Proceedings of the6th Scientists meet on Non Crop Specific Projects - 2018

6th Scientists' Meet on Non Crop Specific Projects was held on 14.06.2018 at TNAU, Coimbatore under the chairmanship of Dr. K. Ramasamy, Vice Chancellor, TNAU Coimbatore. Director of Research, TNAU, Coimbatore and all the Technical Directors were present. Director of Research, TNAU, Coimbatore had given the introductory remarks and the Professors and Heads of the Departments, Environmental Sciences ,Nano Science and Technology, Remote Sensing and Geo informatics, Soil Science and Agricultural Chemistry and Agro Metrology Research Centre have presented the Action taken on the Recommendations and Action Plan of the5th Scientists' Meet on Non Crop Specific Projects. Based on the discussion and review of projects by the Special Officer (DNRM) andDirector (DCM) in the concurrent sessions held on 14.06.2018, the following recommendations and action plans that emanated were presented for the approval of the Chairman. The meet ended with the critical remarks by the Vice Chancellor and voteof thanks by Director of Research, TNAU, Coimbatore.

A. Environmental Sciences

i. Vice Chancellors Remarks

- Diversification of research beyond Distillery spent wash and Paper mill.
- Studying the changes in the ground water quality over the years in the spent wash irrigated areas.
- Prioritizing research areas based on farmers need.
- Extension of research findings to field level for greater application of technology.
- Formulation of projects on interdisciplinary mode.

ii. **Projects reviewed**

S.No.	Theme Area	Number of Projects		
		URP	EFP	Total
1.	Bioremediation of Polluted Environments	1	1	2
2.	Wastewater Treatment and Recycling	2	8	10
3.	Air pollution Monitoring and Mitigation	1	3	4
4.	Integrated Solid Waste Management	2	-	2
5.	Agro-ecology and Ecosystem Services	1	-	1
	Total	**7**	**12**	**19**

iii. **Remarks on the ongoing Research Projects**				
S.No	**Project No. & Title**	**Project Leader**	**Period**	**Remarks**
1.	**NRM/CBE/ENS/2015/003** Evaluating the phyto-remediation potential of aquatic plants in reed bed system for recycling of sewage water in agriculture	Dr. K. Sugnaya, AP, Dept. of ENS, TNAU, Coimbatore	Jun 2015 - May 2017	A lab scale hybrid reedbed system was designed and utilized for treating the sewage effluent with *Canna Indica* as a phytoaccumulating plant**.** The removal efficiency of the reed bed should be expressed in biomass basis. The possibility of disposal of sequestered plants may be made for safe disposal of the plants used for phytoremediation. The project may be closed and completion report to be submitted.
2.	**NRM/MDU/ENS/2014/001** Assessment of heavy metal contamination in periyar main canal of Madurai District	Dr.G.Balasubramanian, Prof., Dept. of Soil &Env., AC&RI, Madurai	Oct 2014 - Sept 2017	The heavy metal contamination in Periyar main canal of Madurai District was assessed for two years. The reason for heavy metal during the analysis may be sourced. The project may be closed and completion report to be submitted.
3.	**NRM/CBE/ENS/14/001** Remediating dye and textile effluent contaminated soil through plant microbes interaction	Dr.R.Jayashree, AP, Dept. of ENS, TNAU, Coimbatore Dr.P.Kalaiselvi, AP, Dept. of ENS, TNAU, Coimbatore	Dec 2014 - Nov 2016	The role of bioamendments and bioinoculants in enhancing salt removal capacity of *Sesuvium* using soil collected from Andipalayam village was studied under greenhouse condition. The form of sodium taken up by the halophyte may be ascertained and complete the project and submit the completion report.

4.	**NRM/CBE/ENS/SUG/2015/001** Insitu management of sugarcane trashes to enrich soil available nutrients for sustainability	Dr.J.Kannan, Prof., HC&RI, Periyakulam	Jun 2015-May 2017	Technique for insitu management of sugarcane trashes under simulated condition was developed. Decomposition pattern may be worked out. Three years data may be pooled before recommending insitu composting of sugarcane trashes. The project may be closed and completion report to be submitted.
5.	**NRM/KKM/ENS/2017/001** Development and standardization of enriched fish waste compost and its evaluation on soil and crop	Dr. S. Shenbagavalli AP (ENS) AC&RI, Killikulam	Jun 2017-May 2020	Fish wastes were collected from the Fish market, Samathanapuram, were mixed with saw dust, coir waste and farm waste and composting was done. The magnitude of pollution due to fish waste disposal may be assessed.
6.	**DST/HCRI/PKM/ENS/2016/R004** Assessment on the utility of water hyacinth (*Eichhorniacrassipes)* biomass as potential bio-sorbent for sequestration of heavy metals from tannery effluent and desorption of chromium from bio-sorbent for effective	Dr. E. Parameswari, AP (ENS),COE, TNAU, Coimbatore	August 2016 - July 2019	A series of batch experiments were conducted to find the optimum strategies for Cr adsorption by water hyacinth biomass. The Chromium species may be determined at low pH (2).
7.	**TNPL/NRM/CBE/ENS/2015/R008** Evaluation of long term effect of utilization of TNPL effluent water for irrigation and remediation of effluent irrigated soil habitat	Dr. S. Avudainayagam, Professor and Head, Dept. of ENS, TNAU, Coimbatore	March 2015-February 2018	Continuous monitoring of soil, ground water quality in 20 bench mark sites in and around TEWLIS area. Based on the past generated data on water quality any existing model may be used to project the data for another ten years. Project period over. Completion report to be submitted.

8.	**ISRO/NRM/KKM/ENS/2012/D001** Establishment and maintenance of aerosol observatory at HRS, Ooty for assessing the Aerosol RadiativeForcing over India (ARFI)	Dr. S. Avudainayagam, Professor and Head, Dept. of ENS, TNAU, Coimbatore	April 2008 - March 2018	The impact of O_3 during the tuber initiation stage of ten genotypes of Potato in open top chamber was studied. The impact of O_3 on crops at ground level may be studied. Project period over. Completion report to be submitted.
<u>Action Taken</u> Phytoremediation potential of Vetiver for wastewater treatment		Dr.S.Paul Sebastian, AP, Dept. of ENS, TNAU, Coimbatore	April 2017 - March 2018	The Phytoremediation potential of Vetiver for paper mill wastewater treatment was assessed. Vetiver along with aeration increased pollutant removal in both raw effluent and treated effluent. Project period over. Completion report to be submitted.

iv**. Action Plan for 2018 – 2019**

S.No	Activity	Project Leader (s)	Year 2018 – 2019	Year 2019-2020	Deliverables/ Expected Out come
1.	Sustainable biogasproduction from sewage through bioaugmentation	Dr.M. Mahaeswari Prof (ENS), Dept. of ENS, TNAU, Coimbatore Dr. S. Karthikeyan Prof. (AGM), Dept. of Bio energy, TNAU, Coimbatore. Dr. K. Mahendran AP (Bio energy), Dept. of Bio energy, TNAU, Coimbatore.	Assessment of ofzonalvariations in constituents of sewage Screening of native methanogens from active biomethanation plants	Development of anaerobic microbial consortia Process optimization for maximum gas recovery. Pilot scale evaluation.	Anaerobic microbial consortia for bio gas production from sewage waste water.

Environmental Sciences

WORK LOAD OF SCIENTISTS

a. Work load of scientists - Environmental Sciences

Theme Area 1- Bioremediation of Polluted Environments
Theme Area 2 – Wastewater Treatment and Recycling
Theme Area 3 – Air Pollution Monitoring and Mitigation
Theme Area 4 – Integrated Solid Waste Management
Theme Area 5 – Agroecology and Ecosystem Services

S.No.	Name of the Scientists	Particulars	Hours / week	Theme area					% of time allotted for Theme Area
				1	2	3	4	5	
1	**Dr.S.Avudainayagam,** Professor & Head, TNAU, Coimbatore	University Sub Project -1		5					12.5
		Externally funded project -2				5			12.5
		Students Guide	5						12.5
		Teaching							-
		Administration	20						50.0
		Other Activities	5						12.5
2	**Dr.M.Maheswari**, Professor (ENS), Dept. of ENS, TNAU, Coimbatore	University Sub Project -1	5						12.5
		Externally funded project	5						12.5
		Students Guide	5						12.5
		Teaching	10						25.0
		PG Coordination	10						25.0
		Other Activities – FWKC trainings	5						12.5
3	**Dr.P.Dhevagi,** Associate Professor (ENS), Dept. of ENS, TNAU, Coimbatore	University Sub Project -2	10	10					25.0
		Externally funded project	5		5				12.5
		Students Guide – 2 + 2 ODL	8						20.0
		Teaching	10						25.0
		Research Coordination	4						10.0
		ODL Coordination	2						5.0
		Other Activities	1						2.5

4	**Dr.M.P.Sugumaran** Associate**(**ENS**),** Dept. of ENS, TNAU, Coimbatore	University Sub Project -1	5						12.5
		Externally funded project	5						12.5
		Students Guide	4						10.0
		Teaching	14						35.0
		UG Coordination	4						10.0
		Others Activities	5						12.5
5	**Dr. R. Jayashree** Assistant Professor (ENS)**,** Dept. of ENS, TNAU, Coimbatore	University Sub Project -1		6					15.0
		Externally funded project			6				15.0
		Teaching	15						37.5
		Students Guide	5						12.5
		Monthly report	3						7.5
		Other Activities	5						12.5
6	**Dr. P. Kalaiselvi** Assistant Professor (ENS)**,** Dept. of ENS, TNAU, Coimbatore	University Sub Project -1		8					20.0
		Externally Funded Projects Co PI			5				12.5
		Students Guide	5						12.5
		Teaching	10						25.0
		LabourIncharge	2						5.0
		Other Activities	10						25.0
7	**Dr.V.Davamani** Assistant Professor (ENS)**,** Dept. of ENS, TNAU, Coimbatore	University Sub Project -1		5					12.5
		Externally funded projects- PI-1				6			15.0
		Externally funded projects- Co PI-2		3	3				15.0
		Students Guide	5.5						20.0
		Teaching	8						13.75
		Other Activities	1.5						3.75
		Technical Coordinator (NRM)	8						20.0
8	**Dr. K. Suganya** AssistantProfessor (ENS)**,** Dept. of ENS, TNAU, Coimbatore	University Sub Project -1		14					35.0
		Externally Funded Projects – Co PI			2				5.0
		Students Guide	4						10.0
		Teaching	16						40.0
		Res. Coordination	1						2.5
		Other Activities	3						7.5

9	**Dr. R. Sunitha,** AssistantProfessor (ENS)**,** Dept. of ENS, TNAU, Coimbatore	University Sub Project -1	5						12.5
		Externally Funded Projects	-						-
		Students Guide	-						-
		Teaching	14						35.0
		Other Activities	21						50.0

B. Soil Science and Agricultural Chemistry

a. General remarks

- Soil fertility details assessed in the URPs may be updated for the respective soil series displayed in the Reference centre of the Department of Soil Science and Agrl. Chemistry, TNAU, Coimbatore.

b. Research projects reviewed

A total number of 6 projects handled by 9 scientists were reviewed by the Special Officer, DNRM, TNAU, Coimbatore. The abstract of the projects reviewed is furnished below:

Crop	Centres	URP	AICRP	EFP	Total
Non crop Meet ,2018	Water Technology Centre, TNAU, Coimbatore	-	-	1	1
	Dept. of SS & AC, TNAU, Coimbatore	-	1	-	1
	ADAC&RI, Trichy	-	1	-	1
	HC&RI, Periyakulam	1	-	-	1
	AC&RI, Valavachanur	1	-	-	1
	CRS, Aliyarnagar	1	-	-	1
	Total	**3**	**2**	**1**	**6**
	No. of scientists involved	3	5	1	9

c. Remarks on the ongoing University Research Subprojects/AICRP/Externally funded projects

Sl.No.	Project No. and Title	Remarks
1	NRM/PKM/SAC/2016/001:Developing spatial variability maps of soil physico-chemical properties and available nutrient status of Western Farm of HC&RI, Periyakulam (April 2016 to March 2019) Dr. D.Muthumanickam,Professor and Head Department of Social Sciences Horticultural College and Research Institute Periyakulam.	Morphological properties and profile studies of the soil series in the farm may be carried out and included Comparison of earlier data may be made and change in the fertility may be interpreted.
2	NRM/ALR/SAC/2016/001: Desalinization of irrigation water for sustainable agriculture (July 2016 to June 2019) Dr.C.Sudhalakshmi, Asst. Professor (SS&AC) Coconut Research Station, Aliyar Nagar.	Effect of structured water, Moringa stump, Nano filters in reducing water salinity may be studied. The surface charge of the Zeolite may be modified using Nanotechnology options and studied. Skimming effect of irrigation water on soil salinization may be studied in collaboration with Water Technology Centre, TNAU, Coimbatore.
3	NRM/VVR/SAC/2016/001 : Soil and water resource inventory of AC&RI, Valavachanur farms (January 2016 to March,2018) Dr. S. Krishnakumar, Asst. Professor (SS&AC) Krishi Vigyan Kendra (KVK) Agricultural College & Research Institute, Madurai - 625 104	Morphological properties and profile studies of the soil series in the farm may be carried out and included. Aluminium content in the soils of Vazhavachanur may be assessed and reported. Closure report may be submitted.

d. Salient findings for information

- Zeolite and powdered seeds of Thetrankottai (*Strychonos potatorum)* possess better desalinization potential.

- Addition of alum, vermiculite, activated charcoal and ion exchange resin increased the EC of saline water.

e. Work load particulars of the scientist's

S.No.	Name of the Scientist	Particulars	Hours per week	% time allotted
1	Dr.D.Muthumanickam Professor and Head Department of Social Sciences Horticultural College and Research Institute, Periyakulam	University projects	5	12.5
		Externally Funded scheme	0	-
		Student guidance	3	7.5
		Teaching	17	42.5
		Other activities	15	37.5
2	Dr. C. Sudhalakshmi Asst. Professor (Soil Science) Coconut Research Station Aliyar Nagar	University projects	20	50
		Externally Funded scheme	10	25
		Student guidance	-	-
		Teaching	-	-
		Other activities : Farm, ODL, Research co-ordination, Venture Capital schemes	10	25
3	Dr. S. Krishnakumar, Asst. Professor (SS&AC) Krishi Vigyan Kendra (KVK)Agricultural College & Research Institute, Madurai – 625 104	University projects	10	25
		Externally Funded scheme	-	-
		Student guidance	-	-
		Teaching	-	-
		Other activities (FLD, OFT, Farmers Training and Extension activities)	25	75

e. Action plan for 2018-19

Theme 1 : Potentials and Constraints of Soils of TNAU Farms

Rationale

- To categorize the soil potentials and constraints to derive soil based recommendations for interdisciplinary research

Activities

Documentation and compilation of

- Details on morphological properties of soil profiles
- Identifying the soil suitability for crops and cropping systems

Co-ordinating Centre and Scientists

- ✓ Dr.R.Santhi, Professor and Head, Dept. of SS & AC, TNAU, Coimbatore
- ✓ Dr. R.Kumaraperumal , Asst. Professor (SS&AC), Dept. of GIS & RS, TNAU, Coimbatore

Centres : TNAU colleges/ Research Stations/KVKs

Scientists: Soil Scientists of respective Colleges / Research stations/ KVKs or nearby locations

Deliverables

- Basic details on the potentials and constraints of soil to suggest suitable management strategies.
- Deriving soil based recommendations for interdisciplinary research.

Justification

The details on soil morphological properties and profile description of all the colleges, research stations and KVKs will be collected for compilation and wherever information's are not available, the details will be collected newly with the help of scientists from Soil Science/Agronomy/Environmental Science working in the respective centres. The work will be facilitated by the Co-ordinating scientists at TNAU, Coimbatore.

f. List of Scientists participated

S.No	Name of the Scientists
Dept. of Soil Science and Agricultural Chemistry, TNAU, Coimbatore	
1	Dr. R. Santhi, Professor and Head (SS&AC)
2	Dr. R. Shanmugasundaram, Professor (SS&AC)
3	Dr. T. Chitdeshwari, Professor (SS&AC)
4	Dr. S. Meena, Professor (SS&AC)
5	Dr. D. Jegadeewari, Asst. Professor (SS&AC)
6	Dr. P. Malathi, Asst. Professor (SS&AC)
Water Technology Centre, TNAU, Coimbatore	
7	Dr. M. Elayarajan, Asst. Professor (SS&AC)
KVK, AC&RI, Madurai	
8	Dr. S. Krishnakumar, Asst. Professor (SS&AC)
ADAC&RI, Trichy	
9	Dr. K. Arulmozhiselvan, Professor (SS&AC) & Project Director (CESSH)
10	Dr.T.Sherene Jenita Rajammal, Asst. Prof.(SS&AC)
Horticultural College and Research Institute Periyakulam	
11	Dr. D.Muthumanickam,Professor and Head
CRS, Aliyarnagar	
12	Dr. C.Sudhalakshmi, Asst. Professor (SS&AC)

C. REMOTE SENSING & GIS APPLICATIONS

i. Remarks of the Vice Chancellor:

1. Drone mapping of TNAU college campuses may be initiated, for which the Pollution Monitoring Vehicle of FC&RI, Mettupalayam may be utilized.
2. Crop area under irrigated and rainfed agriculture has to be delineated precisely.
3. The methodology has to be refined to assess the area under major crops other than rice in Tamil Nadu.
4. Work on spatial estimation of soil moisture for drought monitoring is to be undertaken.
5. Sedimentation studies have also to be taken up using GIS during the process of land degradation and soil erosion mapping
6. Suitability studies for horticultural crops in Salem, Dharmapuri and Krishnagiri districts to be under taken.
7. Water availability in tanks and other water bodies of major tankfed districts *viz.,* Kancheepuram and Tiruvallur has to be assessed periodically for better crop planning.

ii. Research projects reviewed

Total number of projects	: 09
University sub-projects	: 05
Externally funded projects	: 04
No. of scientists involved	: 05

Remarks on the Ongoing University Research Projects

Sl.No.	Project Number and Title	Project Leader	Period	Remarks
1.	**NRM/CBE/RSG/AGR/2016/001** Area mapping and yield estimation of Groundnut, Maize and Rice fallow pulses using SAR data and crop growth models	Dr. S.Pazhanivelan Prof. & Head (RS&GIS) Coimbatore	February 2016 to March 2019	• The interface for yield estimation of maize and other crops fine tuned and developed as a software. • Area mapping of pulses under rice fallow conditions may also be initiated • The project is to be continued
2.	**NRM/CBE/RSG/SAC/2016/ 004** Detection of water stress in Groundnut through Remote Sensing Technique	Dr. R. Jagadeeswaran Asst. Prof. (SS&AC) RS&GIS, Coimbatore	February 2016 to December 2017	• Since, the major objectives were completed, the project may be closed and the completion report to be submitted.
3.	**NRM/CBE/RSG/SAC/ 2016/002** Integration of Optical and Synthetic Aperture Radar Imagery for Maize and Cotton Crop Mapping	Dr. R. Kumaraperumal Asst. Prof. (SS&AC) RS&GIS, Coimbatore	January 2016 to April 2018	• The project is completed and the completion report to be submitted.
4.	**NRM/CBE/RSG/SAC/2016/003** Assessing impact of climate change on the growing period of rainfed crops in Tamil Nadu using Remote Sensing data	Dr. K.P.Ragunath Asst. Prof. (SS&AC) RS&GIS, Coimbatore	January 2016 to April 2018	Validation exercise may be done in comparision to meteorologically derived LGP. The project is to be closed and the completion report to be submitted.
5	**NRM/CBE/RSG/SWC/2016/005** Comparing pixel based and object-based approaches for mapping coconut farms using high resolution remote sensing data	Dr. Balaji Kannan Assoc. Prof. (S&WCE) AEC&RI, Coimbatore	April 2016 to March 2018	The project is completed and the completion report to be submitted.
6	**GOTN/NRM/CBE/RSG/2016/R003** Creating GIS database of soil nutrient status and generating nutrient maps with cadastral base for Tiruvarur District	PI: Dr. R. Sivasamy, Professor (SS&AC) Co-PI: Dr.R. Jagadeeswaran, Asst Prof (SS&AC)	July 2016 to June 2017	The project is completed and the completion report to be submitted.

7	**GOI/NRM/CBE/RSG/2016/R004** Land degradation mapping (II cycle) in Tamil Nadu	Dr. S. Pazhanivelan, P&H (Project Manager) Dr. R. Sivasamy, Professor (Lead Team Member) Dr. R. Jagadeeswaran, Asst. Prof. (SS&AC) (Principal Investigator)	mber 2016 to September 2017	The project is completed and the completion report to be submitted.
8	**NADP/NRM/CBE/RSG/2017/001** Remote sensing based information for crop coverage, yield estimation and drought monitoring	PI: Dr. S.Pazhanivelan Professor and Head (RS&GIS) s: Dr. K.P. Ragunath, Asst. Professor (SS&AC) Dr. R. Kumaraperumal, Asst Prof (SS&AC)	Sep 2017 to March 2019	The project is to be continued
9	TNIAMP– Phase I: Tamil Nadu Irrigated Agriculture Modernization Project (TNIAMP) Phase I (F36NT)	azhanivelan Professor and Head (RS&GIS)	Sep 2017 to March 2023	The project is to be continued

3) ACTION PLAN PROPOSED FOR 2018-19

Theme No. 1		**Crop Area Mapping and Yield Estimation**			
Theme Leader		Dr. S. Pazhanivelan, Prof.& Head (RS&GIS)			
S.No	**Activity**	**Name of the scientist and centre**	**2018-19**	**2019-20**	**Deliverables/expected out come**
	Crop Area Mapping and Yield Estimation	Dr. S. Pazhanivelan, Prof.& Head (RS&GIS) – (15 hrs/week) Dr. K.P. Ragunath, Asst. Prof (SS&AC) – (5 hrs/week) Dr.R.Kumaraperumal, Asst.Prof (SS&AC) (5 hrs/week) Dr. A.P. Sivamurugan, Asst.Prof. (Agron.) – (3 hrs/week) Dr. M. Radha , Asst. Prof. (Agrl. Statistics) - 3 hrs/week Dr.M.Jayachandran, Prof. & Head, SRS, Cuddalore – (3 hrs/week) Dr.A.Kamaraj, Asst. Prof. (Agri. Engg), AC&RI, Echankottai – (3 hrs/week) Dr.P.Kannan, Asst. Prof (SS&AC), DARS, Chettinad – (3 hrs/week) Dr.E.Subramanian, Asst.Prof. (Agron), AC&RI, Madurai – (3 hrs/week)	• Sustaining rice area and yield monitoring • Generating maps and area statistics in cotton, maize, pulses and groundnut.	Developing interface to integrate remote sensing products with DSSAT/Infocrop models to estimate yields of cotton, maize, pulses and groundnut spatially. Localized monitoring of nutrient deficiencies, pest and disease incidence and spraying of pesticides using UAV /drones. Developing Smart Sugarcane Management System, Smart sampling of CCE's. Developing customized software for crop mapping integrating open source tools with python coding	Real time area statistics and maps on crop area, yield and losses at District, Block and village level for rice, cotton, maize, pulses and groundnut Smart sampling plan for coordinating CCE's Smart Sugarcane Management System Customized software for crop mapping Campus maps of TNAU colleges, stations and KVKs at fine resolution using drones

Theme No. 2		Soil and Land Resource Mapping			
Theme Leader		Dr. R. Jagadeeswaran, Asst. Prof. (SS&AC) Dept of RS &GIS			
S.No	**Activity**	**Name of the scientist and centre**	**2018-19**	**2019-20**	**Deliverables/ expected out come**
	Soil and Land Resource Mapping	Dr. R. Jagadeeswaran, Asst. Prof. (SS&AC) (10 hrs/week) Dr.R.Kumaraperumal, Asst.Prof (SS&AC) (5 hrs/week) Dr. K.P. Ragunath, Asst. Prof (SS&AC) – (5 hrs/week) Dr.BalajiKannan, Assoc. Prof. (SWCE) (3 hrs/week)	generate cadastral level soil nutrient mapping assess and monitor the soil micro and secondary nutrient status in Tamil Nadu generate digital soil map for Tamil Nadu	Digital soil mapping of Tamil Nadu Sedimentation analysis using GIS besides land degradation and soil erosion mapping	• Cadastral level soil nutrient map Block level soil available nutrient status • Digital Soil Maps • Sedimentation report pertaining to checkdams, tanks and other water resources

Theme No. 3	Assessing impact of climate change and Environmental monitoring			
Theme Leader	Dr. S. Pazhanivelan, Prof.& Head (RS&GIS)			
Activity	**Name of the scientist and centre**	**2018-19**	**2019-20**	**Deliverables/ expected out come**
Assessing impact of climate change and Environmental monitoring	Dr. S. Pazhanivelan, Prof.& Head (RS&GIS) (5 hrs/week) Dr. K.P. Ragunath, Asst.Prof (SS&AC) (3 hrs/week) Dr.R.Kumaraperumal, Asst.Prof (SS&AC) (3 hrs/week) Dr. S. Panneerselvam, Prof.& Head (ACRC) (3 hrs/week) Dr. S. Avudainayagam, Prof.& Head (ENS) (3 hrs/week)	To study the spatial changes in LGP and cropping pattern in consequence to climate change. Validating AWS rainfall data using satellite-based precipitation products.	Precise mapping of irrigated and rainfed area in Tamil Nadu Validating satellite derived LGP with meteorological parameter based LGP Spatial estimation of methane emission using remote sensing and GHGs using FAO EXACT model	• Irrigated and rainfed area map of Tamil Nadu • Changes in LGP and Cropping pattern due to climate change • Spatial estimation and quantification of methane emission from rice ecosystem.

Theme No. 4	Water resources monitoring and irrigation water management			
Theme Leader	Dr. S. Pazhanivelan, Prof.& Head (RS&GIS)			
Activity	**Name of the scientist and centre**	**2018-19**	**2019-20**	**Deliverables/ expected out come**
Water resources monitoring and irrigation water management	Dr. S. Pazhanivelan (5 hrs/week) Dr.Balajikannan, Asst. Prof (SWCE) – (5 hrs/week) Dr. R. Jagadeeswaran, Asst. Prof. (SS&AC) (10 hrs/week) Dr. A Velayutham, Prof.(Agron), WTC – (3 hrs/week) Dr. S. Ramesh, Asst. Prof. (Agron.) ADAC&RI, Tiruchirapalli – (3 hrs/week) Dr. P. Kannan, Asst. Prof. (SS&AC), DARS, Chettinad – (3 hrs/week) Dr. S. Manikandan, Asst. Prof (SS&AC), AC&RI, Killikulam – (3 hrs/week)	Estimation of Water spread area and duration in tanks using Satellite data Assessing the impact on crop yield and intensity of cropping.	Spatial estimation of soil moisture in cropped fields using SAR data and validation with ground truth observations. Periodical monitoring of tanks for water storage in Kancheepuram and Tiruvallur districts using SAR data for better crop planning Digital mapping of Ayacuts in sub-basins	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 & its impact on crop yield and intensity of cropping Sub-basins wise Ayacut maps Soil Moisture maps for irrigation management and drought monitoring.

Load of each scientist (Theme wise)

Theme No. 1 Crop Area Mapping and Yield Estimation
Theme No. 2 Soil and Land Resource Mapping
Theme No. 3 Assessing impact of climate change and Environmental
Theme No. 4 Water resources monitoring and irrigation water management

Scientists work load (Hrs/Week)

No.	**Name of the scientist**	**Theme 1**	**Theme 2**	**Theme 3**	**Theme 4**	**Total**
1	Dr. S. Pazhanivelan	15		5	5	25
2	Dr.Balajikannan		3		5	8
3	Dr. R. Jagadeeswaran		10		5	15
4	Dr. K.P. Ragunath	5	5	5	3	18
5	Dr.R.Kumaraperumal	5	5	5	3	18
6	Dr.S.Pannerselvam			3		3
7	Dr.S.Avudainayagam			3		3
8	Dr.A.Velayutham				3	3
9	Dr. A.P. Sivamurugan	3				3
10	Dr.E.Subramanian	3				3
11	Dr. T. Ramesh				3	3
12	Dr.A.Kamaraj	3				3
13	Dr.P.Kannan	3			3	6
14	Dr.M.Jayachandran	3				3
15	Dr.M.Radha	3				3
16	Dr.S.Manikandan				3	3

WORK LOAD OF SCIENTISTS WORKING IN THE DEPARTMENT OF REMOTE SENSING AND GIS FOR THE YEAR 2018-19

S.No.	Scientists	Percentage of time
1.	**Dr. S. Pazhanivelan**	
	Univ. Sub Project-1	20
	Teaching	10
	Students guide	20
	Administration	25
	Other Activities	25
2.	**Dr. R. Jagadeeswaran**	
	Univ. Sub Project-1	20
	Teaching	15
	Students guide	15
	Other Activities	50
3.	**Dr.R.Kumaraperumal**	
	Univ. Sub Project-1	20
	Teaching	15
	Students guide	15
	Other Activities	50
4.	**Dr. K.P. Ragunath**	
	Univ. Sub Project-1	20
	Teaching	15
	Students guide	15
	Other Activities	50

LIST OF SCIENTISTS PARTICIPATED

Department of Remote Sensing and GIS, Coimbatore

1. Dr.S.Pazhanivelan, Professor & Head
2. Dr.R. Jagadeeswaran, Assistant Professor (SS&AC)
3. Dr.R. Kumaraperumal, Assistant Professor (SS&AC)
4. Dr.K.P.Ragunath, Assistant Professor (SS&AC)

Agricultural Engineering College & Research Institute, Coimbatore

1. Dr. BalajiKannan, Associate Professor (S&WCE)

Department of Millets, Coimbatore

1. Dr. A.P.Sivamurugan, Assistant Professor (Agronomy)
2. Dr. N.Vadivel, Assistant Professor (Agronomy)

Agricultural College & Research Institute, Madurai

1. Dr. Christy Nirmala Mary, Assoc. Prof (SS&AC), Dept of Soils & Environment
2. Dr. E. Subramanian, Assistant Professor (Agronomy), Department of Farm Management

Agricultural College & Research Institute, Vazhavachanur

1. Dr.C.Sivakumar, Assoc. Professor (Agronomy)
2. Dr. V. Arunkumar, Assistant Professor (SS&AC)

Anbil Dharmalingam Agricultural College & Research Institute, Trichy

1. Dr. T. Ramesh, Assistant Professor (Agronomy)

Agricultural College and Research Institute, Echankottai

1. Dr. A. Kamaraj, Assistant Professor (Bio Energy)
2. Dr.R.Baskaran, Assistant Professor (Agronomy)

Dryland Agricultural Research Station, Chettinad

1. Dr. P.Kannan, Assistant Professor (SS&AC)

Sugarcane Research Station, Cuddalore

1. Dr.M.Jeyachandran, Prof. & Head
2. Dr.S.Tiruvarasan, Assistant Professor (Agronomy)

Krishi Vigyan Kendra, Sirugamani

1. Dr. S.Easwaran, Associate Professor (Horticulture)

D. Nano Science and Technology

i. Remarks of the Vice Chancellor

Volatile profile of Alphonso mango in relation to genomic expression may be determined in collaboration with NCL, Pune.

- On-Farm Testing (OFTs) of the promising technologies such as nano-stickers and nano-pellets may be conducted in major fruits (mango and banana) in packhouses of Theni and Krishnagiri
- Molecular modeling studies for hexanal vapour kinetics with varying temperature and humidity may be carried out and validated with real time fruit preservation
- Insights of GA_3 and IAA in seed invigoration process may be studied in groundnut
- Upon Nano-S fertilization of sunflower seed oil quality attributes such as rancidity, acid number, saponification number and iodine value may be assessed to precisely predict the benefit of nano-forms of sulfur.
- The basic micelle characteristics of chitosan nano-emulsion may be studied
- Nano-silica can be used as an effective delivery system for biomolecules extracted from plants that possess insecticidal / anti-viral properties
- Dissipation studies of nano matrices carrying pheromone molecules (hexadecenol and octadecenol) may be studied in relation to the incidence of yellow stem borer *Scirpophaga incertulas* in rice
- Nano-film developed from banana pseudostem may be further improved by infusing anti-microbial and hydrophobicity properties
- Biosafety protocols and guidelines may be learnt from Indian Toxicological Research Institute (ITRI, Lucknow) and adopted in TNAU

ii. Research projects reviewed

Name of the Scientists	2017-18			2018-19		
	URP	Externally Funded	VCS	URP	Externally Funded	VCS
1. Dr. G.J. Janavi Prof.& Head, DNST, Coimbatore	-	-	1	-	-	1
2. Dr. K.S. Subramanian, NABARD Chair Professor	-	PI - 3 Co-PI - 2	-	-	PI - 3	-
3. Dr. S. Marimuthu Asst. Prof. (Agron.)	2	Co-PI - 2	-	-	Co-PI - 2	-
4. Dr. S. Haripriya Asst. Prof. (Hort.)	1	Co-PI - 1	-	1	Co-PI - 1	-
5. Dr. K. Raja Asst. Prof. (SS &T)	1	Co-PI - 1	Co-PI	1	Co-PI - 1	Co-PI
6. Dr. S.K. Raj Kishore Asst. Prof. (ENS)	1	-	-	-	-	-
7. Dr. Pon Sathyamoorthy Asst. Prof. (Physics)	1	PI - 1 Co-PI - 1	-	1	PI - 1 Co-PI - 2	-
8. Dr. D. Jeya Sundara Sharmila Asst. Prof. (Physics)	1	Co-PI - 1	-	1	Co-PI - 1	-
10. Dr. N. Balakrishnan, NPDF	-	1	-	-	1	-
11. Dr. S. Srivignesh, NPDF	-	1	-	-	1	-

iii. Remarks of the ongoing university research projects

No.	Project Number Title of the project	Project leader	Period	Remarks
1	**NRM/CBE/NST/ENT/2015/001** Smart delivery of *Bacillus thuringiensis* through nano encapsulation for enhanced self-life and toxicity against the Diamond back moth, *Plutella xylostella* L.	Dr. M. Kannan Asst. Prof. (Ent.) DST, TNAU, Coimbatore	January 2015 to December 2017	Recommended for closure of the project. Completion report to be submitted
2	**NRM/CBE/NST/AGR/2013/002** Chitosan Nano-formulation in plant-water relations: Testing for an antitranspirant (AT) activity in maize (*Zea mays* L)	S. Marimuthu Asst.Prof. (Agron.) DST, TNAU, Coimbatore	September 2013 to September 2016 & Extended up to August 2018	Project may be continued
3	**NRM/CBE/NST/13/003** Synthesis and characterization of organic wastes based Superabsorbent Polymers (SAP) for improving moisture retention in the soil	S. Marimuthu Asst. Prof. (Agron.) DST, TNAU, Coimbatore	September 2013 to September 2016 & Extended up to August 2018	Project may be continued
4	**NRM/CBE/NST/ENT/2013/003** Developing Nano matrices to regulate the release of pheromone to monitor Yellow stem borer, *Scirpophaga incertul*as in rice	Dr. M. Kannan Asst.Prof. (Ent.) DST, TNAU, Coimbatore	November 2013 to October 2016 & Extended up to October 2017	Recommended for closure of the project Completion report to be submitted
5	**NRM/CBE/NST/HOR/2013/004** Developing antimicrobial edible coating from plant sources	Dr. S. Haripriya Asst. Prof.(Hort.)	June 2013 to October 2017 & Extended up to September 2018	Project may be continued
6	**NRM/CBE/NST/PHY/2015/004** Computational design of nanomaterials and their interaction with natural product plant protective agents as inhibitors for Cauliflower mosaic virus (CaMV) transmission	Dr. D. JeyaSundara Sharmila ` Asst.Prof. (Physics)	January 2015 to December 2017& Extended up to December 2018	Project may be continued

7	**NRM/CBE/NST/PHY/2015/005** Developing a novel biocompatible coating to enhance the shelf life of fruit (Tomato)	Dr. Pon.Sathya Moorthy, Asst. Prof. (Physics)	September 2015 to August 2017 and Extended up to August 2018	Project may be continued
8	**NRM/CBE/NST/SST/2015/006** Nano–encapsulation of hormones to promote seed germination and seedling vigour of blackgram and groundnut	Dr.K.Raja, Asst. Prof. (SS&T)	August 2015 to July 2018 Extended up to July 2019	Project may be continued

iv. Action plan report

No	Recommendations	Action Taken
1	Study on volatile profile of Alphonso mango to assess the unique flavor that can be exploited for value addition of other varieties of mangoes. The data analysis and result interpretation have to be done. Dr. K.S. Subramanian NABARD chair professor Dr. S. Haripriya Asst. Prof. (Hort.)	The compounds responsible for the unique flavour of Alphonso mangoes were identified as a mixture of mono-terpenes, sesqui-terpenes, di-terpenes, lactones and furanones as reported by NCL, Pune (Despande *et al*., 2017) . In our study, the Alphonso mango fruits were exposed to hexanal formulation. Volatile correlation map of treated fruits were distinct compared to that of the control. Qualitatively, all the treated samples formed one major clade and two sub clades with 12T and 15T forming one sub-clade while, 9T, 6T and 3T forming another sub-clade. In control, major clades with similar two sub-clades were formed with 15C, 12C and 9C forming one sub-clade and 6C, 3C & control formed another. Pertaining to quantitative volatile organic compound profiling, four distinct clades of volatile expression in five different stages in case of control and treated fruits were recorded. These clades have stage specific expression and the data is in harmony with other studies carried out in mango. Manuscript preparation is in progress with NCL, Pune.
2	On-farm testing for dip treatment of fruits (eg. Banana) in hexanal formulation to extend the shelf-life of fruits stored in different packhouses to enable technology release in 2018	Two set of packhouse meets were conducted, one for nine southern districts of TN at HC & RI, Periyakulam (2016) and 10 northern districts of Tamil Nadu at Krishnagiri (2018) involving 120 and 281 traders and packhouse owners, respectively. The hexanal formulation was distributed to 400 farmers and the feedbacks from the users were collected by personal interview. Collected data were classified, tabulated and statistically analyzed. Our feedback

	Dr. K.S. Subramanian NABARD chair professor Dr. G.J. Janavi Professor and Head, DNST	survey suggested that 55% of the respondents got premium price for the EFF dipping, 31% expressed that the ripening of banana fruits were delayed, and 6% indicated that there was no difference between treated and control. The data clearly suggests that more than 80% of the banana / mango fruit growers benefitted from the EFF technology. Notably, banana (var. Nendran) primarily used for chips making stayed fresh for 12 days under room temperature. One of the beneficiaries of the technology A1 Chips, Coimbatore who handles 30 tonnes of fruits a day said that it is highly useful for them. This EFF dip technology is also found beneficial for papaya, guava, cucumber, tomato, curry leaf etc. to extend their shelf-life
3	Evaluation of electrospun fibre matrix (nano-sticker) and cyclodextrin inclusion complex (nano-pellets) loaded with hexanal to extend the shelf-life of fruits (mango and banana) at large scale in packhouses Dr. K.S. Subramanian NABARD chair professor Dr. G.J. Janavi Professor and Head, DNST	Nano-stickers (100 Nos) were distributed @ 50 each to two locations. One in University of Nairobi, Kenya and Harsha Fresh Packhouse, Krishnagiri. The experiments are in progress. Each sticker was loaded with 90 uL of hexnal to achieve a critical concentration of 800 ppm for each packaging boxes to carry 2-3 kgs of fruits. Nano-stickers were tested in the Dept. of NST and found to preserve mango (Alphonso and Bangalora) and banana (Grand naine and Ney poovan) for 2-3 weeks under ambient storage conditions. Overall, the data suggest that the nano-stickers measuring 5x5 cm can be used to extend the shelf-life of fruits. Both nano-stickers and nano-pellets have been approved for filing patents & have been filed.
4	Establishment of pilot plant to produce and supply hexanal formulation to the users as a pre-harvest spray or post-harvest dip to extend the shelf-life of fruits. Dr. K.S. Subramanian NABARD chair professor Dr. G.J. Janavi Professor and Head, DNST	truction of Pilot Plant is nearing completion. In the mean time, with the available facility, hexanal formulation is being produced and supplied to users. So far, 3600 litres of EFF concentrate (to be diluted 50 times) has been distributed for either pre-harvest spray or post-harvest dip of fruits

v. Action plan for 2018-21

Theme No. 1		Design and fabrication of nano-agri inputs				
Theme Leader		Dr. K.S. Subramanian , NABARD Chair Professor, DNST, CBE				
Project 1		Nano-based smart delivery of agri-inputs to promote pulses productivity DST/NRM/CBE/NST/2017/R014				
S.No	**Activity**	**Name of the Scientist(s)**	**2018-19**	**2019-20**	**2020-21**	**Deliverables/ expected outcome**
1	Seed encapsulation with nano-fibre for improved germination and ensured plant population	• Dr. K. Raja P (SST), DNST, CBE • Dr. S. Haripriya P (Hort.), DNST, CBE • Dr. Pon. Sathya Moorth AP (Physics), DNST, CBE	• Hormones (GA_3 & IAA) & insecticide in polymer nano-formulation (emulsion) nano-fibre matrix developed using electrospining technique. Bioinoculants can be encapsulated with sericine protein • Characterization of encapsulated forms of individual agri-inputs before and after loading in the nano-matrix	• Kinetics of input release from the encapsulated forms of nano-agri inputs • Nano-matrix loaded with hormones, bioinoculants and insecticide can be tested independently and in combination under controlled environment	• Greenhouse and field experiments to evaluate the seed encpaulated with nano-matrix • Economic analysis of nano-matrix with conventional formulations	• Encapsulated forms of hormones, bioinoculants and insecticide can be achieved • Encapsulation of seeds of pulses with Nano-matrix will be released to the farming community for use and commercialization

2	Nano-composites for balanced crop nutrition, moisture conservation and spraying of encapsulated *Bt* formulations against lepidopteran pests	• Dr. K.S. Subramanian ABARD Chair Prof. DNST, CBE • Dr. S. Marimuthu Asst. Prof.(Agron.) NST, CBE • Dr. M. Kannan sst. Prof. (Ent.) NST, CBE	• Synthesis and Characterization of nano-composites and hydrogels before & after loading nutrient ions or water • Culturing and mass production of *Bacillus thuringiensis* (*Bt*) • Nutrient release pattern of nano-fertilizer composite in light and heavy textured soils and their nutrient use efficiencies in greengram • Synthesis of *Bt* encapsulate using biopolymer	• Micro-plot and controlled environment experiments to assess the fate of Nano-fertilizer composite in soil – water – plant continuum • Moisture retention & release • characteristics of hydrogels • Characterization of *Bt* encapsulate • Effects of nano-fertilizer composite / hydrogel on the impacts of rhizosphere microorganisms and nutrient dynamics • Resistance of encapsulated *Bt* formulation against UV radiation and heat stress	• Greenhouse and field experiments to evaluate the nano-fertilizer composite / hydrogel on nutrient uptake, available nutrients in soil, yield and quality • Economic analysis of nano-fertilizer composite / hydrogel with conventional formulations • Evaluation of encapsulation efficiency and • *in vitro* release experiment	• Nano-fertilizer composite formulation and / or with hydrogel will be released to the farming community for use and further commercialization of the products • Toxicity of encapsulated *Bt* can be studied

3	• Mechanisms of uptake and translocation of nano-inputs in plant system (Nutrition tracking)	• Dr. Jeya Sundara Sharmila P (Physics), DNST, CBE	• Nutrient absorption pattern (P & Zn) of pulses crop fertilized with nano-fertilizer composite • High resolution imaging of nutrient distribution in nano-fertilized plants	• Molecular modeling of nutrient transporter proteins (Phosphate transporters, Zinc Transporters etc)	• Tracer studies (^{32}P and ^{65}Zn) to assess the nutrient use efficiencies of nano-fertilizer input	• Percent nutrients derived from nano-fertilizer can be quantified • Relative nutrient use efficiencies and its impact on plant growth and uptake

Theme No. 1	Design and fabrication of nano-agri inputs
Theme Leader	Dr. Pon. Sathya Moorthy, AP (Physics), DNST, CBE DST/NRM/CBE/NST/2017/R013
Project 2	**Nano encapsulation of Plant Growth Promoting Rhizobacteria (*Pseudomonas fluorescence* & *Bacillus subtilis*) to improve its shelf life.**

S.No	Activity	Name of the Scientist(s)	2018-19	2019-20	2020-21	Deliverables/ expected out come
1	• Nano encapsulation of Plant Growth Promoting Rhizobacteria to improve its shelf life.	Dr. Pon. Sathya Moorthy AP (Physics) DNST, Coimbatore	• Standardization of protocol for extraction, isolation and purification of sericin protein from silkworm cocoon and characterization using Native & SDS PAGE, SEM, EDAX,	• Standardization of Nano sericin encapsulation of *P. fluorescens* and *B. subtilis* by spray drying. • Structural morphology of sericin encapsulated *P.*	• Sericin encapsulated *P. fluorescens* and *B. subtilis* will be packed as spray dried powder as well as pellet and will be packed in LDPP bags and	• Media less PGPRs • Extreme reduction in bulkiness • Easy to store and transport • Soil treatment. • Shelf life

			TEM, FT-IR, XRD, DSC & TG-DTA and CD, MALDI-TOF, Anti-oxidant activity, may be carried out.	*fluorescens* and *B. subtilis* will be studied using SEM and TEM. • Viability and cell count of the sericin encapsulated *P. fluorescens* and *B. subtilis* will be carried out using viable plate count technique and compared with fresh cultures. • Competency of the serine encapsulated *P. fluorescens* and *B. subtilis* will be inoculated to the suitable growing medium to assess the growth after encapsulation.	stored at RT and 4°C to assess its viability & efficacy periodically.	ovement of PGPRs • Site directed delivery of high density PGPRs

Theme No. 2	Nano-Food Systems
Theme Leader	Dr. K.S. Subramanian, NABARD Chair Prf. DNST, CBE
Project 1	Enhanced Preservation of Fruits using Nanotechnology

S.No	Activity	Name of the Scientist(s)	2018-19	2019-20	2020-21	Deliverables/ expected out come
1	Pre-harvest spray and ost-harvest dip	• Dr. G.J. Janavi Prof. & Head, DNST • Dr. M. Kannan AP (Ent.), HC & RI, Periyakulam • Dr. I. Muthuvel Assoc.Prof. (Hort.) HC & RI, Periyakulam • Dr. A. Subbiah AP (Hort.), HC & RI, Periyakulam	• On-farm testing of pre-harvest spray in fruits (mango, guava, grapes) • On-farm testing of the dip technology in fruits (banana, mango, guava, grapes)	• Commercial scale testing and technology release for adoption for guava and grapes • Commercial scale testing and technology release for adoption for fruit crops	Cost economics and impact assessment	• Hexanal technology can be adopted to minimize post-harvest losses
2	Electrospun nano-fibre matrix (Stickers)	Dr. K.S. Subramanian NABARD Chair Prof. Dr. M. Kannan AP (Ent.), HC & RI, Periyakulam	• Fine tuning of nano-stickers (single and multi-layered) to suit mango and banana storage	Technology release for adoption	Cost-economics and commercial level nano-stickers development	Nano-Stickers can be developed as a commercial product
3	Beta-cyclodextrin inclusion complex (Sachet)	Dr. S. Marimuthu gron.), CBE Dr. K.S. Subramanian RD Chair Prof. CBE	Fine tuning of nano-sachet to suit mango and banana storage	Technology release for adoption	Cost-economics and commercial level nano-sachet development	Nano-Sachet can be developed as a commercial product

4	Nano-film derived from banana pseudostem	Dr. K.S. Subramanian RD Chair Prof. CBE	Extraction of nano-fibrillated cellulose from banana pseudostem	Nano-film on shelf-life of cut fruits and vegetables	Cost-economic assessment and commercial level nano-film development	Nano-film can be released as a commercial product

Theme No. 3	Development of Biosensor
Theme Leader	Dr. K.S. Subramanian
Project 1	Development of gadgets for detecting leaf moisture & nutrients and seed viability

S.No	Activity	Name of the Scientist(s)	2018-19	2019-20	2020-21	Deliverables/ expected out come
	• Nano-drop for Foliar Diagnosis	• Dr. K.S. Subramanian NABARD Chair Prof. DNST, CBE • Dr. S. Marimuthu AP (Agron.), DNST, CBE • Dr. Pon. Sathya Moorthy AP (Physics), DNST, CBE	• Development of on-site detection devices for the measurement of leaf moisture and macro-nutrient status in major crops (rice, maize, greengram, cotton, tomato)	• Calibration of devices for on-site decision making on irrigation scheduling and fertilizer prescription for various systems	• Validation of these sensors with standard operational protocols for scaling up of the technology	• Prototype for monitoring leaf moisture , nitrogen, phosphorous will be made available

	• E-nose for seed quality testing	• Dr. K.Raja (SST), DNST, CBE • Dr. N.Natarajan of. (SST), Office of COE, CBE • Dr. K.S. Subramanian BARD Chair Prof. DNST, CBE • Dr. Pon. Sathya Moorthy • AP (Physics), DNST, CBE	• Measurement and Identification of VOC compounds emanating from oilseeds (Groundnut and Sunflower)	• Development of gadget for monitoring the seed viability	• Validation of the gadget with standard operational protocols for scaling up of the technology	• Prototype for monitoring the seed viability during storage will be made available

Theme No. 4	Bio-safety studies of nanomaterials
Theme Leader	Dr. G.J.Janavi, Prof. & Head, DNST, CBE
Project(s)	Evaluation of nano-materials / nano-products for bio-safety

S.No	Activity	Name of the Scientist(s)	2018-19	2019-20	2020-21	Deliverables/ expected out come
	• Studies on bio-safety of nano-materials / nano-products	• Dr. K.S. Subramanian BARD Chair Prof. DNST, CBE • Dr. S.K. Rajkishore (ENS), DNST, CBE	• Testing of nano-materials / nano-products against microbial cultures , honey bees, earth worms and human cell lines	• Testing of nano-materials / nano-products against microbial cultures , honey bees, earth worms and human cell lines	• Testing of nano-materials / nano-products against microbial cultures , honey bees, earth worms and human cell lines	• Manuals on bio-safety of nano-materials will be made available

Work load of each scientists – Nano Science and Technology

Work load of each scientist (Theme wise)

Theme 1: Nano inputs for Agriculture
Theme 2: Nano-Food Systems

Theme 3: Development of Biosensor

Theme 4 : Bio-safety studies of nanomaterials

Sl. No.	Name of the scientist	Theme 1	Theme 2	Theme 3	Theme 4	Total
(man hours / week)						
1	Dr. G.J. Janavi Prof. & Head	-	15	-	5	20
2	Dr. K.S. Subramanian NABARD Chair Prof.	5	15	5	5	30
3	Dr.S. Marimuthu ASST. Prof. (Agron.)	5	5	5	-	20
4	Dr. K.Raja Asst. Prof. (SST)	10	5	5	5	20
5	Dr.S. Haripriya Asst. Prof. (Hort.)	5	5	-	5	15
6	Dr. Pon Sathya Moorthy Asst. Prof. (Physics)	10	-	5	5	20
7	Dr. Jeya Sundara Sharmila Asst. Prof. (Physics)	15	-	-	-	15
8	Dr.S.K. Rajkishore Asst. Prof. (ENS)	5	-	5	10	20

E.Agricultural Meteorology

Sixth Scientist Meet on Non crop specific projects – 2018 was held on 14, June 2018 at Seminar Hall-I, TNAU, Coimbatore. The Programme was chaired by the honourable Vice ChancellorDr. K. Ramasamyand Co-chaired by Dr. K. Ramaraju, Director of Research.

On 13.06.2018,10.00 AM, a pre review meet was conducted by Dr. C. Jayanthi, Director, Directorate Crop Management (DCM) along with Dr. B.J. Pandian, the Director, Water Technology Centre (WTC) and Dr. D. Jawahar, Director, Natural Resource Management, Coimbatore. Before the start of individual scientist presentation, the Director, Crop Management had narrated the expectation of University and points to be considered during the presentation. Action taken on the recommendations of 5th Meet, 2017was presented by Professor and Head, Agro Climate Research Centre (ACRC), Directorate of Crop Management, Tamil Nadu Agricultural University, Coimbatore. This was followed by project wise presentation of individual scientistand action plan for 2018-21. Suggestions made by the Director, DCM, the Director, WTCand the Director NRM were incorporated, accordingly.

On 14.06.2018, 2.00 pm, Professor and Head, ACRC made the consolidated presentation of pre reviewed action taken on recommendations of 5th scientist meet,salient findings for information and adoption from the agro meteorological research during 2017 -18 and action plan 2018 - 21at the 6th Scientist Meet on Non crop specific project at Seminar Hall-I, TNAU, Coimbatore.

i. Vice Chancellor's Remarks

Study the ground water recharge with rainfall pattern

- Study the influence of oscillation in Bay of Bengal and monsoon
- Study the shift in rainfall pattern of Southern zone of Tamil Nadu
- Develop weather based forewarning methodologies for pest and disease.
- Allot research concentration to Assistant professors on Astrometeorology and Clouds
- Add module for soil moisture estimation from rainfall in Moisture Adequacy Index Software

ii. Salient findings for adoption and information

a.Adoption

Theme 1: Weather forecast and agro advisory

- Automate Agro Advisory Software developed under NADP scheme is first of its kind in India. It automatically generates block level weather forecast for next 6 days, develops weather scenario for the every block of Tamil Nadu using past and forecasted weather data, picks up weather scenario based advisory from the data base and sends the farmer specific, crop specific adviosry to the registered farmers as SMS. This Software is developed for both web and mobile application.

Theme 2: Basic and applied meteorological studies

- Simple, user friendly, web based "TNAU Moisture Adequacy Index software" is developed for agricultural drought assessment. This product will be highly useful for Department of Agriculture officials and State Disaster management.
- District wise Efficient Cropping Zone (ECZ) for major pulses and oil seeds are given in Table 3.2. The **Most Efficient Cropping Zone** has higher yield and crop area, hence periodical technology up gradation is sufficient to sustain the same. In **SpreadEfficient Cropping Zone**, technology intervention has to be done to increase the yield, where the area under the crop is high with low crop productivity. **In Yield Efficient Cropping Zone**, extension activities may be initiated to increase the area, where there is good yield potential with minimum spread. In Inefficient Cropping Zone, alternate suitable cropping system may be promoted, where both the area and yield is low.

Table 3.2 District wise ECZ for major pulses and oilseeds (based on 1981– 2010 data)

Crop	Most Efficient Cropping Zone	Yield Efficient Cropping Zone	Area Efficient Cropping Zone	Inefficient Cropping Zone
Blackgram	Cuddalore, Salem,Namakkal,Virudhunagar, Thoothukudi	Kancheepuram, Thiruvallur, Vellore, Karur, Villupuram, Thiruvanna-malai, Erode, Dharmapuri, Coimbatore, Tiruchirapalli, Perambalur, Pudukottai, Theni Madurai, Dindigul	Thanjavur, Thiruvarur, Nagapattinam, Tirunelveli	Krishnagiri, Ramanatha puram, Sivagangai, Nilgiris, Kanyakumari
Greengram	Salem,Namakkal,Thiruvallur, Virudhunagar, Tirunelveli	Kancheepuram, Cuddalore, Villupuram, Thiruvanna-malai, Karur, Dharmapuri, Krishnagiri, Tiruchirapalli, Perambalur and Dindigul	Thanjavur, Thiruvarur, Nagapattinam, Madurai and Thoothukudi	Vellore, Coimbatore, Erode, Theni, Pudukottai, Ramanatha puram, Sivagangai, Kanyakumari and Nilgiris
Groundnut	Kancheepuram,Thiruvallur, Cuddalore,Villupuram,Dharmapuri, Erode	Karur, Thanjavur, Thiruvarur, Nagapattinam, Dindigul and Tirunelveli	Vellore, Thiruvannamal ai, Salem, Namakkal, Perambalur and Pudukottai	Krishnagiri, Tiruchirapalli, Coimbatore, Madurai, Ramanatha puram, Theni, Virudhunagar Sivagangai,

				Thoothukudi, Kanyakumari and Nilgiris
Gingelly	Cuddalore, Salem,Erode,Thiruvarur	Kancheepuram, Thiruvannamalai, Vellore, Namakkal, Coimbatore and Tiruchirapalli	Thiruvallur, Villupuram, Thanjavur, Karur, Theni, Perambalur, Virudhunagar and Thoothukudi	Dharmapuri, Pudukottai, Ramanatha puram, Sivagangai, Tirunelveli, Krishnagiri, Nagapattinam Madurai, Dindigul, Nilgiris and Kanyakumari

b.**Information**

Theme 1: Weather forecast and agro advisory

- Accuracy of TNAU's block level rainfall forecast is 86, 70, 78, 98 and 81 per cent for the summer, south west monsoon, north east monsoon, winter and annual, respectively, which are higher than IMD's district level forecast.Weather based agro advisories issued by GKMS-AMFU scheme has increased the income of Agro Advisory Service adoptive farmers to the tune of Rs. 5150/- in rice (Aduthurai-AMFU), Rs. 8200/- in maize (Coimbatore-AMFU) and Rs. 6500/- in blackgram and 14135/- in Maize (Kovilpatti)
- Astrometeorological rainfall forecast studies inferred that planets have good influence on the rainfall. Among the planets, the Saturn and Neptune at 61 – 90 and 271 – 300 degrees azimuth had higher rainfall influencing capability. The nearer planets (Sun, Moon, Mercury, Venus) had influenced more of low intensity rainfall events and the far away planets (Neptune, Uranus, Saturn and Jupiter) had influence on high intensity rainfall events. Irrespective of 36 two-planet combinations, the 0 - 30 degrees aspects had more rainfall events than other aspects. Moist planets viz., Neptune, Saturn and Venus at their active azimuth and hot planets viz., Sun, Mars and Uranus at their negative range to a particular location had good influence on the rainfall of that location. The planet activeness concept developed by our TNAU scientist may be processed for "PATENT".

Theme 2: Basic and applied meteorology

- Block level rainfall analysis revealed that, rainfall distribution in all the districts become poor over a period of 1980 – 2015. The quantity of annual rainfall was increased in all the districts except Erode, Nilgiris, Tiruvarur and Turticorin. The increase in rainfall quantity was due to increase in NEM, though there was a sharp decrease in SWM. In all the zones, summer rainfall was at increasing trend. Rainfall events are slowly shifting from SWM to NEM. Number of rainfall events between two rainfall events with <50mm is in decreasing trend at southern, western zone and hill area zone districts, where as it is in increasing trend at cauvery delta,

north western and north eastern zones. Hence, proper *insitu* and *exitu* rainwater harvesting with adjustment in cropping pattern and sowing time are to be revalidated to sustain the food production.

- El Niño/Southern Oscillation (ENSO) impacted the seasonal rainfall patterns over Tamil Nadu. El Niño episode recorded 11 to 30 per cent higher rainfall than normal NEM rainfall and opposite was the condition. In most of the El Niño years (68%), sowing rain for Tamil Nadu occurred during 1st week of September, while in the La Niña years (40%) sowing rain was delayed by one week and received during 2nd week of September.

Theme 3: Climate change and crop weather model

- Study on methane emission from rice varieties inferred that the Genotypes, which recorded higher grain yield, such as CO 51, ASD 16, CO 50 and CB05022 emitted less methane (0.23 - 0.29 kg CO_2 equivalents/kg of grain), while certain land races like Norungan (0.41kgCO_2 equivalents/kg of grain) recorded lower grain yield but emitted high methane. The morphological differences in intercellular gas spaces between genotypes resulted in varying levels of methane emission among genotypes.
- Studies on the impact of climate change on rice yield for 21st century indicated that, in Cauvery delta zone, for RCP 4.5 scenario, irrespective of models and varieties, the decline in rice productivity was consistent from near (-22.4 %) century to end century (-33.5 %).
- Study on the influence of elevated temperature on green gram indicated that the yield reduction was about 50 per cent and 60 per cent when exposed to elevated temperature +2 ^{o}C & +4 ^{o}C from ambient, respectively.
- Study on carbon sequestration potential of Coconut plantation reported that the total carbon sequestration potential of a dwarf palm is 7 t/ha (< 10 years), 14.9 t/ha (> 10 years), where as for the tall palm it was 11.2 t/ha (<10 years) and 36.4 t/ha (>10 years). The organically managed tall type palms more than 10 years has carbon sequestration potential of 50.7 t/ha.
- Impact of climate change on maize yield inferred that the maize yield would reduce by 1.5 to 15.7 per cent under irrigated condition and 16.8 to 19.8 per cent under rainfed condition by mid-century with RCP 8.5 scenario. Under rainfed condition the negative effect of future climate could be minimized and enhanced the maize yield through giving protective irrigation at critical stages viz., 4 DAS, 50 DAS and 65 DAS.
- A climate change projection study for Tiruchirapalli district has also ensured the increasing trend of rainfall quantity during NEM than SWM. The results from the crop weather model studies was also inferred that the crop specific adaptation practices such as altering the sowing window and 25 % extra dose of nitrogen application can be successfully employed to minimize the impacts of climate change.
- Study on integration of remote sensing data and crop weather model indicated clearly that assimilation of satellite products in crop simulation models can provide rice yield estimates with higher accuracy compared to remote sensing and crop simulation techniques when used alone. Crop simulation models have dynamic simulation process, which can bring out the interactions between plant, soil and environment. Remote sensing products are capable of providing updates of contingencies in crop production for large areas.

Theme 4: Remote sensing & Geo Information System

- Study on methane emission from rice fields at regional scale through remote sensing in Tiruchirapalli district inferred that the rate of methane emission was ranged from 37.4 to 48.2 kg/ha for a period of 87 to 121 days of flooding and the total methane emission from Tiruchirapalli district during Samba season 2015-16 was 1.57 Gg. Agreement between observed values with IPCC and LST T factor based methane emission was 94 and 91 per cent, respectively. Hence, remote sensing tools can be used for methane emission monitoring.

iii. Projects reviewed

a. THEME WISE RESEARCH PROJECTS

Theme	URP	External funded Projects				StudnetsResearch	Total
		AICRP	GOI	GoTN	Private		
Weather forecast, Agro Advisory			5	1		3	**9**
Basic and applied meteorology	1					6	**7**
Climate change & Crop models	2				3	17	**22**
RS & GIS						4	**4**
	3	**0**	**5**	**1**	**3**	**30**	**42**

b. CROP WISE

Type of project	URP	AICRP	GOI	GoTN	External funded	Studnets Research	Total
			2			6	**8**
Millets						2	**2**
Minor millets	1					1	**2**
Pulses						2	**2**
Oil seeds			1			4	**5**
Sugarcane						1	**1**
Horticulture						3	**3**
Poultry						1	**1**
Non crop	2		3	1	3	9	**18**
Total	**3**		**6**	**1**	**3**	**29**	**42**

iii. Remarks on the ongoing research projects

a. UNIVERSITY RESEARCH PROJECTS

SN	Project Title	Project Leader(s)	Period & Remarks
	Theme 2: Basic and applied meteorology		
	DCM/CBE/AMT/2016/001 Revalidation of efficient cropping zonation for major food crops in Tamil Nadu	Dr. S. Kokilavani, Asst. Prof. (Agrl. Met.) Dr. Ga. Dheebakaran, Asst. Prof. (Agronomy), ACRC, TNAU, Coimbatore	July 2016 to Mar, 2018 Project results should be supported with the reasons for shift in crop efficient zone **Recommended to extend for another six months by obtaining approval for period extension.**
	DCM/CBE/AGR/2016/002 Effect of climate change on shift in rainfall events of Tamil Nadu at block level	Dr. Ga. Dheebakaran, Asst. Prof. (Agronomy) Dr. S Kokilavani, Asst. Prof. (Agrl. Met.), ACRC, TNAU, Coimbatore	July 2016 to Mar, 2018 Project Completed. **Recommended for closure of the project and submit completion report**
II	**Theme 3: Climate change and crop weather model**		
	DCM/CBE/AGR/SMM/2016/001 Effect of elevated temperature on nutri millets tenai, samai, kuthraivali and pulses	Dr. S. Panneerselvam, Prof. and Head, ACRC Dr. N. Chandrasekaran, Professor (SS&AC) Dr. N. Sritharan, Asst. Prof. (Crop Phy.) TNAU, Coimbatore	Sep 2016 – Mar. 2019 **Recommended to continue**

b. EXTERNALLY FUNDED PROJECTS

SN	Project Title	Project Leader(s)	Period &Remarks
	Theme 1: Weather forecast and agro advisory		
1.	**RWF/DCM/ADT/AGR/2013/R003** GOI – IMD – Agromet – GraminKrishiMausamSewa (GKMS) - Experimental Agro-Met Advisory Services (AAS), Aduthurai.	Dr. C.SharmilaRahale, Asst. Prof. (SS&AC) Dr. K. SubrahmaniyanProfessor (Agronomy)	Apr.2013- Mar.2020 Follow the uniform procedures and methods in all GKMS units **mmended to continue**
2.	**IMD/DCM/CBE/ACR/2014/R006** GOI – IMD – Agmet – GraminKrishiMausamSewa (GKMS)- Weather based agro advisory services for farm decision making for western zone of TN.	Dr. Ga. Dheebakaran Asst. Prof. (Agron), ACRC, TNAU, Cbe -3 Dr. S. Panneerselvam, Prof. and Head, ACRC	Apr.2013–Mar.2020 Follow the uniform repots in all GKMS units **Recommended to continue**
3.	**IMD/ DCM/ KPT/ AGR/ 1995/ R001** GOI – IMD - Agromet – GraminKrishiMausamSewa (GKMS) – Rural Agro meteorological Advisory Service for Southern zone	Dr. B. Arthirani Asst. Prof. (Agrl. Met) ARS, Kovilpatti	Apr.2013–Mar.2020 Follow the uniform repots in all GKMS units **Recommended to continue**
4.	**GOI/DCM/OTY/ACRC/2016/R003** Agrometeorology Field Unit (AMFU) for Agrometeorological Advisory Services (GKMS) under IMD, GOI at HRS, Ooty	Dr. S. Karthikeyan Asst. Prof. (Horti), HRS, Ooty	Apr.2013–Mar.2020 Follow the uniform repots in all GKMS. **Recommended to continue**
5.	**IMD/DCM/ADT/AGR/2011/R001** Forecasting Agricultural output using Space, Agrometerology and Land based observations (FASAL) to Agro Advisory Services for Cauvery Delta Zone – a linked project of Agro Meterological Field Unit (AMFU) for AAS (GKMS) under IMD at TRRI, Aduthurai	Dr. K. Subrahmaniyan Professor (Agronomy) Dr. C.SharmilaRahale, Asst. Prof. (SS&AC)	Apr.2013–Mar.2020 Use both crop simulation models and statistical methods as that of Coimbatore Unit. **Recommended to continue**
6.	**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. Ga. Dheebakaran Asst. Prof. (Agronomy), ACRC, TNAU, Coimbatore	Jan.2011 –Mar.2020 **Recommended to continue**

7.	**NADP/DCM/CBE/ACR/2016/D006** Development of Agro Advisory Services using Automatic Weather Station data at block level in Tamil Nadu under NADP 2013-14	Dr. S. Panneerselvam, Prof. & Head, ACRC Dr.Ga. Dheebakaran, Asst. Prof. (Agron.), Dr. S. Kokilavani, Asst. Prof.(Ag.Meteo.), ACRC, TNAU, Coimbatore.	Apr. 2014 – 2018 Project Completed. **Recommended for closure of the project and submit completion report**
II	**Theme 2: Climate change & crop modeling**		
8.	**AgMIP/DCM/MDU/AGR/2015/R003** Evolving climate resilient farming systems in South India through integrated modeling, adaptation and stakeholders participation	Dr. V.Geethalakshmi Professor (Agronomy), Dept. of Agronomy, Dr. S. Kokilavani, Asst. Prof, ACRC, TNAU, Coimbatore	May 2015- 2017 Project Completed. **Recommended for closure of the project and submit completion report**
9.	No.Dr/P7-4-Mapping Climate change vulnerability to strengthen food security with climate smart adaptation and mitigation options in Tamil Nadu (NATCOM) –(E28ABA**)**	Dr.V. Geethalakshmi Professor (Agronomy), Dept. of Agronomy, TNAU Coimbatore	Apr.2017-Mar.2018 Project Completed. **Recommended for closure of the project and submit completion report**
10.	**NORWAY/DCM/CBE/ACR/2012/R003** ClimaAdapt- Adaptation to climate change: An integrated science-stakeholder approach to develop Adaptation framework for Water and Agriculture sectors in Andhra Pradesh and Tamil Nadu states of India	Dr. V. Geethalakshmi Dept. of Agronomy, TNAU Coimbatore	Jun.2012–Dec.2017 Project Completed. **Recommended for closure of the project and submit completion report**

iv. Action plan for year 2018-2019

S.N	Theme	Topic
1.	Weather forecasting and agro advisory	1. Astrometeorological forecast for extreme events - Cyclone 2. Validating extended range of forecast at district level 3. Improving numerical weather forecasting from block level to village level 4. Response farming and its impact on major food crops
2.	Basic and applied meteorology	5. District wise efficient cropping zonation for commercial crops 6. Developing methodology for Moisture Adequacy Index 7. Soil moisture and temperature on nutrient mobility
3.	Climate change	8. Ensemble modelling for developing future weather scenarios 9. Elevated temperature and moisture stress on wetland weeds

v. Work load of scientists

Theme 1: Weather forecast and weather based agro advisory

Theme 2: Basic &applied meteorology

Theme 3: Climate change and crop models

Theme 4: Remote senisng and GIS

SN	Scientists	Work load	Hours /week	Time allotted for each Theme Area			
				1	2	3	4
1	**Dr. S. Panneerselvam, P&H, ACRC, CBE**						
	Research	University Research Project - 1	2			2	
		Externally funded project - 2	8	8			
		Students Guide – 4 Ph.D, 1 PG	10		4	4	2
	Teaching	1 Ph.D & 1 PG	6				
	Administration	Prof. & Head	20				
	Other Activities	Meeting	5				
2	**Dr. Ga. Dheebakaran, Asst. Prof. (Agronomy), ACRC, CBE**						
	Research	University Research Project - 3	12	9	3		
		Externally funded project – 3 GKMS -1, NADP - 1	20	20			
		Students Guide – 2 (PG)	4	2	2		
	Teaching	1 PG & 1 Ph.D	6				
	Research coordinator		3				
	Vehicle Incharge, Observatory & Stock		3				
	PG Coordinator		3				
	BSc (Agri) – 2017 batch coordinator		3				
3	**Dr. S. Kokilavani, Asst. Prof. (Agricultural Meteorology), ACRC, CBE**						
	Research	University Research Project - 3	18	12	6		
		Externally funded project - 1	6	6			
		Students Guide - 1	4		4		
	Teaching	2 PG	12				

	Other Activities	ACRC Library, UG coordinator	2				
4	**Dr. V. Geethalakshmi, Professor (Agronomy), AC&RI, MDU**						
	Research	University Research Project					
		Externally funded project - 3	25			15	10
	Teaching	1 PG, 1Ph.D	7				
	Students Guide	1 PG, 5 Ph.D	12		2	8	2
5	**Dr. C.SharmilaRahale, Asst. Prof. (SS & AC), TRRI**						
	Research	University Research Project - 1	20				
		Externally Funded Project	12	6			
		Students Guide					
	Extension		2				
	Other Activities	Observatory & Stock	6				
6	**Dr. N. Sritharan, Asst. Prof.,(CRP), Dept. of Crop Physiology, Coimbatore**						
	Research	University Research Project - 1	4		4		
		Externally Funded Projects	4				
		Students Guide – 3 PG	6				
	Teaching	2 PG, UG 1	12				
	Other Activities	Research Co-ord, Dept. Labour	10				
	VCS scheme	Co-PI	4				
7	**Dr. B. Arthirani, Asst. Prof.(Agricultural Meteorology), ARS, Kovilpatti**						
	Research	University Research Project - 3	12				
		Externally Funded Projects - 1 Others – 2 (NSM & VCS)	16 10	16			
	Other Activities	Library incharge, Research Coordinator,	10				

		block level scientist					
8	**Dr. S. Karthikeyan, Asst. Prof. (Horticulture), HRS, Ooty**						
	Research	University Research Project - 3	12				
		Externally Funded Projects -2	24	16			
		Students Guide (Member)	2				
		Farm Management	10				

F. Community Science College and Research Institute, Madurai – 625 104

Proceedings of the 6th Scientists Meet on Non crop specific projects held on 14.06.2018

The Sixth Scientists Meet on Non Crop Specific projects was held at Tamil Nadu Agricultural University, Coimbatore on 14.06.2018 under the chairmanship of Dr.K.Ramasamy, Vice-Chancellor, TNAU, Coimbatore. Dr.K.Ramaraju, Director of Research, Dr. S. Amutha, Dean (Community Science), Dr.M.Jawahar, Director, Natural Resource Management, TNAU, Coimbatore Dr.C.Jeyanthi, Director , Crop Management Studies , Dr. B.J. Pandian Director (WTC), and Dr.N.Varadharaju, Dean, AEC&RI, Coimbatore attended.

Pre-review meeting of the University Research Projects was taken up by Dr. S. Amutha, Dean (Community Science) on 13.06.2017 at TNAU, Coimbatore with all the scientists. The list of participated scientists in 6th Scientists Meet on Non crop specific projects meet is given below:

Scientists from CSC&RI, Madurai

1. Dr.S.Amutha, Dean (Community Science)
2. Dr.S.Kanchana, Professor and Head (HDT&FS)
3. Dr.P.Parimalam, Professor and Head (FRM&CS)
4. Dr.G.Hemalatha, Professor and Head (FSN)
5. Dr.M.Murugan, Professor and Head (DAS)
6. Dr.R.Vijayalakshmi, Assistant Professor (FSN)
7. Dr.P.S.Geetha, Assistant Professor (FSN)
8. Dr.M.Ilamaran, Assistant Professor (FSN)
9. Dr.B. Nallakurumban, Assistant Professor (FSN)
10. Dr.V.Veeranan Arun Giridhari, Asst. Professor (FSN)
11. Dr.V.Meenakshi, Asst.Professor (FSN)
12. Dr.L.Karpagapandi, Asst.Professor (FSN)
13. Dr. E.Tamil Selvi, Assistant Professor (FSN)

Scientists from other Department / Station

14. Dr.K.Shanthi, Assoc. Professor (FSN), Dept. of Horticulture , AC & RI, Killikulam
15. Dr.S. Jesupriya Poornakala, Assistant Professor (FSN), DARS, Chettinad
16. Dr.G.G. Kavithashree, Assistant Professor (FSN), Agricultural College and Research Institute, Eachangkottai, Thanjavur

1. Remarks on the ongoing University Research Projects

Sl. No.	Project Number, Title and Name of the Scientists	Remarks
A. Theme I: Food Processing and Value Addition		
1.	**HSCRI/MDU/FSN/2016/002** Assessing the suitability of TNAU released varieties of Sorghum and Bajra for product development. **Dr. M. Ilamaran,** **Assistant Professor (FSN)**	Millet milk may be developed and nutritional characteristics of the developed product may be studied.
2.	**HSCRI/MDU/HSC/2015/007** Development of non-dairy probiotic Ready-To-Serve Juices **Dr.T.Uma Maheswari,** **Assistant Professor (AGM)**	Probiotic beetroot and citrus RTS has to be standardized and the probiotics and nutritional characteristics of the developed product may be studied. Alginate in flakes form may be worked out.
3.	**HSCRI /PKM/HSC/2015/001** Effect of packaging technologies with suitable packaging materials to extend shelf life and quality of Guava (*Psidium guajava L.*) var. Red flesh. **Dr. V. Vani, Assistant Professor (HSC)**	The local variety of guava from Palani & Madurai district may be used as control and the study may be compared.
B. Theme II: Nutrition and Health		
4.	**HSCRI/MDU/HSC/2015/013** Effect of processing on the bioactive carbohydrates and dietary fiber of selected cereals **Dr. S. Jesupriya Poornakala,** **Assistant Professor (FSN)**	Completion report may be submitted before 30.09.2018 and New URP may be proposed
5.	**HSCRI/KKM/FSN/2015/001** Development of banana flour based health mixes incorporated with millets, pulses and oilseeds **Dr. K. Shanthi,** **Associate Professor (FSN)**	Compare the physico chemical, nutritional characteristics of developed health mixes to commercially available banana flour incorporated weaning food
6.	**HSCRI/MDU/HSC/2015/016** Assessing the quality parameters of red chillies in different stages of food chain **Dr. B. Nallakurumban,** **Assistant Professor (FSN)**	The completion report may be submitted along with publication at the earliest.
7.	**HSCRI/MDU/HSC/2015/018** Studies on nutritional and phyto-chemical components of *Cocos nucifera* vegetative bud. **Dr. L.Karpagapandi,** **Assistant Professor (FSN)**	Isolation and characterization of protein from *Cocos nucifera* embryo may be undertaken.

8.	**HSCRI/MDU/FSN/2017/002** Exploitation of Tamarind varieties for product diversification. **Dr. R. Vijayalakshmi,** **Assistant Professor (FSN)**	The pulp recovery may be standardized
9.	**HSCRI/MDU/FSN/2017/003** Phytochemical and therapeutical profile of conventional foods (*Solanum torvum, Hibiscus sabdariffa, Coccinia indica*) **Dr. V. Meenakshi,** **Assistant Professor (FSN)**	Phyto chemical properties of the selected conventional foods may be analysed.
10.	**HSCRI/MDU/FSN/2017/004** Assessment of nutritional and bioactive compounds and value addition of *Muntingia calabura* fruit **Dr. E. Tamil Selvi,** **Assistant Professor (FSN)**	The bioactive compounds and the possibility of value addition may be explored.
11.	**HSCRI/MDU/FSN/2018/001** Assessing the hypoglycemic effect of selected medicinal plants for Type II Diabetics **Dr. L. Karpagapandi,** **Assistant Professor (FSN)**	Amino acid of Coccinia leaf may be studied.
12.	**HSCRI/MDU/FSN/2018/001** Efficacy of equitable interventions in combating health and nutritional disorders among AC&RI, ECK college students and staff **Dr.G.G. Kavithashree,** **Assistant Professor (FSN)**	The interventions may be given to improve haemoglobin level among the students.
13.	**HSCRI/MDU/HSC/2015/012** Assessment of microbial and heavy metals contamination in commonly consumed selected species of marine and inland fresh and dry fish **Dr. V. Veeranan Arun Giridhari,** **Assistant Professor (FSN)**	Completion report may be submitted before 30.09.2018 and new URP may be proposed
14.	**HSCRI/MDU/HSC/2015/016** Assessing the quality parameters of red chillies in different stages of food chain **Dr. B.Nallakurumban,** **Assistant Professor (FSN)**	Completion report may be submitted before 30.09.2018 and New URP may be proposed

2. Technology for adoption

1. Expanded horsegram snack
2. Instant kavuni rice pittu mix
3. Vita – A rich cookies from Mango peel

3. Action plan for 2018-2021 on the Identified themes

Name of the Scientist	Title of the Action plan proposed
Dr.S.Amutha Dean, CSC&RI, Madurai	Hypocholesterolemic effect of vegetable food products- *in vivo* and *in vitro* studies.
Dr.S.Kanchana Professor &Head Dept. of HDT&FS, CSC&RI Madurai	Standardisation of Texturized Vegetable protein blending Mushroom and selected underutilized pulses
Dr.G.Hemalatha Professor and Head (FSN), CSC&RI, Madurai	Exploitation of sea weeds in development of Vitamin D Enriched Functional Foods : A practical approach to overcome Vitamin D Deficiency
Dr.T.UmaMaheswari Assistant Professor (AGM), CSC&RI, Madurai	Developing and assessing the efficacy of antimicrobial food packaging material: A green technology
Dr.V.Meenakshi Assistant Professor (FSN), Dept. Of ADM, CSC&RI Madurai	Exploring the potential of goat milk through value addition for improving the livelihood of farmers
Dr.S. Jesupriya Poornakala Asst. Professor (FSN), DRAS, Chettinad	Processing of raw jackfruit (*Artocarpus heterophyllus* L.) and assessment of its phytochemical constituents and antidiabetic activity

Theme : **Therapeutic foods**

Title : Hypocholesterolemic effect of vegetable food products- *in vivo* and *in vitro* studies.

Team members : 1**. Dr.S.Amutha**
Dean i/c
Community Science College and Research Institute
Madurai – 625104.

2**. Dr. T. Arumugam**
Professor and Head
Department of Vegetable Science
HC&RI, Coimbatore- 641003.

Objectives	**Activity**		
	2018-19	**2019-20**	**Deliverables /Expected outcome**
Isolation of functional food ingredients- dietary fiber from vegetables To Characterize vegetable fiber as a bioactive substance carrier and to assess its usefulness as a functional component of foodstuffs	Extraction of fiber from improved variety of cluster bean (MDU 1) and ladies finger (Co 5). Development of food products with various level of incorporation of extracted fiber Sensory evaluation of developed products		Therapeutic food products highly suitable for patients with CVD, hypertension, diabetes, obesity and public who are health cautious.
To study the nutritional and nutraceutical properties of developed functional foods		*Invitro* and *Invivo* accessibility of fiber for its hypocholestrolemic effect	Food product development using vegetables for its hypocholestrolemic effect

Theme	**:**	**Food Processing**
Title	**:**	Standardization of Texturized Vegetable Protein blending Mushroom and selected under utilized pulses
Team members	**:**	**Dr.S.Kanchana** Professor and Head Department of Human Development and Family Studies Community Science College and Research Institute Madurai - 625104

Objectives	**Activity**		
	2018-19	**2019-20**	**Deliverables /Expected outcome**
• Standardizing the processing methods for supplementation /protein isolation from mushroom and under utilized pulses for the development of Texturized Vegetable Protein (TVP). • Optimizing the process parameters for development of TVP and assessing the quality parameters • Storage stability and product diversification of the TVP • To evaluate the economic feasibility of the developed products	Standardization of protein isolates from selected mushroom varieties and under utilized pulses. Optimizing the process parameters for development of TVP and assessing the quality parameters Assessing the physical, nutritional and sensory attributes of TVP	• Storage studies of TVP by using suitable packaging materials • Product diversification by preparing TVP Curry and TVP fried • Evaluating the economic feasibility of developed product	Novel mushroom products with enrichment of protein quality

Theme	**:**	**Functional foods**
Title	**:**	Exploitation of sea weeds in Development of Vitamin D Enriched Functional Foods : A practical Approach to overcome Vitamin D Deficiency
Team members	**:**	**Dr.G.Hemalatha** Professor and Head (FSN) CSC&RI Madurai **Dr.S.Amutha** Dean (Community Science) **Dr.T.Uma Maheswari** Asst.Professor (AGM) Dr.Kavitha Pushpam Asst. Professor (Biochemistry)

Objectives	**Activities**			**Deliverables /Expected outcome**
	2018-19	**2019-20**	**2020-21**	
Screening of edible seaweeds for nutraceuticals and functional properties with specific reference to vitamin D nutrition, bioavailability and safety aspects.	• Seaweed powder / extract will be processed from Red (Rhodophyta) and brown (Phaeophyta) seaweeds. Nutraceutical properties of the selected seaweeds will be analysed. • The Safety and Bioavailability studies will be carried out.			Exploitation of sea weed as a potential source of practical and affordable strategy to overcome vitamin D deficiency. Development of functional foods along with antimicrobial properties.

Objectives	Activities			Deliverables /Expected outcome
	2018-19	2019-20	2020-21	
Development of seaweed fortified functional foods for addressing Vitamin D deficiency		i) Optimizing vitamin D rich sea weed based functional foods *viz* ii) studying of quality characteristics and shelf life of the developed functional foods.		
Evaluation of the health benefits of the developed seaweed fortified functional foods			i) Conducting studies with human *in vivo* models for 1.Musclosskeletal function 2. Anti diabetic effect 3. Cardio-protective effect. In vivo animal model studies for ii) Anticancer activity of sea weeds against DAL cells	

Theme	**:**	**Food packaging**
Title	**:**	Developing and assessing the efficacy of antimicrobial food packaging material: A green technology
Team members	**:**	**Dr.T.Uma Maheswari** Assistant Professor (AGM)

Objectives	**Activities**			**Deliverables /Expected outcome**
	2018-19	**2019-20**	**2020-21**	
Standardization of antimicrobial packaging material using chitosan and essential oils	i) Standardization of antimicrobial packaging material using chitosan Basil oil, Lemon oil, Thyme oil, Tea tree oil ii) Studying mechanical and physical properties of packaging material			Antibacterial and antifungal packaging material will be developed Cost effective eco-friendly packaging material will be developed
Testing of antibacterial and antifungal activity of the standardized packaging material		Testing of antibacterial and antifungal activity of the standardized packaging material		
Testing the efficacy of packaging material on the shelf-life of perishable and semi perishable foods viz, fresh fruits, vegetables and dairy products			Testing the efficacy of packaging material on the shelf-life of perishable and semi perishable food products	

Theme	**:**	**Food Processing**
Title	**:**	Exploring the potential of goat milk through value addition for improving the livelihood of farmers
Team members	**:**	**Dr.V.Meenakshi** Assistant Professor (FSN) **Dr.T.Uma Maheswari** Assistant Professor (AGM)

Objectives	**Activities**			**Deliverables /Expected outcome**
	2018-19	**2019-20**	**2020-21**	
To formulate value added products from goat milk	1. To formulate value added products from goat milk -milk powder, paneer, flavoured milk, cheese and ice cream ▪ Milk powder- standardization of goat milk powder using spray drier ▪ Paneer- standardisation of plain paneer , spiced paneer and herbal paneer ▪ Flavoured milk- standardization of flavoured milk with natural and synthetic flavours ▪ Cheese – standardization ▪ Ice cream- Standardization of thickening and stabilizing agents and standardization of ice cream using natural and synthetic flavor			1. The outcome of the project will provide opportunities for enhanced income to farmers, farm women, rural youth by an appropriate and easily adoptable technology. 2. The goat products will also provide a choice of product to lactose intolerance. 3. Alternative self employment ways for goat farmers can be ensured.

Objectives	Activities			Deliverables /Expected outcome
	2018-19	2019-20	2020-21	
To study the physico-chemical, nutritional, microbiological characteristics of developed products during storage		Physico-chemical, nutritional, microbiological characteristics will be studied.		
To study the consumer preference of goat milk products			Formulation of questionnaire and studying the consumer preference of developed goat milk products in rural, semi urban and urban areas.(Sample Size: 150 nos)	

Theme	**:**	**Neutraceuticals and Health foods**
Title	**:**	Processing of raw jackfruit (*Artocarpus heterophyllus* L.) and assessment of its phytochemical constituents and anti diabetic activity
Team Members	**:**	**Dr.S. Jesupriya Poornakala**, Assistant Professor (FSN) Dryland Agricultural Research Station, Chettinad

Sl. No	Objectives	Activities			Deliverables/Expected Out come
		2018-2019	2019-2020	2020-2021	
1.	Processing of raw jackfruit (*Artocarpus heterophyllus* L.) and assessment of its phytochemical constituents and anti diabetic activity	Determination of the total polyphenols, flavonoids, tannins, carotenoids, dietary fiber and nutrient composition of fully matured unripe jackfruit fresh bulbs	Development of chips, dehydrated flakes, papad and flour from raw jackfruit bulbs. Evaluation of physico-chemical properties, phytochemical constituents and nutrient composition of processed jack fruit bulbs.	Determination of diabetic activity and glycemic index of unripe jackfruit fresh bulbs and processed jack fruit bulbs.	The fresh and processed jack fruit bulbs may serve as a functional food due to its anti diabetic properties. The development of processed jack fruit bulbs would ensure its availability during off season

Work load of each scientist (Theme wise)

Theme 1 :	Hypocholesterolemic effect of vegetable food products- *in vivo* and *in vitro* studies.
Theme 2 :	Standardisation of Texturized Vegetable protein blending Mushroom and selected underutilized pulses
Theme 2 b.	Exploring the potential of goat milk through value addition for improving the livelihood of farmers
Theme 3 :	Exploitation of sea weeds in development of Vitamin D Enriched Functional Foods : A practical approach to overcome Vitamin D Deficiency
Theme 4 :	Developing and assessing the efficacy of antimicrobial food packaging material: A green technology
Theme 5 :	Processing of raw jackfruit (*Artocarpus heterophyllus* L.) and assessment of its phytochemical constituents and anti diabetic activity

No.	**Name of the scientist**	**Theme 1**	**Theme 2**	**Theme 3**	**Theme** 4	**Theme 5**	**Other responsibilities (AICRP/TeachingODL/ Farm management/ Administration)**
				(man hours / week)			
Therapeutic foods							
1.	Dr.S.Amutha	10					30
2.	Dr. T. Arumugam	10					30
Food Processing							
3.	Dr.S.Kanchana		10				30
4.	Dr.V.Tirupathi		6				34
5.	Dr.V.Meenakshi		12				28
6.	Dr.T.Uma Maheswari		5				35
Functional foods							
7.	Dr.G.Hemalatha			10			30
8.	Dr.S.Amutha			8			32
9.	Dr.T.Umamaheswari			8			32
Food packaging							
10.	Dr.T.UmaMaheswari				12		28
Neutraceuticals and Health foods							
11.	Dr.S. Jesupriya Poornakala					30	10

Work load of Scientists of (FSN / CSC) FOR THE YEAR 2018-19

Sl. No.	Name of the Scientists and their work load	% of Time
1.	**Dr. S.Kanchana**	
	Teaching / Student guide	30
	Univ. Sub Project	20
	Administration	30
	Other Activities	20
2.	**Dr.K.A.Jeyakumar**	
	Teaching / Student guide	20
	Univ. Sub Project	20
	AICRP	25
	Administration	20
	Other Activities	15
3.	**Dr. G.Hemalatha**	
	Teaching / Student guide	20
	Univ. Sub Project	20
	Ex. Funded Projects & AICRP	35
	Administration	25
	Other Activities	5
4.	**Dr.P.Parimalam**	
	Teaching	15
	Univ. Sub Project	15
	Ex. Funded Projects & AICRP	35
	Administration	25
	Other Activities	10
5.	**Dr. M. Murugan**	
	Teaching / Student guide	15
	Univ. Sub Project	20
	Ex. Funded Projects	40
	Administration	15
	Other Activities	10

Sl. No.	Name of the Scientists and their work load	% of Time
6.	**Dr.R.Saravanakumar**	
	Teaching / Student guide	25
	Univ. Sub Project	15
	AICRP	15
	Administration	25
	Other Activities	20
7.	**Dr.V.Thirupathi**	
	Teaching / Student guide	60
	Other Activities	40
8.	**Dr.G.Sashidevi**	
	Teaching	30
	Univ. Sub Project	20
	Students guide	15
	Other Activities	35
9.	**Dr.P.S.Geetha**	
	Teaching	30
	Univ. Sub Project	20
	Students guide	15
	Other Activities	35
10.	**Dr. R.Vijayalakhsmi**	
	Teaching	30
	Univ. Sub Project	20
	Students guide	15
	Other Activities	35

Sl. No.	Name of the Scientists and their work load	% of Time
11.	**Dr.M. Ilamaran**	
	Teaching	25
	Univ. Sub Project	20
	Students guide	15
	Other Activities	30
12.	**Dr.Veeranan Arun Giridhari**	
	Teaching	25
	Univ. Sub Project	20
	Students guide	15
	Other Activities	30
13.	**Dr.V.Meenakshi**	
	Teaching	30
	Univ. Sub Project	20
	Students guide	15
	Other Activities	35
14.	**Dr.S. Kamalasundari**	
	Teaching	30
	Univ. Sub Project	20
	Students guide	20
	Other Activities	30
15.	**Dr.L.Karpagapandi**	
	Teaching	30
	Univ. Sub Project	20
	Students guide	15
	Other Activities	35
16.	**Dr.E.Tamil Selvi**	
	Teaching	30
	Univ. Sub Project	20
	Other Activities	50

Sl. No.	Name of the Scientists and their work load	% of Time
17.	**Dr.B.Nallakurumban**	
	Teaching	25
	Univ. Sub Project	20
	Ex. Funded Projects & Students guide	25
	Other Activities	30
18	**Dr.J.Selvi**	
	Teaching	30
	Univ. Sub Project	20
	Students guide	15
	Other Activities	35
19.	**Dr.K.Jothilakshmi**	
	Teaching	25
	Univ. Sub Project	20
	Students guide	15
	Other Activities	30
20.	**Dr.K.P.Sivakumar**	
	Teaching	25
	Univ. Sub Project	20
	Students guide	15
	Other Activities	30
21.	**Dr.T.Uma Maheswari**	
	Teaching	25
	Univ. Sub Project	20
	Ex. Funded Projects & Students guide	25
	Other Activities	30

Work load of Scientists of (FSN / HSC) Scientists- Action plan

Scientists	Titles	Theme	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	% time
Dr.S.Amutha, Dean, CSC&RI, Madurai															
Administration		1	<----------												
Teaching / Students guide			<----------PG & Ph.D. teaching ------>												
Other Activities			<----------												
Dr.S.Kanchana, Professor and Head (HDT&FS), CSC&RI, Madurai															
Teaching / Student guide			<-----UG/Ph.D. teaching, Guidance------>												
Univ. Sub Project			2	New URP <----------											
Administration			<----------												
Other Activities			<----------												
Dr.G.Hemalatha, Professor and Head (FSN), CSC&RI, Madurai															
Teaching / Student guide			<----------PG & Ph.D. teaching ------>												
Univ. Sub Project			3	HSCRI/ MDU/ FSN/2017/001											
Ex. Funded Projects & AICRP			All India Co-ordinated Research Project on Home Science SERB, DST, New Delhi SPCDB, Canada												
Administration			<----------												
Other Activities			<----------												
Dr.S. Jesupriya Poornakala, Assistant Professor (FSN), DARS, Chettinad															
Research			5	<----------											
Other Activities			<----------												
Dr.V.Meenakshi, Assistant Professor (ADM), CSC&RI, Madurai															
Teaching/ Students guide			<----------UG & PG teaching ------>												
Research and student guidance			2 b	HSCRI/MDU/FSN/2017/003											
Other Activities			<----------												
Dr.T.Uma Maheswari, Assistant Professor (AGM), CSC&RI, Madurai															
Teaching			<----------												
Research & Students guide				DST-SERB <----------											
Other Activities			<----------												