further, the nano formulation characterized in FTIR evidenced the chemical interaction between the functional group of FD48 cells and the polymer altered the surface of the nano-

formulated FD48 cells. Besides, the film-forming capability of the developed formulation ensures the controlled or sustained release of microbial cells at the target site. The developed nano-formulation increased the survival viability of FD48 cells. It maintained a population of 1010 CFU.mL-1 up to 6 months of storage. The plant growth-promoting traits such as nutrient solubilization and IAA production were preserved in FD48 when ensconced in nano-emulsion. Seeds bacterized with nano-formulated FD48 improved seed germination (17% increase over control) and root length (53% increase over control) in rice plants in the osmotic potential of -0.46 Mpa (PEG 6000).

5. Development of process for laccase production by *Hexagonia hirta* MSF2 using coconut industry wastes and recovery of biochemical

Hexagonia hirta MSF2 produced laccase in solid-state fermentation using coir pith wastes. The laccase produced by *H. hirta* using coir pith substrate was 1585.24 U/g db (dry biomass) under optimized conditions through RSM. The maximum activity and stability of laccase was achieved at pH 4.0 and temperature of 40°C. Organic solvents like DMSO and methanol, and metal ions like $BaCl_2$, $CaCl_2$, $CuSO_4$, and $MnCI_2$ stimulated the laccase activity. Inhibitors like sodium azide and thiourea strongly inhibited the enzyme activity. Besides, the laccase production through solid state fermentation using coir pith substrates simultaneously delignify the lignin present in the coir pith which was confirmed through SEM and FT-IR analysis. Further, metabolic profiling of the coir pith spent medium using GC-MS revealed many aromatic compounds like vanillin, vanilic acid, phenol, catechol and 4-Hydroxy Benzaldehyde were identified.

6. Bioprocessing of Natural Fibres and Agro residues for Production of Oligosaccharides and Starch

Novel enzolv process bio delignification of biomass substrate pretreatment was optimized for maximum cellulose recovery in Banana fibre. From the optimized Enzolv pretreated hydrolysate of banana fiber, industrially important lignin-derived aromatic compounds like Vanillin, 4-Hydroxy Benzaldehyde and Butylated Hydroxytolune were identified via GC-MS analysis. Novel enzolv process for maximum lignin reduction in cotton waste was pre-optimized and statistically optimized in order to focus on the lignin-derived aromatic compounds.

7. Development of Protein based Biostimulant for enhancing crop growth

Mixed culturing of the three bacterial cultures *viz.*, *Bacillus altitudinis*, *Rhizobium rhizogenes* and *R. leguminosarum* yielded significantly higher quantity of EPS (13%) than single inoculations and these three cultures can be exploited for bacterial EPS production.

8. Designing and development of Smart microbial consortium for enhancing nutrient use efficiency

Twelve bacterial cultures (*viz., Methylobacterium thiocyanatum* VRI7-A4, *Azospirillum brasilense* CW903, *Bacillus altitudinis* SSB4, *Bacillus aryabhattai* KSB N2K7, *Peribacillus endoradicis* CE10, *Priestia endophytica* NE14, *Pseudomonas chlororaphis* ZSB15-M2, *Azospirillum lipoferum* AZ204, *Azospirillum brasilense* SP7, *Rhizobium*

leguminosarum, Bacillus megaterium, Paenibacillus mucilaginosous) were obtained from the Department of Agrl. Microbiology, Coimbatore and Madurai towards evaluation for nutrient use efficiency under field condition. Two field trials were initiated in Maize and Sorghum under irrigated conditions. All these cultures were applied through seed and soil. Maize COH 6 and Black Gram VBN 8 were used. Black gram crop is harvested and the experiment on Maize is under progress.

9. Dissemination of Arbuscular Mycorrhizal fungi (AM fungi) production technology to enhance and empower the livelihood of farm women in Tamil Nadu

Bioresource complex for mass production of AM fungal biofertilizer was established. Among the different villages Achunthanvayal and RS Madai was taken as model village. Market linkages were created through Agricultural marketing, ATMA, NABARD, EDII, KABIF, KVK and NGO's to generate income to rural poor and women entrepreneurs for AM fungal biofertilizer. Trainings, demonstrations, creation of awareness, guidance and suggestions were given to the farm women to mass produce AM fungi at periodic intervals. Hands on trainings, demonstrations, social media approach such as radio talks, distribution of leaflets, pamphlets, one to one farmer's programmes, creating awareness among the farmers through interaction meetings were conducted to rural farm women and women self-help groups about mass production of AM fungal biofertilizer.

10. Investigation on the effect of AM fungi and PGPR against panama wilt in banana caused by *Fusarium oxysporum* f. sp. *Cubense*

Two strains of AM fungi (*Glomus* sp & *Acaulospora* sp) were screened based on IP number/gram of inocula & one strain of PGPR (*Bacillus* sp) was screened based on the antagonistic potential against Foc for evaluating their biocontrol potential against Foc under a field trial in banana. Observations on disease incidence percentage and crop growth showed AM fungi 1 + PGPR + Foc and AM fungi 2 + PGPR + Foc to be best performers in exhibiting the antagonistic activity reducing the disease incidence percentage up to 50 % as well as registering significant difference with pathogen inoculated only in promoting plant growth.

C. Remarks on the ongoing Action Plans /URPs/ Core/ AICRPs/ Externally Funded Projects:

S. No.	Project number and title	Name and Designation of the Project leader	Duration	Project wise remarks
	UNIVERSITY RESEARCH PROJECT			
1.	**NRM/MDU/AGM/2020/002** Development of thermotolerant *Bacillus* isolates for plant growth promotion	**Dr. R. Uma Sankareswari** Asst. Professor (Agrl. Micro.), Dr. MSS AC & RI, Eachangkottai	Sep 2020 to August, 2023, extended up to August, 2024	To be continued
2.	**NRM/TRY/AGM/2020/001** Influence of AM fungal association on growth and root biomass production of Ashwagandha (*Withania somnifera* L.) in sodic soil	**Dr. L. Srimathi Priya** Asst. Professor (Agrl. Micro.), HC & RI, Periyakulam	Sept. 2020 – August 2023 extended up to August, 2024	Completion report may be submitted
	Action Plan			
3.	Bio-capsule/Pellet formulation of NPK bio-inoculants and testing its bio-efficacy	**Lead centre** **Dr. B. Jeberlin Prabina**, Professor (Agrl. Micro.), Dept. of SS & AC., Killikulam **Dr. S. Suresh,** Prof. (SS&AC) ARS, Thirupathisaram **Sub centre** **Dr. D. Balachandar,** Professor, Dept. of Agrl. Micro. TNAU, Cbe **Dr. K. Kumutha,** Prof & Head, Dept. of Agrl. Micro., AC&RI., Madurai	2021-2024	To be continued
	AICRP			
4.	**AICRP/NRM/CBE/AGM/001** All India Network Project on Soil Biodiversity and Biofertilizers	**Dr. D. Balachandar** Prof. (Agrl. Micro.), Dept. of Agrl. Microbiology TNAU, Cbe **Dr. M. Gnanachitra** Prof. (Agrl. Micro.), Dept. of Agrl. Micro. TNAU, Coimbatore	ICAR-AICRIP	To be continued
	EXTERNALLY FUNDED PROJECTS			

5.	**SERB/NRM/AGM/CBE/2021/R026** Development of process for laccase production by *Hexagonia hirta* MSF2 using coconut industry wastes and recovery of biochemical (E28AFM)	**Dr. U. Sivakumar** Professor (Agrl. Micro.) & Head, Dept. of Agrl. Micro. TNAU, Coimbatore	30.12.2020 – 29.11.2023	Completion report may be submitted
6.	**ICAR/NRM/CBE/AGM/202/R002.** Bio-proccessing of Natural Fibres and Agro residues for Production of Oligo-saccharides and Starch	**Dr. U. Sivakumar** Professor (Agrl. Micro.) & Head, Dept. of Agrl. Micro. TNAU, Coimbatore	2021-2024	To be continued
7.	**SERB/NRM/AGM/CBE/2021/R001:** Nano-formulated plant probiotic *Bacillus altitudinis* FD48 and their metabolites for induced drought protection, plant defense and enhanced productivity in Rice.	**Dr. U. Sivakumar** Professor (Agrl. Micro.) & Head, Dept. of Agrl. Micro. TNAU, Coimbatore	2020-2023	To be continued with extension proposal
8.	Application of Microorganisms in Agriculture and Allied Sector Net work Project	**Dr. D. Balachandar** Professor (Agrl. Micro.), Dept. of Agrl. Micro. TNAU, Coimbatore	ICAR-AMMAS	To be continued
9.	Development of farmers friendly on-site sensors of soil health assessment	**Dr. D. Balachandar** Professor (Agrl. Micro.), Dept. of Agrl. Micro. TNAU, Coimbatore	DST – SERB - SURE	To be continued
10.	**NRM/ MDU/ AGM/ NON-CROP/ 2024/043** Development of Protein based Biostimulant for enhancing crop growth	**Dr. K. Kumutha** Professor (Agrl. Micro.), Dept. of Agrl. Micro., AC and RI, Madurai	October 2023 to September 2025	To be continued
11.	**BRNS/ACRI/MDU/AGM/2023/R001** Designing and Development of Smart Microbial Consortium for Enhancing Nutrient Use Efficiency	**Dr. K. Kumutha** Professor (Agrl. Micro.), Dept. of Agrl. Micro., AC & RI, Madurai	October 2023 to September 2026	To be continued
12.	**DBT/AGM/KKM/SAC/2018/RO11:** The Spatio temporal documentation of the phyllosphere microorganisms in different agricultural ecosystems through foldscope	**Dr. M. Gomathy** Asst. Professor (Agrl. Micro.), Dept. of SS&AC, Killikulam	2018-2022	Foliar spray of 1% yeast can be evaluated in other crops at critical stage of crop growth (Tomato)
13.	**DBT/ACRI/KKM/AGM/2021//R001:**	**Dr. M. Gomathy**	2021-2024	To be continued

	Dissemination of AM fungi production technology to enhance and empower the livelihood of farm women in the Aspirational district (Ramanathapuram) of TamilNadu	Asst. Professor (Agrl. Micro.), Dept. of SS&AC, Killikulam		
14.	**TNSCST/HCRI/TRY/HOR/2021/R002** Investigation on the effect of AM fungi and PGPR against panama wilt in banana caused by *Fusarium oxysporum* f. sp*. cubense*"	**Dr. L. Srimathi Priya** Asst. Professor (Agrl. Micro.), HC&RI, Periyakulam	April 2021 – March 2023	Completion report may be submitted
	CPMB			
1.	**CPMB/CBE /PMB/2021/002** Computational approaches for analysis of phytochemicals of *Ortho siphonstamineus* against urolithiasi*s*, anti-inflammatory activity and anticancer activity and development of data base	**Dr. N. Bharathi** Asst. Professor, Dept. of Plant Biotechnology, CPMB&B, TNAU, Coimbatore	August 2021 to August 2023	Completion report may be submitted
2.	**CPMB/CBE/ PL.BIO/ Non-I 2022 I 001.** Assessment of the antimicrobial and insecticidal activity of the nimbolide and its hybrid molecules	**Dr. V.P. Santhanakrishnan** Associate Professor	June 2022-May 2024	Completion report may be submitted
3.	**TNAU/CPMB/CBE/DPB/2019/R035** Cloning and characterization of novel biocidal protein genes from indigenous isolates of *Bacillus thuringiensis*	**Dr. S. Mohankumar,** Professor, DPB, CPMB&B, TNAU, Coimbatore	03-10-2019 to 30-09-2024	To be continued

DEPARTMENT OF ENVIRONMENTAL SCIENCES

A. For Adoption: 01

1. Tree Species Suitable for Urban Forestry and Improved Air Quality

- Air Pollution Tolerance Index (APTI) and Anticipated Performance Index (API) of 38 tree species were assessed and classified as highly tolerant (1), tolerant (4), moderately tolerant (18) and sensitive (15).
- From APTI and API, the following tree species are recommended for urban planting to reduce principal air pollutants.

Recommended Tree Species

Highly tolerant and tolerant

1. Sacred fig (*Ficus religiosa*) – APTI: 30.55; API: 87.50
2. False Ashoka Tree (*Polyalthia longifolia*) - APTI 25.80; API: 75.00
3. Manila Tamarind (*Pithecellobium dulce*) - APTI 19.17; API: 87.50
4. Rain tree (*Samanea saman*) - APTI 18.36; API: 81.25
5. Portia Tree (*Thespesia populnea*) - APTI 17.15; API: 81.25

Moderately tolerant

1. Stone apple (*Aegle marmelos)* - APTI 15.94; API: 50
2. Tamarind (*Tamarindus indica*) - APTI 14.25; API: 75
3. Wax apple (*Syzygium samarangense*) - APTI 14.21; API: 68.75
4. Cluster fig (*Ficus racemosa*) - APTI 13.01; API: 75.00
5. Neem (*Azadirachta indica*) - APTI 12.70; API: 75.00

A2. For OFT / Validation: 02

1. Effective Microbial (EM) formulation and its potential in waste treatment

Treatment details

Sewage water treatment experiment	Composting experiment
T1 - Control (Sewage water)	T1 - Control (Vegetable waste)
T2 - Sewage water + 3 % EM	T2 - Vegetable waste + 3 % EM

Replication: 3

Locations: 5
Duration: July 2023 to April 2024

Scientists In-charge

Dr. P. Kalaiselvi KVK, Sandhiyur, Salem
Dr. A. Bharani, Department of ENS, TNAU, CBE
Dr. E. Parameswari, NOFRC, DCM, TNAU, CBE
Dr. S. Paul Sebastian, AC&RI, Kudumiyanmalai
Dr. S. Shenbagavalli, HC&RI, Periyakulam
Dr. A. Krishnaveni, HC&RI, Paiyur

2. Evaluation of *In-situ* decomposition Potential of Maize stalks by using TNAU Biomineralizer

Objectives

To assess the *in situ* degradative ability of the TNAU Biomineralizer on Maize stalks

Treatments

T_1 - Maize stalks (Natural degradation)
T_2 - 100% Maize stalks incorporated in soil using rotavator and applied with TNAU biomineralizer + 100% Urea for balancing C:N ratio of 30:1
T_3 - 100% Maize stalks incorporated in soil using rotavator and applied with TNAU biomineralizer + 75% Urea for balancing C:N ratio of 30:1

Period: One year (2024-2025)

Lead centre & Scientist In-charge:

Dr. V. Davamani, Associate Professor (ENS), DNRM, TNAU, Coimbatore

Co-ordinating Centres & Scientists In-charge:

Dr. P. Kalaiselvi, Associate Professor (ENS), KVK, Salem
Dr. T. Selvakumar, Associate Professor (AGR) & Head, MRS, Vagarai
Dr. S. Paul Sebastian, Associate Professor (ENS), AC & RI, Kudumiyanmalai
Dr. M. Selvamurugan, Assistant Professor (ENS), HC&RI(W), Trichy

A3. For Information: 22
THEME AREA I: Bioremediation of Polluted Environments

1. Hydrochar from wet bio-waste materials and its environmental application

- Optimized conditions for the production of hydrochar from vegetable and fruit waste as 180°C, 4 hours with a liquid solid ratio of 9:1
- Activation with Potassium citrate (1:2) @800°C for 6h produces mesoporous and amorphous carbon which facilitates absorption
- In blackgram, 1% Hydrochar leachate spray enhances the seed germination by 18.55% and vigour index by 45.29%.

2. Eco-Restoration of Coimbatore Lakes with Floating Wetlands

- Standardized the method for the development of durable, flexible and sturdy floating platform to design "Vetiver based floating wetlands" that are efficient in treating lake waters. Water quality indices were improved in a period of five months of installation.
- Pollutant removal efficiency in lake water with VFW is in the order of Nitrates (78%) > Phosphates (52%) > Sulphates (37%) > Total Solids (35 %) > Chlorides (33 %) > BOD (29 %) and COD (27 %).
- In a given area of lake, a minimum of 1 % needs to be covered with VFWs to achieve quantifiable results. VFWs were very efficient in removal of nitrates and phosphates, thus minimizing the eutrophication of lakes in the future.

3. Potential of biostimulants on soil health and crop growth in polluted soils

- Sea Weed Extract was found to contain significant level of nutrients and growth hormones like IAA, Auxin, Gibberellins and cytokinin**.**
- In Tomato grown in tannery contaminated soil with 195 mg kg^{-1} of chromium application of Seaweed extract (0.2%) recorded a higher yield of 25.6 t/ha when compared to control (20 t/ha) and reduced the total chromium content to 178 mg $kg^{-1.}$
- Soluble protein (17.50 mg g^{-1}), lycopene (4.56 mg 100 g^{-1}) and beta carotene (0.94 mg 100 g^{-1}) contents were also high in sea weed extract (0.2%) treated soil when compared to other biostimulants.

4. Enhancement of phytoextraction potential through chelators and subsequent recovery of chromium using Guinea grass (*Panicum maximum*)

- For enhancing the bioavailable fractions of chromium in soil and subsequent removal through plants, the organic chelators *viz*., Oxalic acid, Gluconic acid, and Citric acid, the synthetic chelator *viz*., EDTA, and the organic amendments such as Vermicompost and FYM were tried.
- Among the chelators, citric acid @ 5 m mol kg^{-1} concentration enhanced the bio available fractions of chromium in soil (Water soluble, 89.45 mg kg^{-1} and Exchangeable, 47.98 mg kg^{-1})
- The highest Cr (VI) accumulation in shoots of guinea grass was recorded with citric acid 5 mmol/kg (2.94 mg kg^{-1}), followed by EDTA @ 5mmol/kg (2.42 mg kg^{-1}).
- The highest crude protein (9.3%), crude fibre (18.93 %) and fat content (31%) were observed with citric acid application @ 5mmol/kg.

5. Algal Biomass for Bioremediation of Heavy Metal in Tannery Effluent Polluted Soil

- From the tannery effluent contaminated sites, algal species were isolated and identified as *Chlorella* spp*., Scenedesmus* spp., and *Chlamydomonas* spp. It was found to reduce the total chromium from 957 ppm to 387 ppm in tannery effluent contaminated soil.

6. Fate and remediation of mixed contaminants in soil

- Mixed contaminants alter the root architecture of marigold due to the presence of root inhibitor, 2- methyl cortisol and affects the plant growth
- Application of biochar at 5 t ha^{-1} reduced the negative effects of mixed contaminants *viz.*, Cr, Cd and PFOA in soil. Reduction in soil chromium (68.3%), cadmium (52.7%), and PFOS (92%) were recorded with biochar application; whereas, humic acid application @ 20 kg ha^{-1} reduced the chromium and cadmium by about 48.5% and 40.1%, respectively,
- Addition of humic acid @20 kg/ha or biochar @5 t/ha along with the hyper accumulator plant, marigold can be recommended to manage the Cd, Cr and PFOS contaminated soil

THEME AREA II: Wastewater Treatment and Recycling

7. Rhizobiology of reed plants and its role in water quality improvement for effective recycling

- The efficiency of removal of pollutants in sewage and paper mill effluent with reed plants falls in the order of Indian shot (*Canna indica)* > Cattail (*Typha latifolia)* > Yam (*Colocassia esculenta)* > Taro (*Xanthosoma sagittifolium*).
- Among the reed plants tested, *Canna indica* performed better in pollutant removal (BOD (69%), COD (58%), TDS (57%) and coli form (70%) followed by *Typha latifolia* which recorded a reduction in BOD (62), COD (52), TDS (51) and coli form population (60%)
- Since the Reed plant, *Canna indica* performed better among the reed plants tested in reducing the pollutants and coliform population in a retention time of 7 days, it can be recommended in constructed wetland system for treating sewage and paper mill effluent.

8. Impact of treated paper and pulp industry effluent on soil and crops

- Monitoring studies revealed that the soil and ground water samples collected from benchmark sites of treated paper and board mill effluent irrigated areas of Karur (TNPL-Unit I), Trichy (TNPL Unit II), Pallipalayam (SPB), Thekkampatty (ITC), and Sri Hari Krishna Papers Ltd., Palani indicated that the soil and ground water quality were not deteriorated in these areas due to treated effluent irrigation. All the parameters including RSC, PS, SAR and SSP are well within the limits prescribed by TPCB (< 1.25, 10-20, < 10 and < 60 respectively) which indicate that the well water is safe for irrigation. In addition, the effluents contain significant amount of nutrients. Hence the effluent can also be effectively used as a nutrient source.
- A slight build up of salts in soil was observed in the low-lying areas of TEWLIS, Karur due to irrigation of TNPL-I effluent and well water with high Electrical conductivity.
- Studies with *Sesuvium portulacastrum*, a halophyte grown in effluent irrigated soils at 10 cm X 10 cm spacing recorded a biomass yield of 10.28 t ha^{-1} with a salt uptake of 436 kg ha^{-1}. In remediated soil, application of Microbial Consortium @ 4 kg ha^{-1} along with @ 0.1 % foliar spray and Poultry manure @ 5 t ha^{-1} recorded 38.8% higher yield in grafted brinjal (Dhruva) and 16 percent in yield of chilli compared to non-remediated plots.
- In SPB, Erode, the treated paper mill effluent irrigation along with 50% STCR NPK and 50% Mixed Liquor Suspended Solids (MLSS - sludge from ETP) can be suggested for obtaining highest radish yield of 9.1 t ha^{-1} which is 31.04 % higher than 100% STCR NPK application with well water irrigation. The ascorbic acid content of radish was improved by treated effluent application (0.31mg g^{-1}) when compared to well water application (0.20 mg^{-1}).

- In ITC, Thekkampatty, soil application of ETP sludge vermicompost @ 5 t ha^{-1} along with treated effluent through drip irrigation showed higher green fodder yield of 19,406 kg/acre.

9. Environmental impacts of treated effluent from thermal power plant

- The treated effluent from thermal power plant is suitable for irrigation since the vital quality parameters such as pH (6.12), EC (1.15 dS m^{-1}), BOD 68 (mg/L), TDS (736 mg/L) and heavy metals are within the prescribed limits of the Central Pollution Control Board norms.
- In the experimental trail with Cumbu, yield reduction (12.5%) was observed in treated effluent irrigated plots when compared to fresh water irrigated plots.

10. Recycling of coir industry ETP sludge in Agriculture

- Sludge generated from coir industry wastewater treatment plant is co - composted with Cow dung: Poultry manure @2:1:1 ratio to get quality compost. The compost has 1.40 % N, 1.29 % P and 1.14% K and below detectable level of heavy metals which meets the FCO standard.

11. Carbon nano sheet from groundnut shell for waste water treatment

- The groundnut shell carbon nano sheet activated with both solid and solute KOH shows multilayer thin plates, consists of multi layer ultra fine nano sheets and carbon fragment structure dispersed and overlapping each other and with smoother surface which is useful for the adsorption of pollutants
- Column study indicated that the colour of the sewage water completely reduced within two days of treatment and became colourless and reduced the BOD from 393 mg L^{-1} to 112 mg L^{-1} (71.50%) and COD from 513 mg L^{-1} to 125 mg L^{-1} (75.6%).

12. Fluoride transportation in food chain continuum

- The fluoride concentration in groundwater samples of Coimbatore District varied from 0.31 to 2.45 ppm in 2022-23 and 0.45 to 2.59 ppm in 2023-24. Out of 25 samples collected in 20 blocks, 7 samples contain more than 1.5 ppm of fluoride in groundwater.
- Among the crops tested, fodder grass was found to have maximum fluoride content (1.53 ppm) which was collected from Thondamuthur village of Pollachi south block where fluoride concentration in groundwater samples was found in the range of 2.59 ppm.

13. Recycling of grey water through reed bed technology

- Reed bed system installed with a capacity of 20 m^3/day planted with a macrophyte, *Phragmites australis* reduced the BOD (130 to 26 mg L^{-1}) and COD (392 – 78 mg L^{-1}) of sewage by 80 % in seven days of retention time and it is suitable for irrigation.

THEME AREA III: Air pollution Monitoring and Mitigation

14. Atmospheric Trace gases Chemistry Transport Modeling (ATCTM)

- Seasonal and diurnal variations were observed in ozone concentrations at high altitude of Ooty peaking in summer months and during late afternoon and evening hours. Ozone concentrations were found to be the maximum during April with a concentration of 139.60 ppb and the minimum during the month of January (109.97 ppb).
- The forecasting results indicated a continued upward trend in ozone concentrations over the next three years, with maximum levels reaching 148.5 ppb.
- Elevated ozone had a significant impact on physiological, biochemical and rhizospheric characteristics of Cabbage and among the varieties Primero showed greater resistance to the ozone stress than Tekila.
- The foliar application of 1% Ascorbic acid demonstrated the most significant effectiveness in mitigating ozone stress on cabbage cultivars, followed by Neem coated urea at 1%.
- Reduction in bacterial diversity under eO_3 and the protectants increased the microbial diversity.

15. Assessment of Aerosol Radiative Forcing Over India (ARFI)

- Aerosol Optical Depth (AOD) exhibits monthly and seasonal variations. During winter season, fine mode aerosols, particularly black carbon (BC), predominantly influence AOD levels at the research site. The measured AOD displayed clear seasonal fluctuations. The highest AOD value was observed in summer followed by post monsoon, winter and monsoon which is about 0.36, 0.35, 0.32 and 0.29 respectively.
- A decadal data revealed that the highest mean BC concentration was observed during March (1.63, 1.53, 1.71, 1.55, 1.66, 0.76, 1.49, 1.41 & 1.43 µg/ m^3) followed by April month (1.62,1.89, 1.48, 1.16, 1.22, 1.44, 0.97, 1.43, 1.27 & 1.13 µg /m^3) during 2013, 2015, 2017, 2018, 2021, 2022 & 2023 respectively.
- The MWR AOD showed strong positive correlation with the AOD data retrieved from MODIS retrieved data for the year 2017 to 2024 with R value ranging from 0.8 to 0.98.
- A total of 50 to 150 CFU/m^3 of bacteria were found in the aerosol sampled at the research site. The average number of colonies forming units per cubic meter of air for the month of February, March and April were 60, 95 and 151.5 respectively.
- Positive correlation was observed between BC concentration and temperature with a R value of 0.575; whereas, negative correlation between BC concentration and relative humidity with the R value of -0.9.

THEME AREA IV: Integrated Solid Waste Management

16. Carbon Dots Based Nano formulation from tea waste as biostimulant

- Carbon Dots Nano Formulation @ 500 ppm obtained from tea plants significantly enhanced chlorophyll a (97.5%), chlorophyll b (43%), total chlorophyll (75%) and carotenoids (36 %) over the control.
- Tea leaf quality parameters namely total amino acids and total polyphenols were also significantly enhanced in tea plants treated with CDs NF @ 500 ppm to the tune of 55% and 27%, respectively, over the control. CDs NF are found to be a potential plant biostimulant to tea plants.
- Standard operational protocol was developed to transform tea factory generated wood ash into nanosilica formulation. Nanosilica @ 2000 ppm had significantly enhanced the physiological parameters and quality parameters in tea leaves.

17. Human excreta-based bio- product and its effect on soil and crops

- The product of humanure, biochar and human urine at 1:1:1 ratio has higher nutrients (N- 3.97%, P- 2.12%, K- 4.15%) after 30 days of incubation, and found to be pathogen free.
- Application of enriched humanure significantly enhanced the soil organic carbon by 26% and soil available nitrogen (4.2%), phosphorus (18.59%), and potassium (8.86%) Application of Enriched humanure enhanced the yield in marigold (11.58%), paddy (25%), tomato (15.13%) and Lablab (39.50%) compared to control.
- The quality of the products, in terms of xanthophyll content (390.1 mg/100 g – 11.58%) in marigold, and lycopene and carotenoid levels in tomato also increased by 20 and 11.33% with the application of enriched humanure.

18. Recycling of solid wastes to enhance organic carbon and micronutrient status of farm soils of AC&RI, Madurai

- Soil available phosphorus content was significantly higher (6%) in vegetable wastes compost applied treatments. Soil available Iron (5%), manganese (10%) and copper (6%) content were significantly higher in fruit wastes compost applied treatments. Whereas, the available nitrogen (9%) content was significantly higher in Green manure applied treatment.
- Soil organic carbon was significantly increased (10 to 11%) in all the compost applied treatments

19. *In-situ* decomposition Potential of Maize stalks using TNAU Biomineralizer

- Maize stalks (100%) incorporation in soil using rotavator along with TNAU biomineralizer and Urea for balancing C:N ratio performed better than other treatments.
- CO_2 respiration study implies that the rotavator shredding of maize stalk with application of biomineralizer and urea hastens the degradation process.

- Positive changes in nutrient contents were observed in soil. During degradation period (45 days), an increase in NPK and OC contents (11.51, 30.67, 14.31 & 16.38 % respectively) and 21.32, 31.18, 14.34 & 18.53 % respectively during succeeding crop period were observed.
- In the succeeding crop, enhancement in yield by 14.34% in Maize (KVK, Salem) and 18.30% in Blackgram (AC&RI, KDM) were recorded.

20. Development of effective microbial (EM) formulation and assessing its potential in waste treatment

- EM formulation @ 3% application after 96 hours of incubation showed significant reduction in BOD (69%), COD (65%) and TSS (36%), sulphate content (71%), and coli forms (38%) than the Un- inoculated treatment.

THEME AREA 5 - Agro ecology and Ecosystem Services

21. Ecological impact of Miyawaki plantations in Industrial sites

- Miyawaki plantations at NLC sites sequestered 4.99 tonnes of carbon di oxide and released 13.31 tonnes of Oxygen per year and reduced the noise levels up to 9 dB.
- Among the plants tested, *Gmelina arborea, Pitancelobium dulce, Terminalia arjuna, Albizzia lebbeck, Vitex negundo, Diospyrus ebenum, Ficus religiosa, Switenia macrophylla, Cassia fistula* and *Pterocarpus marsupium* sequestered more Carbon di oxide and released more oxygen.
- Crude protein content of *Albizia lebbeck,* and *Simarouba glauca* and fiber content of *Simarouba glauca, Bauhinia purpurea, Albizia lebbeck, Pongamia pinnata, Cassia siamea* and *Ficus religiosa* were more than 20%.

22. Field mapping of farm soils of KVK Needamanagalam

- Soils of Needamangalam are black in colour with clay loam in texture, very deep (d5, >100 cm), moderately slow (MS) in permeability class, high in water holding capacity (>50%) with a CEC of 30 c mol p^+ kg^{-1}.
- NPK content of soils belongs to low to high status and Zn content is nearing deficit.
- Out of 57 samples, Available N was found to be Low (21), Medium (36); Available P was high in all the samples, Available K was medium in all the samples and for DTPA Zn, 21 samples were found below critical level and 36 samples were above critical level.

B. New Action Plan: 03

1. Estimating the Aerosol Radiative Forcing efficiency over semi-arid Madurai region

Rationale

- Atmospheric aerosols play an important and complex role in the regional/global climate system through scattering and absorption of incoming solar radiation

Objective

- To study the aerosol optical properties and their contribution to radiative forcing over semi-arid Madurai region

Duration:

Two Years (2024 - 2026)

Location:

Dept. of Soils and Environment, AC&RI, TNAU, Madurai

Scientists In –charge:

Dr. R.M. Jayabalakrishnan, Associate Professor (ENS), Dept. S&E, AC&RI, Mdu
Dr. R. Amutha, Professor (Crop Physiology), Dept. of SST, AC&RI, Mdu
Dr. S. Rani, Assistant Professor (Agronomy), Dept. of Agronomy, AC&RI, Mdu
Dr. R. Kumaraperumal, Associate Professor (SS&AC), Dept. of RS&GIS, AC&RI, Cbe

2. Maximizing the carbon sequestration potential of Nerium through silicon fertilization

Rationale:

- Increasing the CO_2 capture and storage through PhytOC production
- Practical approach climate change mitigation

Objective:

To quantify the PhytOC concentration & stock, growth and yield of Nerium under silicon fertilization

Duration:

Two Years (2024 - 2026)

Location:

Dept. of Env. Sciences, DNRM, TNAU, Coimbatore and TCRS, Yethapur

Treatments:

T_{FYM} - FYM alone (20 tones/ha)
$T_{FYM+Si25}$ - FYM + 25%(50kg/ha) Silicon fertilizer ($CaSiO_3$)
$T_{FYM+Si50}$ - FYM + 50% (100kg/ha) Silicon fertilizer ($CaSiO_3$)
$T_{FYM+Si75}$ - FYM + 75% (150kg/ha) Silicon fertilizer ($CaSiO_3$)
$T_{FYM+Si100}$ - FYM + 100%(200kg/ha) Silicon fertilizer ($CaSiO_3$)
T_{Si} - Silicon fertilizer alone ($CaSiO_3$)

Scientists In- charge:

Dr. V. Davamani, Associate Professor (ENS), DNRM, TNAU, Coimbatore
Dr. M. Velmurugan, Associate Professor (Horticulture), TCRS, Yethapur

3. Process optimization and validation of concentrated Ghanajeevamirth based organic bio-stimulant for sustainable agriculture

Rationale:

- Optimizing Ghanajeevamirth reduces reliance on synthetic inputs, enhancing soil health and biodiversity while lowering environmental impact.
- Improved production processes lower costs and increase product stability, making Ghanajeevamirth more affordable and attractive to farmers.
- Boosts crop yields and resilience, promoting healthier plants and more productive farms, contributing to sustainable agriculture.

Objectives

- To produce different types of modified ghanajeevamirth formulation
- Validate and optimize adjuvants for modified ghanajeevamirth formulation and field evaluation
- Field level application of formulated modified ghanajeevamirth
- Impact studies on soil health and biometric parameters in Bhendi and Brinjal

Duration:

Two Years (2024 - 2026)

Location:

Dept. of Env. Sciences, DNRM, TNAU, Coimbatore

Treatment Details

T_1 - Control
T_2 - Modified Ghanajeevamirth from cross bred (25 kg/ac)
T_3 - Modified Ghanajeevamirth from native bred (25 kg/ac)
T_4 - Modified Ghanajeevamirth from both bred (25 kg/ac)
T_5 - Modified Ghanajeevamirth from cross bred (50 kg/ac)
T_6 - Modified Ghanajeevamirth from native bred (50 kg/ac)
T_7 - Modified Ghanajeevamirth from both bred (50 kg/ac)

Scientists In -charge:

Dr. R. Sunitha, Assistant Professor (ENS), Dept. of ENS, CBE
Dr. G. Gayathry, Assistant Professor (AGM), KVK, Vridhachalam
Dr. S.P. Sangeetha, Assistant Professor (AGR), Dept. of Agronomy, Coimbatore
Dr. S. Shenbagavalli, Assistant Professor (ENS), HC&RI, Periyakulam

B. Project wise remarks

S. No.	Title of the project	Project Leader(s)	Duration	Remarks
	UNIVERSITY RESEARCH PROJECT			
1.	**NRM/MDU/ENV/NON/2022/001** Assessing the potential of biostimulants on soil health and crop growth in polluted soils	**Dr. R. Jayashree,** Assoc. Professor, Env. Sci.), Dept. of Env. Sci.	Apr, 2022 to May, 2024	Calculate the required quantity of Humic acid and sea weed extract and BC Ratio needs to be calculated. Completion report may be submitted
2.	**NRM/CBE/ENS/NON/2022/001** Enhancement of phytoextraction potential through chelators and subsequent recovery of chromium using Bamboo (*Bambusa balcooa*)	**Dr. A. Bharani,** Professor (Env. Sci.), Dept. of Env. Sci.	Apr, 2022 to Mar, 2024	Completion report may be submitted
3.	**NRM/VNR/ENS/Noncrop/2023/127** Study on Efficiency of Algal Biomass for Bioremediation of Heavy Metal in Tannery Effluent Polluted Soil and Growth of Crop	**Dr. A. Krishnaveni** Assoc. Prof. (Env. Sci.), HC&RI, Paiyur	Feb, 2023 to Mar, 2025	Munsell color chart may be used for assessing the soil color. Revised proposal may be sent for transferring URP to HC & RI, Paiyur A Microbiologist may be added as Co-PI
4.	**NRM/CBE/ENS/NON/2023/001** Assessing the fate and remediation of mixed contaminants in soil	**Dr. E. Parameswari,** Assoc. Prof. (Env. Sci.), NOFRC, TNAU, Coimbatore **Dr. P. Kalaiselvi,** Assoc. Prof. (Env.Sci.) **Dr. A. Bharani,** Prof. (Env. Sci.)	Jan, 2023 to Dec, 2024	The Project may be continued as per the approved Programme
5.	**NRM/TVM/ENS/2021/001** Synthesis of carbon nano sheet from groundnut shell as potential agent for sewage wastewater treatment	**Dr. P.C. Prabu,** Assoc. Prof. (Env. Sci.), CWGS, Coimbatore **Dr. K. Raja,**	Oct, 2020 to Sep, 2023	Completion report may be submitted at the earliest

S. No.	Title of the project	Project Leader(s)	Duration	Remarks
		Assoc. Professor (SST), CANT, Coimbatore		
6.	**NRM/CBE/ENS/NON/2022/001** Assessment of fluoride transportation in food chain continuum	**Dr. P. Jothimani,** Professor (Env. Sci.) **Dr. E. Parameswari,** Assoc. Prof. (Env. Sci.), NOFRC	Dec, 2022 to Nov, 2024	The Project may be continued as per the approved Programme
7.	**NRM/ PKM/ ENS/ NONCROP/ 2023 /237** Recycling of grey water through reed bed technology and its effects on flower production	**Dr. S. Shenbagavalli,** Asst. Prof. (Env. Science) **Dr. M. R. Backiyavathy,** Prof (SS&AC) **Dr. S. Muthulakshmi,** Professor (Horti), HC & RI, PKM	Aug, 2023 to Dec, 2026	The Project may be continued as per the approved Programme
8.	**NRM/KDM/ENS/SNF/2020/001** Info Crop model for sunflower to sustain the production under changing climate	**Dr. K. Boomiraj,** Assoc. Prof. (Env. Sci.), Dept. of Env. Sci. **Dr. T. Selvakumar,** Assoc. Prof. and Head MRS, Vagarai	Sep, 2021 to Aug, 2024	The Project may be continued as per the approved Programme
9.	**NRM/PKM/ENS/2020/ 001** Recycling of solid wastes to enhance organic carbon and micronutrient status of farm soils of AC&RI, Madurai	**Dr. J. Kannan,** Professor (Env. Sci.) KVK, Virudhunagar	Oct, 2020 to Sep, 2023	Completion report may be submitted at the earliest
10.	**NRM/CBE/ ENS/NONCROP/2024/032** Evaluation of *in situ* decomposition potential of Maize stalks by using TNAU Biomineralizer	**Dr. V. Davamani,** Assoc. Prof. (Env. Sci.) **Dr. P. Kalaiselvi,** Assoc. Prof. (Env. Sci.), KVK, Sandhiyur **Dr. T. Selvakumar,** Assoc. Prof. and Head, MRS, Vagarai	July, 2023 to June, 2025	The Project may be continued as per the approved Programme. Findings may be proposed for OFT.

S. No.	Title of the project	Project Leader(s)	Duration	Remarks
		Dr. S. Paul Sebastian, Assoc. Prof. (Env. Sci.), AC&RI, Kudumiyanmalai		
11.	**NRM/NDM/ENS/Noncrop2023/214** Assessment, Profiling and Composting of Construction and demolition waste of Urban centers of Thiruvarur Dt.	**Dr. C. Prabakaran,** Asst. Prof. (Env. Sci.) KVK, Needamangalam	Sep, 2023 to Aug, 2025	Interim correction may be made in the project proposal as per the suggestion given during the Pre-review meet
12.	**NRM/CBE/ENS/2019/001** Ecological impact of Miyawaki plantations in TNAU Campus	**Dr. M.P. Sugumaran,** Professor (Env. Sci.) KVK, Virdhachalam	Aug, 2020 to July, 2023	Completion Report may be Submitted
13.	**NRM/MTP/ENS/2020/002** Assessing the air pollution tolerance of various tree species for urban forestry and improved air quality	**Dr. M. Prasanthrajan** Professor (Env. Sci.)	Oct,2020 to Sep, 2023	Completion Report may be Submitted
14.	**NRM/NDM/ENS/Noncrop 2023/033** Fertility mapping of the farm soils of KVK, Needamangalam using GIS	**Dr. C. Prabakaran,** Asst. Prof. (Env. Sci.) KVK, Needamangalam	Dec, 2022 to Nov, 2023	Soil mapping with soil parameters with spatial data for 49 ha should be prepared and submitted
15.	**NRM/CBE/ENS/NON/2023/001** Effective Microbial (EM) formulation and assessing its potential in waste treatment	**Dr. P. Kalaiselvi,** Assoc. Prof. (Env. Sci.) KVK, Sandhiyur	July, 2023 to April 2024	EM formulation should be released at the earliest The project may be closed
	EXTERNALLY FUNDED PROJECTS			
16.	**DSTPOWER/NRM/ENS/CBE/2022/R004** Rhizobiology of reed plants and its role in water quality improvement for effective recycling	**Dr. M. Maheswari,** Professor (Env. Sci.) **Dr. P. Dhevagi,** Prof. & Head (Env. Sci.) **Dr. K. Suganya** Assoc. Professor (Env. Sci.)	Aug, 2022 to Aug, 2025	Project may be continued as per the approved technical progeramme
17.	**NRM/DBT/CBE/ENS/REE/2022/R002** Sustainable Management of tea waste to transform tea industry to carbon neutral	**Dr. S.K. Raj Kishore,** Asst. Professor (Env. Sci.) Dept. of REE **Dr. M. Maheswari,**	Mar, 2022 to Feb, 2025	Project may be continued. OFT has to be carried as per the approved Programme Field Trial Details may be

S. No.	Title of the project	Project Leader(s)	Duration	Remarks
	and zero waste industry	Prof. (Env. Sci.) **Dr. R. Sunitha** Asst. Professor (Env. Sci.)		included
18.	**DST-SERB SURE/ ACRI/SSAC/KDM/2024/R001** Production of hydrochar from high wet biowaste materials, value addition and its agricultural and environmental application	**Dr. S. Paul Sebastian,** Assoc. Prof. (Env. Sci.) AC&RI, Kudumiyanmalai **Dr. E. Parameswari,** Assoc. Prof. (Env. Sci.), NOFRC **Dr. M. Vijayakumar** Assoc. Prof. (SS&AC), AC&RI, Kudumiyanmalai	Dec, 2023 to Dec, 2026	Project may be implemented as per the approved objectives
19.	**ISRO/NRM/CBE/ENS/2014/D002** Establishment and Maintenance of Environmental Observatory at Wood House, HRS, Ooty for Atmospheric Trace gases Chemistry Transport Modelling	**Dr. P. Dhevagi,** Prof. & Head (Env. Sci.) **Dr. K. Boomiraj,** Assoc. Prof. (Env. Sci.) Dept. of Env. Sci. **Dr. S.P. Thamaraiselvi,** Assoc. Prof. & Head (HRS, Ooty)	Apr, 2008 to Mar, 2024 Extended up to March 2025	Physiological mechanisms of ozone protectants may be included in the report Project may be continued as per the approved Objectives
20.	**ISRO/NRM/CBE/ENS/2012/D001** Establishment and maintenance of Aerosol Observatory at HRS, Ooty for assessing the Aerosol Radiative forcing over India	**Dr. P. Dhevagi,** Prof. & Head (Env. Sci.) **Dr. P. Jothimani,** Prof. (Env. Sci.), Dept. of Env. Sci. and The Prof. & Head, HRS, Ooty	Apr, 2022 to Mar, 2024 (Contd)	Project may be implemented as per the approved objectives
21.	**NRM/TNSLURB/CBE/ENS/2022/R001** Eco-Restoration of Coimbatore lakes with Floating Wetlands	**Dr. K. Sara Parwin Banu,** Professor (Env. Sci.) HRS, Yercaud	Apr, 2022 to Mar, 2024	After getting the patent, the technology may be given for adoption. The project may be closed
22.	**TNPL/NRM/CBE/ENS/2021/R008** Evaluation of long-term effect of using	**Dr. P. Dhevagi,** Prof. & Head (Env. Sci.)	Apr, 2021 to Mar, 2024	Project may be implemented as per the approved objectives

S. No.	Title of the project	Project Leader(s)	Duration	Remarks
	treated TNPL Unit I (Karur) effluent water for irrigation and remediation of effluent irrigated soil habitat	**Dr. A. Bharani,** Prof. (Env. Sci.) Dept. of Env. Sci. **Dr. K. Sivasubramanian,** Professor (Env. Sci.) IFS, Agronomy	Extended up to March 2027	
23.	**TNPL/NRM/TRY/SAC/2019/R001** Environmental quality assessment in the use of Paper Board Industry (TNPL Unit II) waste water for agro-forestry system	**Dr. M. Baskar,** Prof. & Head (SS & AC) **Dr. M. Selvamurugan,** Asst. Professor (Env. Sci.), ADAC & RI, Trichy.	Apr, 2019 to Mar, 2024	Project may be continued as per the approved Programme
24.	**SPBL/NRM/CBE/ENS/2014/R005** Ecofriendly utilization of Seshasayee paper mill effluent and solid wastes of Unit I, Pallipalayam, Erode, Namakkal district and Unit II, Elanthaikulam, Thirunelveli district and monitoring its impact on soil and groundwater	**Dr. P. Dhevagi,** Prof. and Head (Env. Sci.) **Dr. A. Bharani,** Professor (Env. Sci.), **Dr. V. Davamani,** Assoc. Professor (Env. Sci.)	Apr, 2023 to Mar, 2024 Extended up to March 2025	Project may be continued as per the Technical Programme
25.	**ITC/NRM/CBE/ENS/2014/R003** Studies on the impact of ITC-Kovai Paper Board Mill treated effluent along with sludge on soil health and crop productivity	**Dr. P. Dhevagi,** Prof. and Head (Env. Sci.) **Dr. R. Jayashree,** Assoc. Professor (Env. Sci.)	July, 2023 to June, 2026	Project may be continued as per the Objectives
26.	**SFI/NRM/CBE/ENS/2022/R003** Developing human excreta-based bio product and evaluating its effect on the quality of soil and crop produce	**Dr. P. Dhevagi,** Prof. & Head (Env. Sci.) **Dr. M. Maheswari,** Prof. (Env. Sci.) **Dr. P. Jothimani,** Prof. (Env. Sci.) **Dr. G. Sridevi,** Asst. Prof. (SS&AC), Dept. of SS&AC, Cbe	July, 2022 to June, 2024	The project may be closed and completion report may be submitted
27.	**SHKP/NRM/ENS/CBE/2023/R001**	**Dr. P. Dhevagi,**	Jan, 2023 to	Project may be continued as per

S. No.	Title of the project	Project Leader(s)	Duration	Remarks
	Monitoring the impact of and recycling of treated paper mill effluent from Shri Hari Krishna Papers Pvt. limited, Nallur, Udumalpet	Prof. and Head (Env. Sci.) **Dr. V. Davamani,** Assoc. Professor (Env. Sci.) **Dr. K. Sivasubramanian,** Prof. (Env. Sci.) IFS, Agronomy	Dec, 2025	the approved programme
28.	**BE/RSI/NRM/CBE/ENS/2023/001** Bioconversion of coir industry ETP sludge into value-added manure and assessing its effect on soil and crops	**Dr. P. Dhevagi,** Prof. and Head (Env. Sci.) **Dr. K. Sivasubramanian,** Prof. (Env. Sci.), IFS, Agronomy **Dr. E. Parameswari,** Assoc. Prof. (Env. Sci.), NOFRC	July, 2023 to June, 2024	Project may be continued as per the approved programme

CENTRE FOR AGRICULTURAL NANOTECHNOLOGY

A1. For Adoption: Nil.

A2. For OFT: Nil.

A3. For Information: 06

1. Secondary metabolites such as Paromomycin, Clindamycin and Cyclohexane are derived from agriculturally important microbes as next generation herbicide against *Echinochloa colona* and *Trianthema portulacastrum.*
2. *Methylobacterium* was successfully encapsulated in nano-fibers that are viable for seven months. PFM loaded nano-fibers coated seeds recorded higher germination and seedling growth under optimal and PEG induced moisture stress conditions.
3. The Nano P fertilizer synthesized releases phosphate for 45 days with a release of 35 ppm of phosphate
4. Azadirachtin formulation impregnated in nano-porous bio-silica is enhancing its Photostability and disintegration protection stability for 24 months under ambient conditions.
5. Accelerated Solvent Extraction augments the recovery of Withaferin A (265.29 ± 0.53 mg/g) from distilled water at 140^{o}C temperature in a nine minutes static cycle.
6. Fabrication of Nano-sensing film using Paste and peel-off approach is optimized for the detection of chlorpyrifos, imidacloprid, acetamiprid, thiram and thiobenzoate with a detection limit 5 to 25 ng/cm^{2}.

B. Action Plan proposed (2024-2025): 02

Action Plan 1.				
Theme No 1	Nano-Agri Inputs for the smart delivery of active molecules into soil, plant and other bio systems			
Scheme Title	Nano-Herbicide for Pre-Emergence Application in Rain-fed Agriculture			
S. No.	**Activity**	**Scientist**	**2024-25**	**Deliverables**
1.	• To synthesize polymeric systems for moisture triggered release of active molecules • To characterize the release pattern of active molecules in water medium • To validate the weed control bio efficacy of nano-herbicides through *in-vivo* and *in-vitro* studies	**Dr. S. Marimuthu** Associate Professor (Agronomy), CANT, TNAU, Coimbatore	Synthesis of polymeric systems for moisture triggered release of active molecules	Moisture triggered polymeric system for the delivery of herbicide in rainfed agriculture

Action Plan 2.				
Theme No. 2	Nano-Food Systems			
Scheme Title	Nano cellulose Packaging for increasing the shelf life of Pulses			
S. No.	**Activity**	**Scientist**	**2024-25**	**Deliverables**
1.	• Synthesis and characterization of nano-cellulose from maize cob • Fabrication of polymeric nano-composite and characterization • Assessing the sustainability of nano-composite as active packaging material	**Dr. C. Sharmila Rahale** Assistant Professor (SS&AC.), CANT, TNAU, Coimbatore	Synthesis of nano-cellulose from maize cob and Fabrication of polymeric nano-composite and characterization	Synthesis and characterization of nano-cellulose from maize cob and fabrication of polymeric nano-composite

C. Project wise remarks

Remarks on the ongoing University Research projects/ Externally Funded Projects/ Core Projects

S. No.	Project No. and Title	Scientists in-charge	Duration	Remarks
Externally funded projects				
1.	**DST/NRM/CBE/NST/2020/R023** Nano-fiber encapsulation of Methyl bacterium for Groundnut Seed invigoration to improve productivity under rain fed ecosystem	Dr. K. Raja	Feb.2020 to July. 2023	Completion report may be submitted
2.	**CIL/NRM/CBE/CANT/2022/R001** Evaluation of Coromandel International Ltd., Nano DAP (Liquid) on Rice and Maize	Dr. C. Sharmila Rahale	December 2022 to November 2023	Completion report may be submitted
3.	**EID/NRM/CBE/NST/2020/R024** Insights into molasses-based Potash and value addition of bio methanated slurry and spent wash through nanotechnological interventions	Dr. C. Sharmila Rahale	August 2021 to July 2024	Completion report may be submitted
4.	**DST/NRM/CBE/NST/2021/R030** Eco-friendly management of Citrus Greening Disease through phloem specific Delivery of IMPDH inhibitors encapsulated in Nano system.	Dr. Jeya Sundara Sharmila	October, 2021 – September, 2023	Completion report may be submitted
5.	**NRM/DNST/GOI-DBT/2021** Flexible and Adhesive surface Enhanced Raman Spectroscopy Based Nanostructures Device for Efficient Detection of Multicomponent Pesticide Residues in Fruits and Vegetables	Dr. S. Thirumalairajan	Dec. 2018 to Dec.2024	The project may be continued
D. University Research Projects				
1.	**NRM/CBE/AGM/NON/001** Exploring Antimicrobial secondary metabolites from agriculturally important microbes as next-generation weedicide	**Dr. V. Gomathi** Professor & Head (CANT)	March 2022 to Feb. 2024	Completion Report may be submitted
2.	**NRM/CBE/NST/PUL/2022/001** Design and Fabrication of nano P fertilizer utilizing Rock phosphate and P solubilising	**Dr. C. Sharmila Rahale,** Asst. Prof. (SS&AC)	September 2022 to June 2024	Completion Report may be submitted

	bacteria and its effect on green gram			
3.	**NRM/CBE/NST/NON/001** Nanoformulation of plant bioactives from Ashwagandha (*Whitania somnifera*) and Kalmegh (*Andrographis paniculata*) for enhanced immune boosting activity	**Dr. S. Haripriya,** Assoc. Professor (Hort.)	January 2022 to December 2024	The project may be continued
4.	**NRM/CBE/NST/PHY/2020/01** Developing advanced formulation for botanical insecticide (Azadirachtin) using nanoporous biogenic silica from sugarcane bagasse for high bioefficacy.	**Dr. D. Jeya Sundara Sharmila,** Asst. Prof. (Phy.)	January 2020 to June 2024	Completion Report may be submitted
5.	**NRM/ CBE/ PHY/ NONCROP/ 2024 / 040** Molecular modelling and docking to target *Papaya Ring Spot Virus* transmission protein Interactions and its control through biogenic nano-porous silica formulations.	**Dr. D. Jeya Sundara Sharmila,** Asst. Prof. (Phy.)	April 2024 to March 2026	The project may be continued

DIRECTORATE OF CROP MANAGEMENT

Agricultural Meteorology

A1. For Adoption: 01

1. **TNAU Mobile App for Agromet Advisory Service**: Improved TNAU – AAS: web cum Mobile App has been relaunched during March 2024 and promoted through all medias (radio, TV, dailies and monthly magazines), farmers awareness programme, WhatsApp, Extension Officers meetings and students' RAWE programs. It is aimed to reach 8 lakh farmers during this year. The improvement includes new look and easy registration, unlimited crop registration per farmer, new advisories for crop with chemical names, new crop production advisories for day today farm activities etc.

A2. For OFT: NIL

A3. For information: 15

Theme 1: Basic and Applied Meteorology

1. **Microclimate modification for higher yield in maize:** Additive series intercropping of cowpea or green gram under paired row system with 125% of recommended dose of nitrogen created a favourable microclimate for maize through higher light interception, radiation use efficiency and leaf area index compared to lower nitrogen levels or sole cropping with normal spacing.
2. **Microclimate modification for higher yield in Baby corn:** The optimal growing environment for higher yield and quality of baby corn viz., air temperature (26 to 28 °C) and RH (60 and 70%), morning canopy temperature (24 to 25°C), afternoon canopy temperature (28 to 30 °C), RH-I (75 to 83%) and RH-II (68 to 73%) could be achieved by early sowing (4th week of Jan) with a closer spacing (60x20 cm).
3. **Climate variability on neem seed yield:** Optimal soil moisture coupled with a maximum temperature of 33 ^{o}C during reproductive phase increased number of flowers and fruit set by inducing positive physiological responses viz., higher RWC, IAA oxidase and NRase activity. The high wind speed and excess soil moisture during the reproductive phase may impact the neem seed yield. The LASSO model performed better neem seed yield prediction with lesser deviation (7.7 % & 0.95 r^2).

Theme 2: Climate change & crop weather model

4. **Crop Yield Forecasting**: IMD sponsored FASAL scheme at ACRC, TNAU, Coimbatore revealed that the LASSO model provided more accurate rice yield forecast during *kharif* than *rabi* season. Incorporating farmers' practices as input, the Crop Simulation Models outperformed the statistical models in yield prediction. Notably, the F_3 (preharvest) stage yield forecast surpassed the accuracy of the F_2 (Flowering stage) forecast.

5. **Sowing window on rice yield**: IMD sponsored FASAL scheme at TRRI, Aduthurai inferred that the rice sown in the I week of June (kharif) and II week of October (rabi) produced significantly higher grain yield 5435 kg/ha and 5625 kg/ha, respectively, compared to the delayed sowing. Combined with 125% RDF-N, the rice cultivars ADT 57 and ADT 54 performed exceptionally well during the kharif and rabi, respectively.
6. **Climate change impact on Tamil Nadu rainfall distribution**: DST, India and AISRF Australia sponsored project predicted that the number of Consecutive Dry Days (CDD) is expected to decrease in most of the decades for both SSP2-4.5 and SSP5-8.5 scenarios. Conversely the Consecutive Wet Days (CWD) is predicted to increase during the North East monsoon. Notably, the NEM projected to experience a higher number of CWD than the SWM in both emission scenarios.
7. **Climate change on inter annual variation in rainfall and drought risk**: The projected maximum and minimum temperature show increasing trend in both near and mid-century. During SWM season, the Southern and Western agro climate zone are projected to receive higher mean rainfall in future climates, whereas the lowest mean rainfall is projected in North Eastern Zone. During NEM season, most of the zones would experience higher mean rainfall compared to historical period in both near and mid-century, while High- altitude zone (Nilgiris) showed decrease in mean rainfall. Despite an increase in rainfall is projected, the intense rainfall within the short time frame was observed, which lead to frequent drought during future climate. The coefficient of variation on the rainfall was increasing and inter annual variation of seasonal rainfall affects the reliability on rainfall.
8. **Global Circulation Models for Future Rainfall Projections:** DST, India and AISRF Australia sponsored project suggested that the ACCESS-CM2, ACCESS-ESM1-5, EC-Earth-Veg-LR, MIROC-ES2L and CNRM-ESM2-1 are the suitable sites of CMIP6 for rainfall projections in Tamil Nadu. The ensemble mean of the five selected best models with the scenario of SSP5-8.5 predicts a positive shift in annual and NEM for both the near-term (2021–2050) and mid-term (2051–2080) future.
9. **Mitigation techniques to reduce GHG from rice production:** Methane emissions from flood irrigated rice field was 6.9, 10.9 and 5.8 mg m^{-2} day^{-1} during AT, PI and Maturity stages, respectively. The N_2O emission from flooded and 100 % RDF rice field was between 4.02 and 5.39 mg m^{-2} day^{-1}. Incorporating rice straw with TNAU bio mineralizer + PUSA decomposer capsule, AWDI irrigation at 15 cm soil moisture depletion had profound effect in reducing both methane and N_2O emissions up to 10 %.
10. **Adaptation techniques to reduce climate change impact on tomato production:** Research with different source of N fertilizers (Urea, Neem Coated urea, Nano urea, Amm. Sulphate & Vermi Compost), IW/CPE levels (0.8 & 1.0)

recorded higher plant growth attributes in IW/CPE of 1.0 + Neem Coated Urea, higher yield Attributes in IW/CPE of 0.8 and & Neem Coated Urea combination. In contrast, nano urea performed poorly under both IW/CPEs. Both the SSP245 and SSP585 recorded decrease in yield (35 to 80%) from the current yield. Increasing the fertilizer dose to 125% RDF helped to mitigate the impact of climate change.

11. **Climate change impact on Tamil Nadu Cotton Production**: DST, India and AISRF Australia sponsored project concluded that over the next few decades, cotton yield is expected to decline up to 80 % in the cotton-growing districts of Tamil Nadu, which is attributed to anticipated rise of extreme weather events during the growing period. Consequently, there would be 18.3% decline in cotton production. However, the impact could be minimized by adopting sowing during the 1st week of September, while the early sowing during 4th week of August may have a more pronounced negative impact.

Theme 3: Weather based pest and disease forewarning model

12. **Forewarning of BPH in rice**: The upper and optimum threshold temperature limits for different stages of BPH *viz*., Egg (39.14ºC & 24.91^{o}C), Nymph1 (36.04ºC & 27.11^{o}C), Nymph2 (37.37ºC & 24.05^{o}C), Nymph3 (36.86ºC & 25.35^{o}C), Nymph4 (37.55ºC & 23.6^{o}C) and Nymph5 (37.55ºC & 25.85^{o}C). The faster infestation occurs between 30ºC and 35ºC, with more than 50% of damage occurring from the fifth to the tenth day. At 35ºC, symptoms reached hopper burn on the fifth day itself.

13. **Favourable weather for Fall Army Worm (FAW)**: The thumb rules identified are i. If the weekly mean temperature was ≤ 26 °C and the morning RH was ≤84% then there is 75 % chance of occurrence of severe leaf damage (>30 %) by FAW; ii. If the weekly mean temperature was ≤ 26 °C and the morning RH was ≥84 % then there is only a 10 % chance of occurrence of severe leaf damage (>30 %) by FAW; iii. If the weekly mean temperature lies ≥ 26 °C and the weekly total rainfall received is ≤ 15 mm then there is a 100 % chance of severe leaf damage (>30 %) by FAW; iv. If the weekly mean temperature lies ≥ 26 °C and the weekly total rainfall received is ≥ 15 mm then there is 58 % chance of occurrence of severe leaf damage (>30 %) by FAW.

Theme 4: Remote sensing in meteorology

14. **Satellite products for weather based crop yield estimation**: The multi-temporal, dual-polarization Sentinel IA SAR data could be used to identify and map the chickpea and sorghum cropped area. Crop growth variables extracted from remote sensing products are well matched with DSSAT generated growth variables.

15. **Satellite products for gridded rainfall**: DST, India and AISRF Australia sponsored project found that the ERA5 demonstrated superior ability to capture the rainfall events with high probability of detection followed by MSWEB. The

MSWEB is having higher prediction accuracy for seasonal and annual rainfall with lower RMSE and bias ranges. These findings could be helpful in creating a well-knit historical climate dataset to identify climate risks and compute weather perils for Weather Index Insurance (WII).

ACTION PLAN for 2024 – 2025:

S. No.	Project Title	Project Teams
	Theme 2 – Basic and Applied Agrometeorology	
1.	**Study the trends & pattern of unseasonal rainfall events on regular monsoon** Studying unseasonal rainfall behavior during the monsoon period in Tamil Nadu is crucial due to its significant impacts on agriculture, water resources, and overall climate resilience. The region heavily depends on the monsoon rains for its agricultural activities and water supply. Deviations from the expected rainfall patterns can lead to severe consequences, including crop damage, water scarcity, and flooding. Understanding these patterns helps in better preparedness and adaptation strategies to mitigate the adverse effects of unseasonal rainfall.	Dr. Ga. Dheebakaran Dr. S. Kokilavani ACRC, TNAU
2.	**Revisiting the crop water coefficient of major crops** (URP / Network project at Coimbatore & Kovilpatti) Crop water coefficient is important parameter, required for field level irrigation scheduling, water budgeting and distribution of large storages. Available crop water coefficient was calculated long before during 1970s. Due to global warming and climate change, there must be change in this value, may result in erroneous scheduling and water budgeting. Hence, it is need of the hour to revisit the crop water coefficient of important irrigated crops of Tamil Nadu. **(Continuation of last year study)**	Dr. N.K. Sathyamoorthy ACRC, TNAU Dr. B. Arthirani ARS, Kovilpatti
3.	**Study the wind drift from drone spray during different wind speed and drone height.** Application of pesticides and nutrient spray using drone is one of the important transformations in agriculture. Precision farming, labour scarcity, low cost and quicker coverage are the important factors that makes the drone's intervention as inevitable for agriculture. There are lot of studies are carried in many centers to optimize the spray fluid concentration, droplet size, drone speed and drone height. Wind Speed has profound influence on these parameters and the wind drift causes lots issues to crops in the nearby field, animals and humans. Hence, it is proposed to quantify the wind drift at different height of drone spray in different wind speed at varying distance from the source. **(Continuation of last year study)**	Dr. Ga. Dheebakaran Assoc. Prof. (Agronomy) ACRC, TNAU Dr. KP. Ragunath Assoc. Prof. (SS&AC) CWGS

B. Research Projects and Remarks

THEME WISE RESEARCH PROJECTS

Theme	URP	Externally funded Projects			Students' Research	Total
		GOI	GoTN	Private		
1. Basic & applied meteorology	4	-	1	1	3	9
2. Weather forecast &Agro Advisory	-	14	1	-	2	17
3. Climate change & Crop models	-	4	-	-	4	8
4. Pest & Disease Forewarning	1	-	-	-	3	4
5. Remote sensing	-	-	-	-	4	4
6. ACRC scientists' projects in other CSM	5	2	-	2	-	9
Total	**10**	**20**	**2**	**3**	**16**	**51**

B1. UNIVERSITY RESEARCH PROJECTS

S. No.	Project Title	Project Leader(s)	Period	Remarks
	Theme 1: Basic and applied meteorology			
1.	**Project No.: Newly proposed** Impact of ENSO on weather variations at high resolutions in Tamil Nadu.	**Dr. N.K. Sathyamoorthy** Prof. & Head, ACRC **Dr, S. Kokilavani** Asst. Prof. (Agromet.), ACRC	Mar. 2024 – Mar. 2026	New Project. To be continued.
2.	**DCM/CBE/PHY/ALLIED/2024/ 089** Quantifying future drought change and associated uncertainty in southern Tamil Nadu with standardized PET index (SPEI)	**Dr. Pon. SathyaMoorthy** Asst. Prof. (Physics), **Dr. R. Ravi Kumar,** Asst. Prof. (Maths), **Dr. N.K. Sathyamoorthy** Professor and Head, ACRC, TNAU, CCE	Jun. 2024 - May. 2025	New project. To be continued.
3.	**DCM/CBE/PHY/ALLIED/2024/087** Short-term wind speed prediction on partial differential equation with finite element multi-level primitive model.	**Dr. R. Ravi Kumar,** Asst. Prof. (Maths), ACRC **Dr. Pon. Sathya Moorthy** Asst. Prof. (Physics), ACRC **Dr Karthikeyan R**	Jun. 2024 – May. 2025	New project. To be continued

		Assoc. Prof. (Agronomy), DCM		
4.	**DCM/CBE/PHY/ALLIED/2024/ 085** Nano silica (SiO_2) an alternative to improve the drought tolerance of blackgram.	**Dr. Pon. Sathya Moorthy** Asst. Prof. (Physics) **Dr. M. Djanaguiraman** Assoc. Prof. (CRP), **Dr. S. Rajkishore,** Asst. Prof. (ENS), REE, TNAU, CBE	Jun. 2024 - May, 2025	New project. To be continued.
	Theme 2: Pest & Disease Forewarning			
5.	**DCM/CBE/PAT/MILLETS & FORAGES/2024/086** Forewarning of weather-based decision support system for maize Turcicum Leaf Blight disease management using web application	**Dr. V. Sendhilvel,** Assoc. Prof. (Pl. Path.), ACRC **Dr. K. Senguttuvan**, Asst. Prof. (Agrl. Ent.), FC&RI **Dr. S. Kokilavani,** Asst, Prof. (Agromet), ACRC	Mar. 2024 – Mar, 2027	New project. To be continued.

B2. EXTERNALLY FUNDED PROJECTS

S. No.	Project Title	Project Leader(s)	Period	Remarks
I	**Theme 1: Basic and applied meteorology**			
1.	**NADP/DCM/CBE/ACR/2020/D007** Revival of Automatic Weather Station network in 285 blocks and relocation of few automatic Weather Stations in Tamil Nadu.	**Dr. N. K. Sathymoorthy,** Prof. & Head, ACRC **Dr. Ga. Dheebakaran**, ACRC **Dr. R. Karthikeyan**, DCM **Dr. V. Senthilvel**, ACRC **Dr. S. Kokilavani**, ACRC **Dr. Pon. Sathya Moorthy**	2023-2024	Completed. Completion report may be submitted.
2.	**CIL/DCM/CBE/DCM/2019/R008** Neem (*Azadirachta indica*) seed yield prediction exploring weather and physiological interaction (F37AIV)	**Dr. V. Geethalakshmi** Vice Chancellor, TNAU **Dr. A. Senthil**, P&H, CRP **Dr. M. Rajavel**, PRO	July 2019 – Jun. 2024	Completion report may be submitted.
	Theme 2: Weather forecasting and agro advisory services			
3.	**NCMRWF/DCM/ADT/ AGR/2013/ R003** GOI – IMD – Agromet – Gramin Krishi Mausam Sewa	**Dr. T. Sivasankari** Asst. Prof. (Micro.)	Apr. 2014 - Mar. 2025	To be continued.

	(GKMS) - Experimental Agro-Met Advisory Services (AAS), Aduthurai.	**Dr. S. Elamathi** Assoc. Prof. (Agronomy) TRRI, Aduthurai		
4.	**IMD/DCM/CBE/ACR/ 2014/R006** GOI – IMD – Agmet –Gramin Krishi Mausam Sewa (GKMS) at Agro Meteorological Field Units (AMFU), Coimbatore	**Dr. Ga. Dheebakaran** Asst. Prof. (Agronomy) ACRC, TNAU, CBE **Dr. N.K. Sathyamoorthy** Prof. and Head, ACRC	Apr. 2014 - Mar. 2025	To be continued.
5.	**IMD/DCM/KPT/AGR/ 1995/R004** Agrometeorology Field Unit (AMFU) for Agrometeorological Advisory Services (GKMS – Gramin Krishi Mausam Sewa) under IMD, GOI at ARS, Kovilpatti.	**Dr. B. Arthirani** Asst. Prof. (Agrl. Met) **Dr. B. Bhakiyathu Saliha** Professor and Head ARS, Kovilpatti	Apr. 2014 - Mar. 2025	To be continued.
6.	**GOI/DCM/OTY/ACRC/2016/R003** Agrometeorology Field Unit (AMFU) for Agrometeorological Advisory Services under IMD, GOI at HRS, Ooty	**Dr. L. Rajendran** Assoc. Prof. (Pl. Pathology) **Dr. P. Raja,** Assoc. Prof. & Head, HRS, Ooty	Mar. 2014 - Mar. 2025	To be continued.
7.	**GOI/DCM/PPI/ACRC/ 2016/R001** Agro meteorology Field Unit (AMFU) for Agro meteorological Advisory Services (GKMS) under IMD, at HRS, Pechiparai.	**Dr. D. Rajakumar** Assoc. Prof. (Agronomy) **Dr. A. Jaya Jasmine** Prof. and Head, HRS, Pechiparai	Mar. 2014 - Mar. 2025	To be continued.
8.	Setting up District Agro Met Units (DAMUs) at KVKs for Weather Based Agro Advisory Services under ICAR-IMD Collaboration – KVK, Vriddhachalam, Cuddalore.	**Dr. K. Natarajan** Programme Coordinator **Ms. C. Arulmathi** SMS (Agrometeorology)	2019 – 2024	Project discontinued from 1.3.2024
9.	Setting up District Agro Met Units (DAMUs) at KVKs for Weather Based Agro Advisory Services under ICAR-IMD Collaboration – KVK, Papparapatti, Dharmapuri.	**Dr. M.A. Vennila** Programme Coordinator **Mr. P. Arunkumar**. SMS (Agrometeorology)	2019 – 2024	Project discontinued from 1.3.2024
10.	Setting up District Agro Met Units (DAMUs) at KVKs for Weather Based Agro Advisory Services under ICAR-IMD Collaboration – KVK, Pudukkottai	**Dr. A. Yuvaraja** Programme Coordinator **Mr. B. Balamurali** SMS (Agrometeorology)	2019 – 2024	Project discontinued from 1.3.2024

11.	Setting up District Agro Met Units (DAMUs) at KVKs for Weather Based Agro Advisory Services under IMD-ICAR, KVK, Ramanathapuram District	**Dr. S. Vallal Kannan** Programme Coordinator **Dr. M. Vengateswari** SMS (Agrometeorology)	2019 – 2024	Project discontinued from 1.3.2024
12.	Setting up District Agro Met Units (DAMUs) at KVKs for Weather Based Agro Advisory Services under IMD - ICAR-IMD – KVK, Sandhiyur, Salem	**Dr. R. Jegathambal** Programme Coordinator **Dr. C. Pradipa** SMS (Agrometeorology)	2019 – 2024	Project discontinued from 1.3.2024
13.	Setting up District Agro Met Units (DAMUs) at KVKs for Weather Based Agro Advisory Services under IMD – ICAR KVK, Sirugamani, Tiruchirappalli	**Dr. C. Raja Babu,** Programme Coordinator **Dr. V. Guhan** SMS (Agrometeorology)	2019 – 2024	Project discontinued from 1.3.2024
14.	Setting up District Agro Met Units (DAMUs) at KVKs for Weather Based Agro Advisory Services under IMD-ICAR, KVK, Tiruvallur, Thirur District	**Dr. S. Banumathy,** Programme Coordinator **Dr. S. Arul Prasd** SMS (Agrometeorology)	2019 – 2024	Project discontinued from 1.3.2024
15.	Setting up District Agro Met Units (DAMUs) at KVKs for Weather Based Agro Advisory Services under IMD-ICAR, KVK, Virinjipuram, Vellore.	**Dr. A. Thirumurugan** Programme Coordinator **Ms. K. Rathika**, SMS (Agrometeorology)	2019 – 2024	Project discontinued from 1.3.2024
16.	Setting up District Agro Met Units (DAMUs) at KVKs for Weather Based Agro Advisory Services under ICAR-IMD Collaboration – KVK, Aruppukottai, Virudhunagar.	**Dr. ChelviRamessh** Prog. Coordinator **Dr. N.S. Sudarmanian** SMS (Agrometeorology)	2019 – 2024	Project discontinued from 1.3.2024
17.	**GoTN/TANTRANSCO/DCM/CBE/ACRC/R001.** Improving the accuracy with seamless development of TNAU's high resolution medium range weather forecast and Upgrading TNAU AAS web cum Mobile App.	**Dr. Ga. Dheebakaran** Asst. Prof. (Agronomy) **Dr. N.K. Sathyamoorthy** Prof. and Head, ACRC **Dr. S. Kokilavani, ACRC**	Nov. 2023 – Oct. 2026	To be continued
III	**Theme 3: Climate change & crop modeling**			
18.	**IMD/DCM/ADT/AGR/2011/ R001** Forecasting Agricultural output using Space, Agrometeorology and Land based observations (FASAL) to Agro Advisory Services for Cauvery Delta	**Dr. K. Manikandan** Assoc. Prof. (SS&AC) **Dr. S. Elamathi** Assoc. Prof. (Agronomy)	Jan. 2011 Mar. 2024	Project Completed

	Zone TRRI, Aduthurai.	TRRI, Aduthurai		
19.	**IMD/DCM/CBE/ACR/2010/ R001** Yield forecasting for rice, maize and Groundnut in Western zone of Tamil Nadu using space, Agrometeorology and land-based observation (FASAL)	**Dr. V. Geethalakshmi** Vice Chancellor, TNAU **Dr. Ga. Dheebakaran** Assoc. Prof. (Agronomy), ACRC, TNAU, Coimbatore	Jan. 2011 Mar. 2024	Project completed
20.	**DST/DCM/CBE/FARM/2021/R001** **AISRF:** Enhancing Climate Change Adaptation Processes for Farmers and Agribusiness	**Dr. V. Geethalakshmi,** Vice Chancellor, TNAU **Dr. M. Raveendran** Director of Research **Dr. A. Senthil,** Prof. & Head, CRP	Apr 2021 to Mar. 2025	To be continued
21.	**ICAR-BISA/DCM/CBE/ACRC/ 2023/R001** ICAR – CRIDA & BISA – CIMMYT sponsored scheme titled 'Atlas of Climate Adaptation in South Asian Agriculture (ACASA): Developing Climate Change Strategies at granular scale for Tamil Nadu'	**Dr. Ga. Dheebakaran** Assoc. Prof. (Agronomy)	Nov. 2023 – Dec. 2025	To be continued

AICRP-IFS, DEPARTMENT OF AGRONOMY

A1. For Adoption: 01

1. Integrated Farming System for marginal farmers of Cauvery New Delta Zone (Sustainable Resource Management for Climate Smart IFS)

Centre: AICRP-IFS Sub centre, ARS, Thanjavur

- Integrated Farming System model involving components *viz.,* Crop + Horticulture + Dairy + Fishery + Poultry + Vermicompost recorded a total net return of Rs. 2,18,888/- year.
- The maximum net return of Rs. 75,744/- was obtained from cropping system followed by Rs. 58,550/- from the dairy unit and Rs. 31,110/- from fishery unit.
- A major share of 35 % was contributed by cropping system to the net income followed by dairy unit (25%) and fishery unit (15%). This model promotes employment generation was 411-man days. About 28.0 % of inputs generated from the IFS model was recycled within the system.

A2. OFT- Nil

A3. For Information: 04

1. Identification of cropping system module for different farming system modules (New Cauvery Delta Zone)

Centre: AICRP-IFS Sub centre, ARS, Thanjavur

- Cropping system involving Maize- Rice (*Seeraga samba*) - Bhendi + blackgram (5:1) produced higher Rice Grain Equivalent Yield of 25285 Kg/ha with net return of Rs.3,53,113 / ha/year and BCR of 3.0 at Cauvery Delta Zone of Thanjavur.

2. On-Farm crop response to plant nutrients in pre-dominant cropping systems

Centre: AICRP-IFS OFR centre, MRS, Vagarai.

- In high productive block, recommended dose of fertilizer application of 250:75:75 kg NPK/ha with ZnSO4 @ 37.5 kg/ha registered significantly higher maize grain yield of 10471 kg/ha, highest system net return of Rs.85,824/ha and BCR of 1.88 in maize-maize cropping system.
- In low productive block, groundnut- gingelly cropping system recorded highest groundnut yield of 2039 kg/ha with the application of 25:50:75 kg N, P and K/ha + Borax @ 10 kg/ha during *rabi* season. Highest gingelly grain yield of 731 kg/ha was registered in application of 35:23:23 kg N, P and K/ha + $MnSO_4$ @ 5 kg/ha during summer.

- In low productive block, balanced application of NPK fertilizers along with micro nutrient in groundnut-gingelly cropping system produced highest system yield of 2770 kg/ha, highest system net return of Rs.1,27,437/ha and BCR of 2.48.

3. Diversification of Existing Farming Systems under Marginal household conditions

Centre: AICRP-IFS OFR centre, MRS, Vagarai

- Among the farming systems, Crop + Dairy+ poultry and Crop + Dairy + Goat/sheep + poultry farming systems recorded 51% and 93% increased mean net income (Rs.98,602 and Rs. 1,40,281) respectively over benchmark survey

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

Centre: AICRP-IFS OFR centre, MRS, Vagarai

- Among the farming systems, Crop +Dairy + poultry and Crop + Dairy+ Goat/sheep + poultry recorded 49% and 84% enhanced mean total net income of (Rs.1,36,568 and Rs.1,70,977) respectively over benchmark survey

Action plan proposed (2024-25): 01

1. Impact Assessment of Integrated Farming System in Tamil Nadu

Objectives

- To study the impact of IFS on income and employment generation in farmers' holdings of Tamil Nadu
- To assess the extent of value addition in farm produce by the IFS farmers

Technical Programme

S. No.	Districts	Total Beneficiary Farms	IFS Beneficiary (10%)	Non-IFS Beneficiary (10%)	Total Farms (Nos.)
1.	Thanjavur	100	10	10	20
2.	Karur	100	10	10	20
3.	Tirupur	100	10	10	20
4.	Dharmapuri	100	10	10	20
5.	Krishnagiri	100	10	10	20
6.	Tirupattur	100	10	10	20
	Total	600	60	60	120

Duration: 2024-2025

Centre and Scientist: Dr. S. Senthilnathan, Assoc. Prof. (Agrl. Economics), AICRP-IFS, Dept. of Agronomy, TNAU, Coimbatore

Expected Outcome: Impact assessment of Integrated Farming System Protocol in Tamil Nadu

C. Research Projects and Remarks

Remarks on the Ongoing URPs /AICRPs / Externally Funded Projects

S. No.	Project Number and Title	Scientist in-charge	Duration	Remarks
I	**URP** **DCM/CBE/AGR/NON/2022/001** Prediction and validation of carbon footprint in components of IFS model	**Dr. K. Sivasubramanian** Prof. (Env. Sci.) **Dr. P.M. Shanmugam** Prof. (Agronomy) **Dr. S.P. Sangeetha** Asst. Prof. (SS&AC)	April 2022 - May 2024	Project may be concluded and completion report may be submitted
II	**AICRP-IFS**			
1.	**AICRP/DCM/CBE/AGR/001** Sustainable resource management for climate smart IFS	**Dr. P.M. Shanmugam** Prof. (Agronomy) **Dr. S.P. Sangeetha** Asst. Prof. (Agronomy) **Dr. K. Sivasubramanian** Professor (ENS)	April 2023 - May 2028	The project may be continued
2.	**AICRP/DCM/CBE/AGR/001** Expt. 1 a. - Identification of cropping system module for different farming system modules	**Dr. S.P. Sangeetha,** Asst. Prof. (Agron.) **Dr. P.M. Shanmugam** Professor (Agronomy) **Dr. K. Sivasubramanian** Professor (ENS)	April 2023 - May 2028	The project may be continued
3.	**AICRP/DCM - CBE – AGR/001** Carbon crediting and GHG emission in IFS model	**Dr. K. Sivasubramanian** Professor (ENS) **Dr. P.M. Shanmugam** Professor (Agronomy) **Dr. S.P. Sangeetha**, Asst. Prof. (Agronomy)	April 2023 - May 2028	The project may be continued
4.	**AICRP/DCM - CBE - AGR/001** Sustainable Resource Management for Climate Smart IFS	**Dr. T. Parthipan,** Asst. Prof. (Agronomy), ARS, Thanjavur	Apr.23- May 2028	The project may be continued
5.	**AICRP/DCM - CBE - AGR/001**	**Dr. T. Parthipan,**	April 2017-	The project may

	Identification of cropping system module for different farming system modules	Asst. Prof. (Agron.), ARS, Thanjavur	May 2024	be continued
6.	**AICRP/DCM - CBE – AGR/001** OFR Experiment I: On-Farm crop response to plant nutrients in pre-dominant cropping systems	**Dr. N. Satheeshkumar,** Assoc. Prof. (Agron.), MRS, Vagarai	April 2023-May 2027	The project may be continued
7.	**AICRP/DCM - CBE – AGR/001** OFR Experiment II: Diversification of Existing Farming Systems under Marginal household conditions	**Dr. N. Satheeshkumar,** Assoc. Prof. (Agron.), MRS, Vagarai	April 2023-May 2027	The project may be continued
8.	**AICRP/DCM - CBE – AGR/001** OFR Experiment III: On-farm evaluation of farming system modules for profitability and livelihood of small & marginal farmers	**Dr. N. Satheeshkumar,** Assoc. Prof. (Agron.), MRS, Vagarai	April 2023-May 2027	The project may be continued
9.	**AICRP/DCM - CBE - AGR/001** Pilot study on "Model Value Chain Development for Integrated Farming Systems"	**Dr. S.K. Natarajan,** Assoc. Prof. (Agron.), TCRS, Yethapur	April 2022 to May 2027	The project may be continued
II	**Externally funded project**			
10.	**ICAR/Pilot/DCM/CBE/AGR/ 2023 / R001** Pilot project for Crop Diversification	**Dr. P.M. Shanmugam** Prof. (Agronomy) **Dr. K. Sivasubramanian** Professor (ENS) **Dr. S.P. Sangeetha** Asst. Prof. (Agronomy)	Oct 2023 to Sep 2028	The project may be continued

NAMMAZHVAR ORGANIC FARMING RESEARCH CENTRE

A1. For Adoption - Nil

A2. For OFT: 01

OFT 1. Evaluation of bioorganic fertilizer formulations suitable for organic vegetable production

Crop: Tomato

Treatment details

T_1 - Existing organic package of practices developed by NOFRC
T_2 - Bioorganic fertilizer formulation @ 1000 kg/ha
T_3 - Farmer's practice

Observations to be recorded

Initial and postharvest soil analysis:

pH, EC, Available N, P, K, OC, Ca, Mg, micronutrients, microbial diversity

Growth & yield parameters:

Plant height, average fruit weight, number of fruits per plant, yield / ha

Co-ordinating centre: NOFRC, TNAU, Coimbatore

Scientists In-charge: Dr. E. Parameswari, Assoc. Prof. (Env. Sci)
Dr. P. Janaki, Professor (SS&AC)
Dr. M. Suganthy, Professor (Agrl. Ento)

OFT centres & Scientists In-charge:
KVK, Sandhiyur: Dr. P. Kalaiselvi, Assoc. Prof. (Env. Sci)
FC&RI, Mettupalayam: Dr. K. Suganya, Assoc. Prof. (Env. Sci)
AC&RI, Kudimiyanmalai: Dr. S. Paul Sebastian, Asst. Prof. (Env. Sci)
HC&RI, Paiyur: Dr. A. Krishnaveni, Assoc. Prof. (Env. Sci)
ARS, Vagaidam: Dr. M.P. Kavitha, Assoc. Prof. (Agronomy)

OFT 2: Evaluation of BioGreen for improving growth and yield of greens

Treatment details

T_1 - Foliar spay of panchagavya @3 % twice at 10 and 20 DAS
T_2 – Foliar spay of BioGreen @ 3 % twice at 10 and 20 DAS
T_3 - Farmer's practice

Crops: Palak, amaranthus, leafy coriander

Co-ordinating centre: NOFRC, TNAU, Coimbatore

Scientists In-charge: Dr. P. S. Kavitha, Assoc. Prof. (Hort), DPM, TNAU, Coimbatore
Dr. M. Kavitha, Assoc. Prof. (Hort.), HC & RI, Coimbatore
Dr. E. Parameswari, Assoc. Prof. (Env. Sci.), NOFRC

OFT centres & Scientists In-charge:
KVK, Sandhiyur: Dr. P. Kalaiselvi, Assoc. Prof. (ENS)
HC & RI, Paiyur: Dr. B. Senthamizhselvi, Assoc. Prof. (Hort)
VRS, Palur: Dr. K.S. Vijayselvaraj, Assoc. Prof. (Hort)
HC & RI, Periyakulam: Dr. K. Nageswari, Prof. & Head, Dept. of Veg. Sciences

OFT 3: Evaluation of organic pot mixture supplements for home / rooftop garden

Treatment details

T_1 - Vermicompost (50 g @ 15 days interval for greens and 100 g @ monthly intervals for all other crops)
T_2 - Organic pot mixture supplement (50 g @ 15 days interval for greens and 100 g @ monthly intervals for all other crops)
T_3 - Untreated control

Crops: Kitchen garden / roof garden potted plants (greens, vegetables and ornamentals)

Co-ordinating centre: NOFRC, TNAU, Coimbatore

Scientists In-charge: Dr. P. S. Kavitha, Assoc. Prof. (Hort), DPM, TNAU, Coimbatore
Dr. M. Kavitha, Assoc. Prof. (Hort.), HC & RI, Coimbatore
Dr. E. Parameswari, Assoc. Prof. (Env. Sciences), NOFRC, Cbe
Dr. A. Ramalakshmi, Assoc. Prof. (Microbiology), Dept. of Food Processing Engineering, AEC & RI, Coimbatore

OFT centres & Scientists In-charge:
KVK, Sandhiyur: Dr. P. Kalaiselvi, Assoc. Prof. (ENS)
HC & RI, Paiyur: Dr. S. Srividhya, Assoc. Prof. (Hort)
VRS, Palur: Dr. K.S. Vijayselvaraj, Assoc. Prof. (Hort)
HC & RI, Periyakulam: Dr. K. Nageswari, Prof. & Head, Dept. of Veg Sciences

A3. For information: 06

1. The IOFS model comprising of crop, livestock, fodder, perennial horticultural plantations, composting units, agroforestry and pest repellent cafeteria has provided the net income of Rs.78,575/- per annum with BCR of 1.98 generating an average employment of 535 man days per year. Location specific IOFS models have been established in 14 KVKs of TNAU and are being maintained to create awareness to the farmers.
2. Bioorganic Fertilizer @ 1000 kg/ha recorded higher fruit yield of 36.8 t/ha in tomato with the B:C ratio of 3.41 and found superior over the existing organic package of practices.
3. The formulation BioGreen 4 was found to be the superior biostimulant for improving

growth, yield and quality parameters in palak.

4. Pot mixture supplement 4 was found to be the best treatment for improving growth, yield parameters in palak.
5. Agniastra 1 and brahmastra 1 @ 3 litres per acre were found to be statistically on par with each other in the management of thrips and leaf curl damage in chilli, shoot and fruit borer in brinjal and thrips infesting chilli, while, agniastra 1 was found to be superior over brahmastra 1 in the management of whiteflies. Regarding leaf miner damage, all the three formulations of agniastra (1, 2 and 3) were found to be statistically on par with each other.
6. Among the different farming systems evaluated for the management of insect pests of vegetable cops, inorganic practice with chemical insecticides was superior in the management of thrips in chilli, shoot and fruit borer in brinjal, thrips, whiteflies and leaf miner in tomato. It was followed by organic and natural farming systems.

Research Projects and Remarks

S. No.	Centre	URP	ICAR	EFP	Total	Project recommended for closure
1.	Network Project on Organic Farming	-	1	-	1	-
2.	NOFRC - Main	5	-	-	5	-
	Total number of projects	**5**	**1**	**-**	**6**	**-**

A. Remarks on the Ongoing URPs/ICAR

S. No.	Project Number and Title	Scientist in-charge	Duration	Remarks
I.	**ICAR**			
1.	ICAR / DCM / CBE / SOA / 2015 / R001 Network Project on Organic Farming: Development of Integrated Organic Farming System (IOFS) Model	Dr. R. Krishnan Dr. M. Kavino Dr. M. Suganthy	June, 2024 to May, 2029	The project may be continued with perennial cropping system
II.	**URP**			
1.	DCM /CBE/ ENS/ NONCROP /2023 / 104 Development and evaluation of bioorganic fertilizer formulations suitable for organic production system	Dr. E. Parameswari Dr. P. Janaki Dr. M. Suganthy Dr. P.S. Kavitha	January 2023 to December 2024	The project may be continued and the results may be proposed for OFT
2.	DCM/CBE/NOFRC/HOR/2023/001 Standardization of bio-formulation for improving growth and yield in greens	Dr. P.S. Kavitha Dr. M. Suganthy Dr. E. Parameswari Dr. M. Kavitha	January 2023 to March 2024	The project may be closed after taking up confirmatory trial The results may be proposed for OFT
3.	DCM/CBE/NOFRC/HOR/2023/002 Development of organic pot mixture supplements for home gardens	Dr. P.S. Kavitha Dr. P. Janaki Dr. E. Parameswari Dr. G. Thangamani	January 2023 to March 2024	The project may be closed after taking up confirmatory trial The results may be proposed for OFT
4.	DCM/CBE/AEN/HORT.CROPS/2023/255Studies on the efficacy of astras in vegetable pest management	Dr. M. Suganthy Dr. K. Ganesan	October, 2023 - September, 2025	The project may be continued
5.	DCM/CBE/AEN/HORT.CROPS/2023/257 Comparative evaluation of different farming systems in the management of insect pests of vegetable crops	Dr. M. Suganthy Dr. K. Ganesan	October, 2023 - September, 2025	The project may be continued

VETERINARY AND ANIMAL SCIENCES

A1. For Adoption: NIL

A2: For OFT: NIL

A3: For Information: 01

1. On assessing the quantity of broiler poultry litter under institutional environment, it was evaluated that a commercial broiler bird was producing 609 g of excreta in a production period of 42 days (@ 255 g/kg live weight). This finding will be useful to the broiler industry stakeholders and farmers in planning of logistics, forecasting space requirement and processing requirement of broiler poultry litter

B. Remarks on the Ongoing URPs /AICRPs / Externally Funded Projects

S. No.	Project Number and Title	Scientist in-charge	Duration	Remarks
Animal Sciences				
1.	**URP** **DCM/CBE/VAS/NONCROP/2023/206** Assessing quantity for broiler poultry litter in commercial broiler birds under institutional environment	Dr. M. Thirunavukkarasu Asst. Prof., Dept. of Agronomy (V&AS unit), TNAU, Coimbatore Dr. S. Karthikeyan Prof & Head, PHTC, Coimbatore	September 2023 to December 2024	Project may be closed and completion report to be submitted
2.	**URP** **DCM/CBE/VAS/NONCROP/2023/207** Enhancing the quality of broiler poultry litter and reducing the period of composting of broiler poultry litter with microbial consortium	Dr. M. Thirunavukkarasu Asst. Prof., Dept. of Agronomy (V&AS unit), TNAU, Coimbatore Dr. S. Karthikeyan Prof & Head, PHTC, Coimbatore	September 2023 to December 2024	Project to be continued
3.	**URP** **DCM/PPY/VAS/Non crop/2023/079** Effect of low cost feed supplement on growth performance and economics of TANUVAS Aseel birds in Backyard system	Dr. R. Thangadurai, Asst. Prof. (VAS) Dr. M.A. Vennila, Assoc. Prof. (Agrl. Extension)	March 2023 to March 2024	Project may be closed and completion report to be submitted
4.	**URP**	Dr. R. Thangadurai, Asst. Prof. (VAS)	March 2024 to	The project may be

	DCM/PPY/VAS/Non crop/2024/023 Effect of flooring on growth performance and biometry of Mecheri lamb	Dr. M.A. Vennila, Assoc Prof. (Agrl. Extension) Dr. P. Kohila, Asst. Prof. (VAS)	March 2026	continued
5.	**URP** **DCM/CBE/VAS/NONCROP/2023/282** Study the effect of Phytogenetic feed additives as an alternative to antibiotic growth promoter in Broilers	Dr. P. Chitra, Assoc. Prof. Dept. of Agronomy (V&AS unit) TNAU, Coimbatore Dr. P. Kohila, Asst. Prof., Dept. of Agronomy (V&AS unit)	December 2023 to November 2025	Project to be continued
6.	**URP** **DCM/CBE/VAS/Non crop/2024/001** Evaluation of Milk Enzymatic Profile as an indicator of subclinical mastitis in crossbred dairy cattle	Dr. P. Kohila, Asst. Prof. (VAS) Dr. P. Chitra, Assoc. Prof. (VAS) Dr. M. Thirunavukkarasu, Asst. Prof. (VAS)	January 2024 to December 2025	The project to be continued
7.	**URP** **DCM/VNR/VAS/NON Crop/2024/107** Holistic approach on detection control and management of sub clinical mastitis in dairy cows	Dr. M. Balumahendiran, Asst. Prof. (VAS)	May 2024 to May 2026	The project to be continued

CENTRE FOR WATER AND GEOSPATIAL STUDIES

I. Research Projects

Theme	URP	Action plan	AICRP	EFP	Total
Water Technology Centre	-	3	7	8	**18**
Remote Sensing & GIS	4	-	-	12	**16**
				Total	**34**

A. Centre for Water and Geospatial Studies

1. **Technologies for adoption/OFT: Nil**
2. **Research Projects and remarks**

2.1 Remarks on the ongoing University Research Projects / AICRP / Externally Funded Projects

S. No.	Project No. and Title	Project leaders	Duration	Remarks
1.	Standardization of automated irrigation to increase water productivity in major irrigated crops	**CWGS- Coimbatore** Dr. V. Ravikumar, Prof. & Head, Dept. of SWCE Dr. M. Raju, Professor (Agronomy) Dr. S. Selvakumar, Professor (SWCE) Dr. A.P. Sivamurugan, Assoc. Prof., (Agron) Dr. K.P. Ragunath, Assoc. Prof. (SS&AC) **ARS, Bhavanisagar** Dr. N. Sakthivel, Professor and Head Dr. V. Vakeeshwaran, Assoc. Prof. (SST) **AC&RI, Madurai** Dr. Veeraputhiran, Professor (Agronomy) Dr. Bhakiyathu saliha, Professor (SS&AC)	June,2022–May,2024	Project may be closed
2.	Working out the water productivity in different sub basins and developing policy document on crop planning, crop intensification and alternate livelihood	Dr. S. Pazhanivelan, Director (CWGS) Dr. S. Selvakumar, Professor (SWCE) Dr. A.P. Sivamurugan, Assoc. Prof. (Agron) Dr. K.P. Ragunath, Assoc. Prof. (SS&AC)	June,2022–May,2024	Project may be continued
3.	Assessing methane emission by using satellite measurements and field-based observation	Dr. S. Pazhanivelan, Director (CWGS) Dr. K.P. Ragunath, Assoc. Prof. (SS&AC) Dr. A.P. Sivamurugan, Assoc. Prof. (Agron)	June,2022–May,2024	Project may be continued
4.	**ICAR/AICRP/WTC/CBE/IWM/001** Identification of potential Groundwater Recharge zones in various river basins of Tamil Nadu	Dr. V. Ravikumar, Prof. & Head, Dept. of SWCE	2020-2023	Project may be continued
5.	**ICAR/AICRP/WTC/CBE/IWM/001** Design of Sediment Filtration for Groundwater Recharge through wells	Dr. V. Ravikumar, Prof. & Head, Dept. of SWCE	2021-2024	Project may be closed
6.	**ICAR/AICRP/WTC/CBE/IWM/001** Assessment of Water Resources in the Pambar Kottakkaraiyar River Basin - Water Budgeting for Tamil Nadu	Dr. S. Selvakumar, Professor (SWCE)	2022-2024	Project may be continued
7.	**ICAR/AICRP/WTC/CBE/IWM/001**	Dr. S. Selvakumar, Professor (SWCE)	2022-2024	Project may be

S. No.	Project No. and Title	Project leaders	Duration	Remarks
	Estimation of crop coefficient for Cotton under drip irrigation	Dr. V. Ravikumar, Prof. & Head, Dept. of SWCE		continued
8.	**ICAR/AICRP/WTC/CBE/IWM/001** Estimation of crop coefficient of Banana under drip irrigation in western zone of Tamil Nadu	Dr. S. Selvakumar, Professor (SWCE) Dr. V. Ravikumar, Prof. & Head, Dept. of SWCE	2023-2024	Project may be continued
9.	**ICAR/AICRP/WTC/CBE/IWM/001** Developing water management strategy under water deficit in semi dry rice cultivation	Dr. S. Rani, Assistant Professor (Agronomy) Department of Agronomy, AC&RI, Madurai Dr. J. Prabhaharan, Assoc. Prof. (SS&AC), Dept. of Agronomy, AC&RI, Madurai	June, 2023 to May, 2026	Project may be continued
10.	**ICAR/AICRP/WTC/CBE/IWM/001** IPNS based Coordinated Fertigation experiment in Chilli	Dr. J. Prabhaharan, Assoc. Prof. (SS&AC), Dept. of Agronomy, AC&RI, Madurai Dr. S. Rani, Asst. Prof. (Agron.), Dept. of Agronomy, AC&RI, Madurai	2021-2023	Project may be continued
11.	**F36NT** Tamil Nadu Irrigated Agriculture Modernisation Project (TNIAMP)	Dr. S. Pazhanivelan, Director (CWGS) & Nodal Officer (TNIAMP) Dr. M. Raju, Professor (Agronomy) Dr. A.P. Sivamurugan, Assoc. Prof. (Agron) Scientists of different sub basins	2017-2024	Project may be continued
12.	**WAYCOOL-CCX/CWGS/CBE/2024/New** Enhancing resilience of farmers through regenerative agriculture	Dr. S. Pazhanivelan, Director (CWGS) Dr. P.C. Prabu, Associate Professor (ENS) R. Baskaran, Professor (Agronomy) S. Thiruvarasan, Assoc. Prof. (Agron) Dr. C. Sivakumar, Professor (Agronomy) M. Raju, Professor (Agronomy)	April,2024 to March,2027	Project may be continued
13.	**IFFCO/CWGS/CBE/2023/R00** Insights and field validation of nano fertilizers in major crops under different agro ecosystems	Dr. S. Pazhanivelan, Director (CWGS) Dr. M. Raveendran, Director of Research Dr. P. Kannan, Associate Professor (SS&AC)	November, 2023 – Nov., 2025	Project may be continued
14.	**IRRI/CWGS/CBE/2024/R001** Greenhouse gas measurement under rice-based systems in different rice growing agro-ecologies of India	Dr. S. Pazhanivelan, Director (CWGS) Dr. M. Raveendran, Director of Research Dr. P. Kannan, Associate Professor (SS&AC) Dr. P.C. Prabu, Associate Professor (ENS)	August, 2023 to July,2026	Project may be continued

S. No.	Project No. and Title	Project leaders	Duration	Remarks
		Dr. A.P. Sivamurugan, Assoc. Prof. (Agron)		
15.	**NICRA/NRM/CBE/RSGIS/2022/R001** Assessing crop loss during extreme weather events integrating satellite and Drone imageries with crop growth models	Dr. S. Pazhanivelan, Director (CWGS) Dr. K.P. Ragunath, Associate Professor (SS&AC)	Jan,2022 to Dec, 2024	Project may be continued
16.	**CCX-TNAU/WTC/CBE/2022/R001** Climate resilient rice farming system through innovative water management practices by farmer participatory approach	Dr. V. Geethalakshmi, Vice-Chancellor, TNAU Dr. S. Pazhanivelan, Director (CWGS) Dr. M. Rajavel, Associate Professor (CRP) Dr. M. Raju, Professor (Agronomy) Dr. A.P. Sivamurugan, Assoc. Prof. (Agron) Dr. K.P. Ragunath, Assoc. Prof. (SS&AC) Dr. R. Tamizh Vendhan, Registrar, TNAU Dr. R. Kumaraperumal, Assoc. Prof. (SS&AC) Scientists of different sub basins	Dec, 2022 to March, 2027	Project may be continued
17.	**GOI/MNCFC/CWGS/CBE/2023/R001** GP level crop yield estimation using SAR and optical satellite data integrating crop growth models for non-cereal crops	Dr. S. Pazhanivelan, Director (CWGS) Dr. M. Raju, Professor (Agronomy) Dr. A.P. Sivamurugan, Assoc. Prof. (Agron) Dr. K.P. Ragunath, Assoc. Prof. (SS&AC) Dr. R. Kumaraperumal, Assoc. Prof. (SS&AC) Dr. Mrunalinikancheti, Sr. Scientist (Agron)	April,2023 to March,2024	Project may be continued
18.	**COCA-COLACWGSCBE/2023/R001** Creating spatial data base on mango growing areas with varietal information using remote sensing, drone and mobile mapping techniques	Dr. S. Pazhanivelan, Director (CWGS) Dr. M. Raveendran, Director of Research Dr. M. Raju, Professor (Agronomy) Dr. K.P. Ragunath, Assoc. Prof. (SS&AC) Dr. A.P. Sivamurugan, Assoc. Prof. (Agron) Dr. N.K. Sathyamoorthy, Prof. & Head (ACRC) Dr. C. Sivakumar, Professor (Agronomy)	August, 2023 to July, 2025	Project may be continued
19.	**TNPCB/CWGS/CBE/2024/R001** Soil quality mapping across industrial areas of Tamil Nadu using geospatial tools	Dr. V. Geethalakshmi, Vice-Chancellor, TNAU Dr. S. Pazhanivelan, Director (CWGS) Dr. M. Raveendran, Director of Research Dr. P.C. Prabu, Associate Professor (ENS) Dr. K.P. Ragunath, Assoc. Prof. (SS&AC) Dr. S. Selvakuamr, Professor (SWCE)	March, 2024 to February, 2026	Project may be continued

S. No.	Project No. and Title	Project leaders	Duration	Remarks
		Dr. P. Kannan, Associate Professor (SS&AC)		
20.	**PKF/CWGS/CBE/2024/R001** Mapping coconut plantations in Tamil Nadu using geospatial technologies and developing strategies for sustainable coconut farming	Dr. S. Pazhanivelan, Director (CWGS) Dr. A.P. Sivamurugan, Assoc. Prof. (Agron) Dr. M. Raju, Professor (Agronomy), Dr. K.P. Ragunath, Assoc. Prof. (SS&AC) Dr. P. Kannan, Associate Professor (SS&AC) Dr. S. Praneetha, Professor (Horticulture)	March, 2024 to February, 2025	Project may be continued
21.	**GOI/YESTECH/CWGS/CBE/2024/R001** Technology based yield estimation (YESTECH) under PMFBY in Tamil Nadu	Dr. S. Pazhanivelan, Director (CWGS) Dr. K.P. Ragunath, Assoc. Prof. (SS&AC) Dr. A. P. Sivamurugan, Assoc. Prof. (Agron) Dr. S. Selvakumar, Professor (SWCE) Dr. M. Raju, Professor (Agronomy) Dr. P. Kannan, Associate Professor (SS&AC) Dr. P.C. Prabu, Associate Professor (ENS)	March, 2024 to February, 2025	Project may be continued
22.	**BE/IFFCO/CWGS/CBE/2024/R001** Effect of different bio-stimulants (MirakFx and Surfafour) on growth and yield of Blackgram	Dr. P. Kannan, Assoc. Prof. (SS&AC)	May 2024 to April 2025	Project may be continued

B. Department of Remote Sensing and GIS

1. Technologies for adoption/OFT: Nil

2. Remarks on the ongoing University Research Projects / AICRP / Externally Funded Projects

S. No.	Project No. and Title	Project leaders	Duration	Remarks
1.	**NRM/CBE/RSG/SAC/2020/001** Digital Soil Mapping using machine learning algorithms and expert system approach	Dr. R. Kumaraperumal, Assoc. Prof. (SS&AC)	October,2019 to September, 2022	Project may be closed
2.	**NRM/CBE/RS&GIS/NON/001** Quantification of Soil Nutrients using Hyperspectral Remote Sensing Techniques	Dr. R. Jagadeeswaran, Prof. (SS&AC) D. Muthumanickam, Professor and Head Dr. Bakiyathu Saliha, Professor (SS&AC), AC&RI, Madurai	November, 2021 to October, 2023	Project may be closed and the completion report is to be submitted

S. No.	Project No. and Title	Project leaders	Duration	Remarks
3.	**NRM/CBE/RSG/HOR/2021/001** Standardizing Drone Spraying of Nutrients and Plant Protection Chemicals in Agricultural and Horticultural Crops	Dr. S. Pazhanivelan, Director (CWGS) Dr. R. Kumaraperumal, Assoc. Prof. (SS&AC) Dr. K.P. Ragunath, Assoc. Prof. (SS&AC)	December 2020 to March 2023	Project may be closed
4.	**NRM/CBE/GIS/NON/2022/001** Inter-comparison of satellite-derived soil moisture products and their validation using ground-based observations	Dr. D. Muthumanickam, Prof. & Head Dr. R. Kumaraperumal, Assoc. Prof. (SSAC)	June 2022 to May 2024	Project may be closed
5.	**NRSC/NRM/CBE/RSG/2021/R001** Establishment of field equipment for validation of Evapotranspiration and Soil Moisture products	Dr. S. Pazhanivelan, Director (CWGS) Dr. D. Muthumanickam, Prof. & Head Dr. R. Kumaraperumal, Assoc. Prof. (SS&AC) Dr. K.P. Ragunath, Assoc. Prof. (SS&AC)	Sep, 2021 to March, 2024	Project may be continued
6.	**GoTN/CWGS/CBE/RSGIS/ 2024/R001** Mapping of Soil Type in Reserved Forest of Coimbatore District Using GIS Techniques	Dr. S. Pazhanivelan, Director (CWGS) Dr. D. Muthumanickam, Prof. and Head Dr. R. Kumaraperumal, Assoc. Prof. (SS&AC) Dr. R. Jagadeeswaran, Prof. (SS&AC) Dr. K.P. Ragunath, Assoc. Prof. (SS&AC)	February, 2024 to November, 2024	Project may be continued

II. Action plans proposed for 2024-27

S. No.	Action plans proposed
1.	**Detailed soil survey, Digital Soil mapping and quantification of soil nutrients** **Activities** Detailed soil survey and digital soil mapping in Tamil Nadu Soil mapping in notified forest areas in Coimbatore district Land degradation mapping Duration: Three Years (2024–2027) Linkages established: SLUSI, NRSC, NBSS &LUP and TN Govt. Forest Department **Centres with Scientist** **CWGS** Dr. S. Pazhanivelan, Director (CWGS)

	Dr. K.P. Ragunath, Associate Professor (SS&AC) Dr. P. Kannan, Associate Professor (SS&AC) Dr. P.C. Prabu, Associate Professor (ENS) **Department of RS&GIS** Dr. D. Muthumanickam, Professor and Head Dr. R. Kumaraperumal, Associate Professor (SS&AC) Dr. R. Jagadeeswaran, Professor (SS&AC) **AC&RI, Madurai** Dr. S. Sheeba, Professor and Head, Department of SS&AC **RRS, Vridhachalam** Dr. R. Baskaran, Professor and Head, Dr. C. Harisudan, Associate Professor (Agronomy) **ADAC, Trichy** Dr. M. Baskar, Professor and Head Dr. S. Rathika, Associate Professor (Agronomy) **Expected outcome** Cadastral level soil nutrient map Block level soil available nutrient status Digital Soil Maps Spectral library on soil nutrients Land Degradation maps of Tamil Nadu
2.	**Crop Area Mapping and Yield Estimation** **Activities** Rice area mapping and yield estimation for insurances Developing technology-based yield estimation methodologies in other field crops Mapping horticultural crops and plantations using object-based classification Duration: Three Years (2024–2027) Linkages established: MNCFC, NRSC, SAC, IRRI, Coca-Cola, PKF, DES and DoA **Centre with Scientist** Dr. S. Pazhanivelan, Director (CWGS) Dr. K.P. Ragunath, Associate Professor (SS&AC) Dr. A.P. Sivamurugan, Associate Professor (Agronomy) **Expected outcome** Real time area statistics and maps on crop area, yield and losses at District, Block and village level for rice, cotton, maize, pulses, groundnut, sugarcane and millets

	Automated crop information system Maps and statistics on tomato, onion and turmeric
3.	**Crop loss assessment, climate change and environmental monitoring using geospatial technologies** **Activities** Developing methodology for crop loss assessment due to flood, cyclone and drought Spatial estimation of ET and Soil moisture & Spatial estimation of methane emission Mapping of Industrial Polluted areas Developing protocols for implementing regenerative agriculture Duration: Three Years (2024–2027) Linkages established: ICAR-NICRA, CCX, IRRI, Waycool, TNPCB **Centres with Scientist** **CWGS** Dr. S. Pazhanivelan, Director (CWGS) Dr. K.P. Ragunath, Associate Professor (SS&AC) Dr. P. Kannan, Associate Professor (SS&AC) Dr. D. Muthumanickam, Professor and Head Dr. P.C. Prabu, Associate Professor (ENS) **KVK, Papparapatti** Dr. C. Sivakumar, Professor (Agronomy) **ORS, Tindivanam** Dr. S. Thiruvarassan, Associate Professor (Agronomy) **RRS, Vridhachalam** Dr. R. Baskaran, Professor and Head **ARS, Kovilpatti** Dr. Bakiyathu Saliha, Professor and Head **Expected outcome** Methodology for crop loss assessment during disasters Maps and statistics on ET and soil moisture Spatial estimation and quantification of methane emission from rice ecosystem Mapping of Industrial Polluted areas and Mining sites in Tamil Nadu

4.	**Water resources monitoring and irrigation water management** **Activities** Surface and groundwater quantity and quality monitoring Revisiting crop water requirement at subbasin level Innovative water harvesting structures and artificial ground water recharge Duration: Three Years (2024–2027) Linkages established: CGWB, IIWM **Centres with Scientist** Dr. S. Pazhanivelan, Director (CWGS) Dr. K.P. Ragunath, Associate Professor (SS&AC) Dr. R. Kumaraperumal, Associate Professor (SS&AC) Dr. S. Selvakumar, Professor (SWCE) Dr. M. Raju, Professor (Agronomy) Dr. A.P. Sivamurugan, Associate Professor (Agronomy) **Expected outcome** Crop area maps for sub basins and crop cover change Information on water storage in major tanks Water resource mapping–water spread & duration of water availability in tanks and its impact on crop yield and intensity of cropping
5.	**Developing drone based comprehensive spraying protocol for major crops** **Activities** Developing comprehensive drone spraying protocol for various inputs in field and horticultural crops Standardize spray dynamics by selecting right drone model and nozzles Capacity building / Drone pilot licensing / Demonstrations Duration: Three Years (2024–2027) Linkages established: DoA, MoA&FW, DGCA **Centres with Scientist** **Department of RS&GIS** Dr. R. Kumaraperumal, Associate Professor (SS&AC) Dr. D. Muthumanickam, Professor and Head Dr. R. Jagadeeswaran, Professor (SS&AC) **CWGS** Dr. S. Pazhanivelan, Director (CWGS) Dr. K.P. Ragunath, Associate Professor (SS&AC Dr. A. P. Sivamurugan, Associate Professor (Agronomy)

	Crop Physiology Dr. Babu Rajendra Prasad, Assistant Professor (CRP) **Pathology** Dr. Senthilvel, Associate Professor (Pathology) **Expected outcome** Comprehensive standardized spraying protocol for major crops

CENTRE FOR PLANT PROTECTION STUDIES

A. Technologies for Adoption/OFT/Information

I. Technology for Adoption: Nil
II. On-farm trial: Nil
III. For information

1. Agricultural Entomology

In the bee hotels established, the non-Apis species recorded in common were carpenter bee *Xylocopa* spp, small carpenter bee *Ceratina* spp, blue banded bee *Amegilla* spp. and leaf cutter bee *Megachile* spp.

Formic acid @ 20 ml/ colony was highly effective against *Varroa* mite on *A. cerana*, followed by *Acorus calamus* extract and. *A. calamus* powder.

At field recommended dose, Chlorantraniliprole exhibited the lowest mean mortality rate in honey bees in bhendi (8.92) and cotton (5.72) ecosystems. Cyantraniliprole is relatively selective to pollinators in pumpkin and cucumber ecosystem. Managed bee pollination with *Apis cerana indica* and *Tetragonula iridipennis* resulted in highest fruit yield in pumpkin and increased performance in bee colonies

Collecting bee pollen once in three days for 2 h/ day (7 to 9 AM) did not adversely affect the Indian bee colony. Bajra pollen stood out with higher crude protein content, total amino acids & essential amino acids compared to coconut pollen through GCMS analysis

Galleria mellonella was the ideal host for the development *of Bracon hebetor* and Bracon adults spent more time on *G. mellonella* larvae. Molecular verification of *B. hebetor*, exhibited a 99 % concordance in the NCBI database (accession No. OR398970.1).

2. Plant Pathology

Three different species of phytoplasma such as *Ca. Phytoplasma aurantifolia*, *Ca. Phytoplasma trifolii* and *Ca. Phytoplasma balanitae* with different subgroups like 16SrII-D, 16SrII-G, 16SrII-N, 16SrII-F, 16SrII-U, 16SrV-B and 16SrVI-D have been identified in Tamil Nadu.

3. Nematology

The recovery of entomopathogenic nematode was assessed in 81 collected soil samples and *Metarhabditis amsactae* was confirmed from four native isolates through molecular and morphological identification.

B. Action Plan

AP 1. Cataloguing of Non Apis bee species in Different Cropping Systems
Theme Leader: Dr. V. R. Saminathan, Prof. (Ento.), TNAU, Coimbatore
Action: Documentation of various non Apis bee visitors in different cropping systems of Tamil Nadu

Observations to be recorded:
i. Collection, preservation and identification of non-Apis bees
ii. Visitation rate and handling time of major non-Apis bee species

Participating Centres:

TNAU, Coimbatore	Dr. G. Preetha, Assoc. Prof. (Ento.)
AC&RI, Madurai	Dr. B. Usharani, Assoc. Prof. (Ento.)
HC & RI, Periyakulam	Dr. S. Suganya Kanna, Assoc. Prof. & Head (Ento.)
HC & RI (W), Trichy	Dr. S. Sheeba Joyce Roseleen, Asst. Prof. (Ento.)
KVK, Tiruppur	Dr. P. A. Saravanan, Assoc. Prof. (Ento.) & Programme Coordinator

AP 2. Studies on Bee Pollination in Dragon Fruit
Theme Leader: Dr. V. R. Saminathan, Prof. (Ento.), TNAU, Coimbatore
Action: Categorization of different hymenopteran pollinators visiting the flowers of dragon fruit
Observations to be recorded:
i. Observation on the hymenopteran pollinators
ii. Identification of major pollinators of dragon fruit

Participating Centres:

TNAU, Coimbatore	Dr. V. R. Saminathan, Prof. (Ento.)
AC&RI, Madurai	Dr. B. Usharani, Assoc. Prof. (Ento.)
HC & RI, Periyakulam	Dr. S. Suganya Kanna, Assoc. Prof. & Head (Ento.)
HC & RI (W), Trichy	Dr. S. Sheeba Joyce Roseleen, Asst. Prof. (Ento.)
HRS, Ooty	Dr. B. Vinothkumar, Assoc. Prof. (Ento.)
KVK, Tiruppur	Dr. P. A. Saravanan, Assoc. Prof. (Ento.) & Programme Coordinator

AP 3. Monitoring of small hive beetle, *Aethina tumida* in Indian bee colonies
Theme Leader: Dr. V. R. Saminathan, Prof. (Ento.), TNAU, Coimbatore
Action: Assessing the intensity of small hive beetle infestation in Indian honey bee colonies of Tamil Nadu
Observations to be recorded:
i. Observation on the population of small hive beetle/ Indian bee colony
ii. Assessment on the intensity of damage by small hive beetle

Participating Centres:

TNAU, Coimbatore	Dr. V. R. Saminathan, Prof. (Ento.)
KVK, Madurai	Dr. K. Suresh, Assoc. Prof. (Ento.)
HC & RI, Periyakulam	Dr. S. Suganya Kanna, Assoc. Prof. & Head (Ento.)
HC & RI (W), Trichy	Dr. S. Sheeba Joyce Roseleen, Asst. Prof. (Ento.)
VOCAC&RI, Killikulam	Dr. K. Elanchezhyan, Assoc. Prof. (Ento.)
KVK, Papparapatty	Dr. K. Sasikumar, Asst. Prof. (Ento.)
KVK, Tiruppur	Dr. P. A. Saravanan, Assoc. Prof. (Ento.) & Programme Coordinator
ARS Virinjipuram	Dr. A. Thirumurugan, Professor (Ento.) & Head
KVK, Tirur	Dr. V.A. Vijayashanthi, Asst. Professor (Ento.)

C. Remarks on the URPs/ Externally funded projects

1. Agricultural Entomology

S. No.	Project number and title	Period	Investigators	Remarks
1.	CPPS/MDU/AEN/NONCROP/2023/ 260 Studies on survival and reproduction of black soldier fly, *Hermetia illucens* Linn (Diptera: Stratiomyidae) on different rearing substrates	January 2024 to December 2026	Dr. G. Srinivasan Prof. (Ento.) AC & RI, Madurai	Project may be continued
	AICRP			
2.	All India Coordinated Research Project (AICRP) on Honey bees and Pollinators	2023-2024	Dr. V.R. Saminathan, Professor (Ento.), TNAU, Coimbatore	Project may be continued

2. Plant Pathology

S. No.	Project number and title	Period	Investigators	Remarks
1.	**CPPS/CBE/PAT/NON/2022/ 001** Unravelling the molecular phylogeny of phytoplasmas associated with important crop plants in Tamil Nadu	July 2022 to June 2025	Dr. G. Senthilraja Assistant Professor (Plant Pathology)	Project may be continued
2.	**CPPS/MDU/PAT/RIC/2021/ 001** Genetic improvement of *Trichoderma asperellum* tolerance to hexaconazole.	April 2021 to March 2024	Dr. V. Ramamoorthy Asst. Prof. (Plant Pathology) Dr. MSS AC & RI, Eachangkottai	Project may be concluded and completion report may be submitted

3. Nematology

S. No.	Project number and title	Period	Investigators	Remarks
1.	**CPPS/ECK/CP/NON/001** Studies on native isolates of Entomopathogenic nematodes at Thanjavur District	January 2022 to December 2024	Dr. M. Shanmuga Priya, AP (Nema.) Dr. N. Seenivasan Prof. (Nema.) Dept. of Entomology Dr. MSS AC&RI, Thanjavur Dept. of Nematology, TNAU, Coimbatore	Project may be continued

D. REMARKS

General Remarks

- All the scientists may be motivated to publish research articles in peer reviewed Journals of NAAS rating more than 7.0 (**Action**: All Scientists)
- Scientists may be encouraged to submit research proposals for external funding(**Action**: All Directorates).

Natural Resource Management

- STCR technology may be popularized (**Action**: Dept. of SS&AC, TNAU, Coimbatore)
- Data on soil profile available at CWGS may be collected and utilized in monolith studies for better soil resource inventory (**Action**: Dept. of SS&AC, TNAU, Coimbatore/CWGS)
- Difference between Pusa bio-mineralizer and TNAU bio-mineralizer may be assessed (**Action**: Dept. of SS&AC, TNAU, Coimbatore).
- Root Organ Culture (ROC) of AM fungi technology may be developed at the earliest (**Action**: Dept. of Agrl. Microbiology, AC&RI, Madurai and AC&RI, Killikulam)
- New species of *Methylobacterium* may be documented (**Action**: Dept. of Agrl. Microbiology, TNAU, Coimbatore)
- Foliar spray of 1% yeast may be evaluated in other crops at critical stage of crop growth (**Action**: Dept. of Agrl. Microbiology, VOC AC&RI, Killikulam)
- Vetiver floating wetlands may be monitored and maintained continuously. (**Action**: Dept. of Environmental Sciences, TNAU, Coimbatore).
- A constructed wetland ecosystem may be established at TNAU main campus for enriching the practical knowledge of the visitors (Action: Dept. of Environmental Sciences).
- More nano products may be developed and popularized. (**Action**: CANT, TNAU, Coimbatore)

DCM

Meteorology

- Special drive may be given to popularize the TNAU-AAS Web cum Mobile App to reach at least 8 lakh farmers. The farmers' database may be obtained from the Directorates of CWGS and Extension Education and incorporated in the TNAU-AAS database immediately (**Action**: All scientists of ACRC).
- All the Heads of TNAU Research Stations and Programme Coordinators of KVKs are advised to register as much as farmers in TNAU – AAS App and share the number of farmers registered every month to Professor and Head, ACRC for submitting a consolidated report to the Vice Chancellor (**Action**: Prof. & Head, ACRC/All P&Hs/PCs of Research Stations/KVKs)

- Research on optimisation of wind speed for drone spray may be carried out (**Action**: DCM/CWGS/Dean, AEC & RI, TNAU, CBE)

AICRP-IFS

- IFS models developed at TNAU may be compared with that of farmers and location specific recommendations may be given (**Action**: DCM)
- Benefits of IFS models developed under garden land and wetland ecosystems may be assessed (**Action**: DCM)
- Enhancing inputs use efficiency in IFS through circular food systems approach may be studied (**Action**: DCM)

NOFRC

- Research on Bioorganic fertilizer formulations may be intensified.
- Research projects on management of weeds through organics and formulation of botanicals for pests and diseases may be taken up.

Veterinary and Animal Sciences

- Latest technologies developed in TANUVAS may be customized to the location specific conditions based on the farmers' need (**Action**: All VASs).
- Popularization of IFS models and development of SOP for all Districts of Tamil Nadu (**Action**: All VASs).
- Research projects to address livestock issues may be proposed (**Action**: All VASs).

CWGS

- Irrigation water requirement of crops may be revisited using advanced approaches in the context of large-scale adoption of AWDI/SRI and Micro irrigation systems.
- Water harvesting structures designed and developed under AICRP-IWM may be demonstrated in large scale
- SOPs may be developed for monitoring large scale adoption of AWDI to provide ecosystem services through carbon credit program.
- Mitigation technique to reduce GHG in rice production may be given priority.
- Interdisciplinary approach may be followed in the studies related to GHG emissions. All the findings from studies conducted at RS&GIS, ACRC and Department of ENS may be compiled and documented.

Centre for Plant Protection Studies

- Research on Bee hotel may be extended and the results may be effectively utilized for enhancing pollination
- Studies on under-utilized beneficial insects like lac may be taken up.

- A catalogue of Non Apis bee species in different cropping systems may be prepared.
- Capacity building of farmers on beekeeping may be strengthened through trainings.

E. List of Participants

S. No.	Name	Designation and Department
1.	Dr. V. Geethalakshmi	Vice Chancellor, TNAU, Coimbatore
2.	Dr. M. Raveendran	Director of Research, TNAU, Coimbatore
3.	Dr. M. Shanthi	Director, CPPS, TNAU, Coimbatore
4.	Dr. N. Senthil	Director, CPMB&B, TNAU, Coimbatore
5.	Dr. S. Pazhanivelan	Director, CWGS, TNAU, Coimbatore
6.	Dr. R. Umarani	Director, Seed Centre, TNAU, Coimbatore
7.	Dr. P. Balasubramanian	Director, NRM, TNAU, Coimbatore
8.	Dr. P. Dhevagi	Prof. & Head (ENS), TNAU, Coimbatore
9.	Dr. D. Selvi	Prof. & Head (SS&AC), TNAU, Coimbatore
10.	Dr. E. Kokiladevi	Prof. & Head (DPB), TNAU, Coimbatore
11.	Dr. V. Gomathi	Prof. & Head, Nanotechnology, TNAU, Coimbatore
12.	Dr. D. Muthumanickam	Prof. & Head, RS&GIS, AEC&RI, Coimbatore
13.	Dr. M. Baskar	Prof. & Head, Dept. of SS&AC, ADAC&RI, Trichy
14.	Dr. R. Baskaran	Prof. & Head, RRS, Vridhachalam
15.	Dr. K. Angappan	Prof. & Head, Dept. of Pl. Patho., Coimbatore
16.	Dr. K. Devrajan	Prof. & Head, Dept. of Nematology, Coimbatore
17.	Dr. M. Murugan	Prof. & Head, Dept. of Agrl. Ento., Coimbatore
18.	Dr. N.K. Sathyamoorthy	Prof. & Head, ACRC, TNAU, Coimbatore
19.	Dr. R. Krishnan	Prof. & Head, NOFRC, TNAU, Coimbatore
20.	Dr. P. Parasuraman	Prof. & Head, Agronomy, TNAU, Coimbatore
21.	Dr. K.G. Sarbarinathan	Assoc. Prof. & Head, AC&RI, Madurai
22.	Dr. P. Janaki	Professor (SS&AC), NOFRC, TNAU, Coimbatore
23.	Dr. K. Sathiya Bama	Professor (SS&AC), TNAU, Coimbatore
24.	Dr. S. Mohankumar	Professor (Biotechnology), TNAU, Coimbatore
25.	Dr. M. Maheswari	Professor (ENS), TNAU, Coimbatore
26.	Dr. T. Kalaiselvi	Professor (Mirco.), TNAU, Coimbatore
27.	Dr. A. Bharani	Professor (ENS), TNAU, Coimbatore
28.	Dr. P. Jothimani	Professor (ENS), TNAU, Coimbatore
29.	Dr. K. Kumatha	Professor (Micro.), TNAU, Coimbatore
30.	Dr. M. Sugantha	Professor (Ento.), NOFRC, Coimbatore
31.	Dr. S. Maragatham	Professor (SS&AC), TNAU, Coimbatore
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33.	Dr. M. Senthil Kumar	Professor (AGM), TNAU, Coimbatore
34.	Dr. R. Jegadeeswaran	Professor (SS&AC), RS&GIS, AEC&RI, Coimbatore
35.	Dr. G. Srinivasan	Professor (Ento.), AC&RI, Madurai
36.	Dr. V. Ravikumar	Professor (SWCE), Water & Geospatial Studies, Coimbatore
37.	Dr. K.M. Sellamuthu	Professor (SS&AC), CSW, TNAU, Coimbatore
38.	Dr. N. Seenivasan	Professor, Dept. of Nematology, Coimbatore
39.	Dr. V.R. Saminathan	Professor, Dept. of Agrl. Ento., Coimbatore
40.	Dr. M.R. Srinivasan	Professor (Agrl. Ento.), TNAU Press, Coimbatore
41.	Dr. M.P. Sugumaran	Professor (ENS), KVK, Virudhachalam
42.	Dr. P.T. Ramesh	Professor (ENS), VOC AC&RI, Killikulam

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45.	Dr. P.M. Shanmugam	Professor (Agron.), Agronomy, TNAU, Coimbatore
46.	Dr. K. Sivasubramanian	Professor (ENS), Agronomy, TNAU, Coimbatore
47.	Dr. J. Kannan	Professor (ENS), KVK, Aruppukkottai
48.	Dr. S. Selvakumar	Professor (SWCE), CWGS, TNAU, Coimbatore
49.	Dr. M. Raju	Professor (Agron.), CWGS, TNAU, Coimbatore
50.	Dr. M. Elayarajan	Professor (SS&AC), DNRM, TNAU, Coimbatore
51.	Dr. C. Babu	Professor (PBG), Directorate of Research, TNAU, Cbe
52.	Dr. N. Balakrishnan	Professor (Ento.), Directorate of Research, TNAU, Cbe
53.	Dr. K. Suganya	Assoc. Professor (ENS), FC&RI, Mettupalayam
54.	Dr. R. Jayashree	Assoc. Professor (ENS), TNAU, Coimbatore
55.	Dr. M. Sangeetha	Assoc. Professor (SS&AC), RRS, Paiyur
56.	Dr. S. Suganya	Assoc. Professor (SS&AC), TNAU, Coimbatore
57.	Dr. K. Sivakumar	Assoc. Professor (SS&AC), TNAU, Coimbatore
58.	Dr. G. Preetha	Assoc. Professor (Ento.), Seed Centre, Coimbatore
59.	Dr. S. Suganya Kanna	Assoc. Professor (Ento.), HC&RI, Periyakulam
60.	Dr. P.S. Kavitha	Assoc. Professor (Horti.), DPM, TNAU, Coimbatore
61.	Dr. P. Kalaiselvi	Assoc. Professor (ENS), KVK, Salem
62.	Dr. A. Krishnaveni	Assoc. Professor (ENS), HC&RI, Paiyur
63.	Dr. P. Chitra	Assoc. Professor (Agronomy), TNAU, Coimbatore
64.	Dr. R. Uma Sankareswari	Assoc. Professor (AGM), Dr. MSS AC&RI, Eachangkottai
65.	Dr. M. Gomathy	Assoc. Professor (AGM), TNAU, Coimbatore
66.	Dr. S. Haripriya	Assoc. Professor (Horti.), Veg. Science, HC&RI, Cbe
67.	Dr. R. Anandham	Assoc. Professor (AGM), TNAU, Coimbatore
68.	Dr. R. Kumaraperumal	Assoc. Professor (SS&AC), RS&GIS, AEC&RI, Coimbatore
69.	Dr. P.C. Prabu	Assoc. Professor (ENS), CWGS, TNAU, Coimbatore
70.	Dr. K.P. Ragunath	Assoc. Professor (SS&AC), CWGS, TNAU, Coimbatore
71.	Dr. S.K. Natarajan	Assoc. Professor (Agron.), TCRS, Yethapur
72.	Dr. V. Vakeswaran	Assoc. Professor (SST), ARS, Bhavanisagar
73.	Dr. K. Raja	Assoc. Professor, Nanotechnology, Coimbatore
74.	Dr. S. Marimuthu	Assoc. Professor, Nanotechnology, Coimbatore
75.	Dr. M. Paramasivan	Assoc. Professor (SS&AC), VOC AC&RI, Killikulam
76.	Dr. K. Suresh	Assoc. Professor (Agrl. Ento.), KVK, Madurai
77.	Dr. L. Rajendran	Assoc. Professor (Pl. Patho.), HRS, Ooty
78.	Dr. V.P. Santhanakrishnan	Assoc. Professor (Org. Chemistry), Coimbatore
79.	Dr. S. Saravanan	Assoc. Professor (V&AS), KVK, Madurai
80.	Dr. G. Sudhakar	Assoc. Professor, ARS, Vaigaidam
81.	Dr. R. Karthikeyan	Assoc. Professor (Agron.), CM, TNAU, Coimbatore
82.	Dr. V. Davamani	Assoc. Professor (ENS), NRM, TNAU, Coimbatore
83.	Dr. M. Gopalakrishnan	Assoc. Professor (SS&AC), NRM, TNAU, Coimbatore
84.	Dr. S. Marimuthu	Assoc. Professor (Agron.), NPRC, Vamban
85.	Dr. P. Kannan	Assoc. Professor (SS&AC), CWGS, TNAU, Coimbatore
86.	Dr. A.P. Sivamurugan	Assoc. Professor (Agron.), CWGS, TNAU, Coimbatore
87.	Dr. S. Paul Sebastian	Assoc. Professor (ENS), AC&RI, Kudumiyanmalai
88.	Dr. P. Malathi	Assoc. Professor (SS&AC), TNAU, Coimbatore
89.	Dr. K. Boomiraj	Assoc. Professor, Dept. of ENS, TNAU, Coimbatore
90.	Dr. Ga. Dheebakaran	Assoc. Professor (Agron.), ACRC, TNAU, Coimbatore
91.	Dr. R. Sunitha	Asst. Professor (ENS), COE, TNAU, Coimbatore
92.	Dr. R. Rajeswari	Asst. Professor (SS&AC), TNAU, Coimbatore

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94.	Dr. C. Prabhakaran	Asst. Professor (ENS), KVK, Needamangalam
95.	Dr. T. Parthipan	Asst. Professor (Agron.), ARS, Thanjavur
96.	Dr. S.K. Rajkishore	Asst. Professor (ENS), Dept. of REE, AEC&RI, Coimbatore
97.	Dr. J. Prabhaharan	Asst. Professor (SS&AC), AC&RI, Madurai
98.	Dr. V.B. Raghavendran	Asst. Professor (V&AS), KVK, Pudukottai
99.	Dr. R. Sudha Raja Kumar	Asst. Professor (Pl. Patho.), IOH, Pechiparai
100.	Dr. M. Balumahendiran	Asst. Professor (V&AS), AC&RI, Vazhavachanur
101.	Dr. R. Thangadurai	Asst. Professor (V&AS), KVK, Dharmapuri
102.	Dr. Thirunavukkarasu	Asst. Professor (V&AS), Agronomy, Coimbatore
103.	Dr. G. Kumar	Asst. Professor (V&AS), Agronomy, VOC AC&RI, Killikulam
104.	Dr. M. Ramasamy	Asst. Professor (V&AS), KVK, Virinjipuram
105.	Dr. T. Balaji	Asst. Professor (SS&AC), KVK, Virinjipuram
106.	Dr. K. Manikandan	Asst. Professor (SS&AC), SS&AC, VOC AC&RI, Killikulam
107.	Dr. V. Ramamoorthy	Asst. Professor (Pl. Patho.), Dr.MSS AC&RI, Eachangkottai
108.	Dr. G. Senthilraja	Asst. Professor (Pl. Patho.), Pulses, Coimbatore
109.	Dr. Pon. Sathya Moorthy	Asst. Professor (Physics), AC&RC, Coimbatore
110.	Dr. R. Ravikumar	Asst. Professor (Maths), AC&RC, Coimbatore
111.	Dr. M. Selvamurugan	Asst. Professor (ENS), HC&RI (W), Trichy
112.	Dr. S. Shenbagavalli	Asst. Professor (ENS), HC&RI, Periyakulam
113.	Dr. L. Srimathi Priya	Asst. Professor (Agrl. Micro.), HC&RI, Periyakulam
114.	Dr. R. Poorniammal	Asst. Professor (Agrl. Micro.), AGM, Coimbatore
115.	Dr. S. Sheeba Joyce Roseleen	Asst. Professor (Agrl.Ento.), HC&RI (W), Trichy
116.	Dr. T. Sivasankari Devi	Asst. Professor (AGM), TRRI, Aduthurai
117.	Dr. G. Porkodi	Asst. Professor (SS&AC), SRS, Cuddalore
118.	Dr. N. Bharathi	Asst. Professor (Bioinformatics), TNAU, Coimbatore
119.	Dr. G. Sridevi	Asst. Professor (SS&AC), TNAU, Coimbatore
120.	Dr. S. Kokilarani	Asst. Professor (Micro.), ACRC, TNAU, Coimbatore
121.	Dr. B. Arthirani	Asst. Professor (Agrl. Metro.), ARS, Kovilpatti
122.	Dr. D. Jeya Sundara Sharmila	Asst. Professor (Physics), CANT, TNAU, Coimbatore
123.	Dr. C. Sharmila Rahale	Asst. Professor (SS&AC), Nano Technology, Coimbatore
124.	Dr. E. Parameswari	Asst. Professor (ENS), NOFRC, Coimbatore
125.	Dr. S.P. Sangeetha	Asst. Professor (Agronomy), TNAU, Coimbatore
126.	Dr. A. Sumithra	Asst. Professor (V&AS), KVK, Tiruppur
127.	Dr. P. Kohila	Asst. Professor (V&AS), KVK, Salem
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