Directorate of Natural Resources Management

PROCEEDINGS OF THE MODERN TOOLS AND TECHNOLOGIES MEET HELD ON 10.05.2017

DEPARTMENT OF ENVIRONMENTAL SCIENCES

Crop Scientists' Meet 2017 on Modern Tools and Technologies was held on 10.05.2017 at TNAU, Coimbatore under the chairmanship of Dr.C.R.Anandakumar, Registrar, and Dr.M.Maheswaran**,** Director of Research. On 10.05.2017 by 9.30 AM, pre-review of the University Research Projects (URP) combining all the disciplines in Natural Resource management was taken up by Dr. D. Jawahar, Director of Natural Resource Management. The review was assisted by Dr.Arulmozhichelvan, Professor and Head, Dept of Soil Science and Agricultural Chemistry, Dr.G.J.Janavi, Professor and Head, Dept of Nanoscience and Technology, Dr.P.Shanmuga Sundaram, Professor (SS&AC) and Research Coordinator of the Department and the list of participants for the scientists' meet are appended.

The pre-review meeting began with an introduction by Dr. D. Jawahar (NRM), who narrated the way of carrying out a project. Followed by that, overall project review for the Department of Environmental Sciences was taken up. Considering the time and to avoid duplications, Dr.S.Avudainayagam, Professor and Head, Department of Environmental Sciences presented the overall research outcome under the five theme areas. He made a presentation on the action taken on the recommendations made during the last meet, progress made under various themes and the action plan formulated for 2017-18 and accordingly the presentation was made. In his presentation, he highlighted the outcome like Remediating dye and textile effluent contaminated soil through plant microbes interaction, Phytoremediation potential of aquatic plants in the reed bed system under theme area, ***I Bioremediation of Polluted Environments.***

Under theme area **II, *Wastewater Treatment and Recycling***, Impact of distillery and paper mill effluents on crops (Beetroot crop, Elephant foot yam Cluster bean and Bhendi, Tapioca, and Jasmine) , on soil and groundwaterwere highlighted. Greenhouse gases emission in rice ecosystem of Tamil Nadu, Aerosol characteristics over high altitude in Southern India Impact of ozone on crops in Ooty, Tamil Nadu, Methane emission mitigation through enhancedmethane oxidation and rhizosphere engineering, Carbon Sequestration in Rainfed ecosystem and Establishing Green Corridor along the coastline of Cuddalore district for ecological preservation were presented under the theme area ***III - Air pollution monitoring and mitigation***. Research related to ***Integrated Solid Waste Management*** and ***Agro-ecology and Ecosystem Services*** were also covered under the theme area ***IV and V*** respectively. Suggestions were made by the Director of NRM and accordingly, modified presentation was made on 10.05.2017 AN before the Registrar and the Director of Research.

1. Staff pattern

Among 30 scientists of this department, a total of 12 scientists from Coimbatore and 12 from other campuses (one professor from DARS, Chettinad, one professor from Information and Training Centre, Chennai ,three scientists from ADAC&RI, Trichy , one scientist from each of the following FC&RI, Mettuplayam, ORS, Tindivanam , ARS, Thirupathisaram, HC&RI, Periyakulam , ARS, Aliyarnagar , AC&RI, Thiruvannamalai , AC&RI, Kudumiyanmalai) attended the meet.

2. Remarks on the ongoing University Research Projects

General Comments (All Scientists)

- Diversify the research areas beyond Distillery spent wash and Paper mill in order to help the farmers.
- The research areas may be prioritized based on farmers need
- The studies done in small scale may be extended to field level for greater application of Technology.
- Environmental Impact Assessment, Bioindicators and Biosensors are getting momentum. So projects may be formulated in these areas

S. No.	Project Number	Remarks
1	**NRM/CBE/ENS/SUG/ 2015 / 001** Dr.J.Kannan *In-situ* management of sugarcane trashes to enrich soil available nutrients for sustainability	Field experiment was conducted at Sugarcane Research Station, Cuddalore for the *in-situ* decomposition the sugarcane trashes. **Suggestions:** The trash accumulated in the sugarcane field may be quantified before starting the composting of pulverized trashes.
2	**NRM/CBE/ENS/ 2015 / 003** Dr. K. Suganya Evaluating the phyto-remediation potential of aquatic plants in reed bed system for recycling of sewage water in agriculture	A labscale hybrid reedbed system was designed and utilized for treating the sewage effluent with Canna Indica as a phytoaccumulating plant**.** **Suggestions:** The removal efficiency of the reed bed should be expressed in biomass basis. The rate of flow and retention time may be indicated
3	**NRM/TPS/ENS/2015/001** Dr.C. Prabhakaran Development of Integrated Solid waste management (ISWM) Strategy for APPTA	Composting of market waste of APPTA through rapid composting technique, and evaluated using paddy TPS 5 as test crop. Application of market waste compost @ 5 t ha^{-1} with 100 and 75% NPK recorded higher yield.

		Recommendation: Application of market waste compost @ 5 t ha^{-1} with 100 and 75% NPK recorded higher yield is recommended **Suggestion :** • Composition of waste materials in the APPTA market may be Studied. This may be accounted while recommending the compost dose • Trials may be conducted two more years for the above recommendation
4	**NRM/TMV/ENS/2014/001** Dr.P.C.Prabu Assessment of Soil and Water Pollution in Polluted Ecosystem of Shrimp cultivation	Shrimp pond effluent and excess drawing of groundwater has increased the soluble salts in groundwater in polluted villages. Based on the classification for sodicity hazard to crops, majority of the polluted area were classified as 'moderate to high' and 'high to very high' for sodicity hazard (Tindivanam) **Suggestion:** • Number of villages and District may be mentioned • In Shrimp wastewater contamination, pre and post monsoon impact may be included
5	**NRM/CBE/ENS/2014/001** Dr.R.Jayashree& Dr.P.Kalaiselvi Remediating dye and textile effluent contaminated soil through plant microbes interaction	Pot culture experiment was conducted to assess the role of bioamendments and bioinoculants in enhancing salt removal capacity of *Sesuvium* using soil collected from Andipalayam village. **Suggestion:** *Trianthemaportulacastrum* may be compared with *Sessuviumsp*in salt accumulation potential
6	**Student Project** Dr.P.T.Ramesh Study on ecology of birds and insects in organic and inorganic rice ecosystem Student: G.K.Dinesh	Birds and insects are mobile. The checklist of all birds and insects may be collected in the organically maintained field

Approved Action plan for Year 2017-2018

Theme Area 1: Bioremediation of Polluted Environments					
S.No	**Activity - 1**	**Name of the Scientist**	**Year 2017-18**	**Year 2018-19**	**Deliverables/ Expected Out come**
01	Sustainable management of industrial effluent contaminated soils using castor priming with AM fungi	Dr.P.Kalaiselvi	To assess the salt tolerance potential of castor plants in association with AM fungi in textile effluent and tannery effluent contaminated soil.	To assess the heavy metal tolerance and removal capacity of castor plant along with AM fungi	Sustainable management strategies for textile and tannery effluent contaminated soils will be developed.
	Activity - 2				
02	Phytoremediation potential of Vetiver for wastewater treatment	Dr. S. Paul Sebastian	• Application of the vetiver system for sewage and paper mill effluent treatment • Batch scale experiments will be conducted for nutrient removal, organic and inorganic pollutants removal by vetiver from sewage and paper mill effluent	Conducting pilot scale studies for treating the sewage and paper mill effluent	• Low cost, eco-friendly and effective wastewater Vetiver Treatment System (VTS) will be evolved • Water pollution due to nutrients will be reduced (Eutrophication of lacks will be reduced)
Theme Area 2: Air Pollution Monitoring and Mitigation					
03	GHGs emission flux reduction in Agroecosystem	Dr. A. Lakshmanan Dr. K. Boomiraj	Quantifying methane and N_2O fluxes from different rice cultivation systems (Conventional, SRI, AWD and DSR)	Developing microbial technologies for reducing methane and N_2O fluxes	• Inventory for methane and N_2O flux developed • Bio consortium for minimizing GHG emission developed

List of Participants

S.No.	Place	Name and Designation
1	Department of Environmental Sciences, AC&RI, Coimbatore	Dr.S.Avudainayagam ,Professor and Head
2		Dr.P.Dhevagi, Associate Professor
3		Dr.M.P.Sugumaran Associate Professor
4		Dr. P.T. Ramesh Assistant Professor
5		Dr. R. Jayashree Assistant Professor
6		Dr.V.Davamani Assistant Professor
7		Dr. K. Suganya Assistant Professor
8		Dr. S. Paul Sebastian Assistant Professor
9		Dr. K. Boomiraj Assistant Professor
10		Dr. P. Kalaiselvi Assistant Professor
11	Dean (Agri) , AC&RI, CBE	Dr.K.SaraParwinBanu, Professor
12	DARS, Station, Chettinad	Dr. C. Udayasoorian, Professor
13	ITC, Chennai	Dr.K.Valliappan, Professor
14	ADAC&RI, Trichy	Dr. P.Thangavel, Professor
15		Dr. M. Maheswari, Professor
16		Dr. M. Selvamurugan, Assistant Professor
17	FC&RI, Mettuplayam	Dr. M. Prasanthrajan, Associate Professor
18	COE,TNAU, Coimbatore	Dr.E.Parameswari , Assistant Professor
19	ORS, Tindivanam	Dr. P.C.Prabu, Assistant Professor
20	ARS, Thirupathisaram	Dr. C. Prabakaran, Assistant Professor
21	HC&RI, Periyakulam	Dr.J.Kannan, Professor
22	ARS, Aliyarnagar	Dr.R.M.Jayabalakrishnan, Assistant Professor
23	AC&RI, Thiruvannamalai	Dr.A. Krishnaveni, Assistant Professor
24	AC&RI, Kudumiyanmalai	Dr. S. Rajkishore, Assistant Professor

WORK LOAD OF SCIENTISTS FOR THE YEAR 2017-18

Theme Area 1- Bioremediation of Polluted Environments
Theme Area 2 – Air Pollution Monitoring and Mitigation

S. No	Scientists		Hours /week	% of time allotted for Theme Area				
				1	2	3	4	5
1	**Dr.S.Avudainayagam , Professor & Head**							
	Research	University Sub Project -1	5	14				
		Externally funded project –Sesayee Paper and Board	5		14			
		Students Guide	10					

	Teaching		Nil					
	Administration		10					
	Other Activities		6					
2	**Dr.P.Dhevagi, Associate Professor**							
	Research	University Sub Project -1	9					25
		Externally funded project – Sakthi Sugars	5		14			
		Students Guide - 1	4					
	Teaching		12					
	Research Coordination		5					
	Other Activities	Vehicle Incharge	1					
3	**Dr.M.P.Sugumaran Associate Professor**							
	Research	University Sub Project -1	9					
		Externally funded project - Amaravathy	5					25
		Students Guide	4		14			
	Teaching		15					
	Others Activities	Venture Capital scheme	3					
4	**Dr. R. Jayashree Assistant Professor**							
	Research	University Sub Project -1	5	14				
		Externally funded project - Bannari Amman sugars	5		14			
	Teaching		13					
	Students Guide		3					
	UG Coordination		4					
	Other Activities	Instrument Incharge, Chemicals , Glasswares	6					
5	**Dr.V.Davamani Assistant Professor**							
	Research	University Sub Project -1	10	28				
		Externally funded projects- Co-PI	7	19				
		Externally funded projects- Co PI	6		17			
		Students Guide	3					
	Teaching		6					
	Other Activities	Department Library , Audit and Department meetings	4					
6	**Dr. K. Suganya Assistant Professor**							
	Research	University Sub Project -1	12	33				
		Externally Funded Projects – Co PI	1					
		Students Guide	4					
	Teaching (UG,PG)		14					
	Res. Coordination		1					
	Other Activities	NSS Programme officer	3					
		Ward counselling	1					

7	**Dr. S. Paul Sebastian Assistant Professor**							
	Research	University Sub Project -1	5		14			
		Externally Funded Project M/s. TNPL and ITC	7		19			
		Students Guide	6					
	Teaching		13					
	ODL Coordination		2					
	Other Activities	Instrument Incharge, Department Purchase, Bioremediation Lab Incharges	3					
8	**Dr. K. Boomiraj, Assistant Professor**							
	Research	University Sub Project -1	8	22				
		Externally Funded Projects Co-PI UGC Sponsored	4	11				
		Students Guide	3					
	Teaching		10					
	PG Coordination		5					
	Other Activities	VCS Analytical &Advisory Services	6					
9	**Dr. P. Kalaiselvi Assistant Professor**							
	Research	University Sub Project -1	8	22				
		Externally Funded Projects Co PI	2		6			
		Students Guide	4					
	Teaching		12					
	Labour Incharge		1					
	Dept.Extn activities		4					
	Other Activities	Instrument incharge, Venture Capital scheme	5					

DEPARTMENT OF NANO SCIENCE AND TECHNOLOGY

Individual research projectreview wastaken up by the Special Officer (NRM), Professor and Head, Department of Nano Science and Technology, TNAU, Coimbatore. Dr.K.S.Subramanian, Professor (SS&AC),Department of Nano Science and Technology presented the Research highlights and Action Plan for 2017 – 2019 and the report of action taken on the remarks made in the 4th Crop Scientists' Meet on Modern Tools and Technologies.

The proceedings are presented herein:

1. Staff Pattern
2. Remarks on the individual University Research Projects
3. Action taken on the remarks made in 4th Crop Scientists' Meet on Modern Tools and Technologies
4. Action Plan: 2017-2019

Staff Pattern

Designation	Discipline							
	Hort.	**SS & AC**	**AGR**	**SST**	**ENT**	**CRP**	**PHY**	**Total**
Professor	1	1	-	-	-	-	-	**2**
Assoc.Professor	-	-	-	-	-	-	-	**0**
Asst.Professor	1	-	1	1	1	1	2	**7**
Total	**2**	**1**	**1**	**1**	**1**	**1**	**2**	**9**

* All the 9 scientists are in TNAU, Non –Plan Main Scheme.

2a. Remarks on the individual University Research Projects

S. No.	Project Number and Title	Remarks
1	**NRM/CBE/NST/2013/001** **(Sep.2013 to Sept.2016)** Chitosan Nano-formulation in Plant-Water Relations:Testing for an Anti transpirant (AT) Activity in Maize (ZeamaysL) (Dr. S.Marimuthu)	The project is recommended for closure and the completion report may be presented to the RPAC for approval. The project is recommended for on stations trials in Maize
2	**NRM/CBE/NST/2013/03** **(Sep.2013to Sept.2016)** Synthesis and Characterization of Organic Wastes Based Superabsorbent Polymers (SAP) For Improving moisture Retention in the Soil (Dr. S.Marimuthu)	The project is recommended for closure and the completion report may be presented to the RPAC of DNRM for approval

3	**NRM/CBE/NST/2013/002** (**Nov.2013 to Oct. 2017**) Developing Nano matrices to regulate the release of pheromone to monitor Yellow stem borer, *Scirpophaga incertulas* in Rice **(Dr. M. Kannan)**	The project may be continued . On farm testing of the technology to be taken up.
4	**NRM/CBE/NST/2013/003** **Kept in abeyance** (Sept.2014 to Sep. 2015) **Continued** (Sept., 2015 to Oct. 2016) **Approval for extension** (Oct.2016 to Sep. 2017) Developing antimicrobial edible coating from plant source **(Dr. S.Haripriya)**	The project may be continued
5	**NRM/CBE/NST/2015/004** **(Jan. 2015 to Dec.2017)** Smart delivery of Bacillus thuringiensis through nano encapsulation for enhanced self-life and toxicity against the Diamondback moth, Plutellaxylostella L. **(Dr. M. Kannan)**	The project may be continued
6	**NRM/CBE/NST/2015/001** **(August, 2015 to July, 2018)** Nano encapsulation of hormones to promote seed germination and seedling vigour of blackgram and groundnut **(Dr. K.Raja)**	The project may be continued The nanotechnological observations (SEM) on radicle morphology of nano-formulation coated seeds may be studied
7	**NRM/CBE/NST/2015/002** **(Sept. 2015 - August 2017)** Developing a novel biocompatible coating to enhance the shelf life of fruit (Tomato) **(Dr. Pon. SathyaMoorthy)**	The project may be continued
8	**NRM/CBE/NST/2015/003** **(Jan.2015 to Dec. 2017)** Computational design of nanomaterials and their interaction with natural product plant protective agents as inhibitors for Cauliflower mosaic virus (CaMV) transmission **(Dr. D. JeyaSundaraSharmila)**	The project may be continued

2b. RemarksonExternally FundedResearchProjects		
9	**NRM / CBE / NST /2012/ S.01** **(Dec. 2014 to March, 2018)** Enhanced Preservation of Fruitsusing Nanotechnology **(Dr. K.S. Subramanian)**	The project may be continued
10	**NRM / CBE / NST /2013 /S01** **(June 2013 to May 2016)** Nanotechnological strategies for seed invigouration in rainfed groundnut **(Dr. N.Natarajan)**	The project is closed. Completion report has been sent to the funding agency. The project report may be presented in RPAC of DNRM
11	**DST/NRM/CBE/NST/2014/R005** **(June, 2014 to May,2017**) Development of Sulphur Nano Fertilizer Formation for Sunflower to Enhance Productivity, Use Efficiencyand Environmental Safety **(Dr.R.Rajeswari)**	The project may be continued
12	**No.SR/NM/NS-1024/2011(G)** **(June, 2014 to May, 2017)** Construction and evaluation of Lithium ion battery with synthesized nano structured cathode materials - Lithiumcompounds for (LiCoPO4 andLiNiPO4 and LiMixYxPO4,Y=Co or Ni, M = Y, Gd, Sm, Eu) **(Dr. S. Selvasekarapandian)**	The project may be continued
13	**ICAR/NRM/NST/CBE/2015/R010** **(April, 2015 to March, 2016** **Extended for one year from** **April , 2016 to March, 2017)** **Project 1.** Diagnostic Kit For Early Detection of Nutrient Deficiency in Rice and Maizeand Smart Delivery of Nano fertilizers for balanced nutrition in maize **Project 2 (i).** Customizingnanoparticles for seed qualityenhancement **Project 2 (ii).** Fabrication of slow release nano encapsulated herbicide formulation for season long weed control **Project 3.**Targeting activated oxygen quenching in plantsusing nanoparticles to increasecrop yield under abiotic stressconditions.	The project is closed. Completion report has already been to the Funding Agency ICAR – Nano-Platform for approval. The Completion project report may be presented in RPAC of DNRM

	(Dr. K.S. Subramanian Dr.N.Natarajan Dr.K.Raja Dr.C. R. Chinnamuthu Dr.S.Marimuthu Dr. M. Djanaguiraman)	
14	**DST/NRM/NST/CBE/2015/R11 (Dec., 2015 to Nov.2018)** Mycofiltration to remediate heavy metals from vegetable production system in peri-urban areas **(Dr. N. Balakrishnan)**	This project may be continued

3. Remarks made on the research high lights presented during 5th Crop Scientists' Meet

A. Study on volatile profile of Alphonso mango to assess the unique flavor that can be exploited for value addition of other varieties of mangoes

Center (s) : Dept. of Nano Science and Technology, TNAU, Coimbatore

Scientist (s) in-charge : Dr. K.S. Subramanian, DNST, TNAU, Coimbatore
Dr. S. Haripriya, DNST, TNAU, Coimbatore

This is a continuation of the work that was recommended in the 4thCrop Scientists' Meet. Volatile organic compound (VOC) profile analysis has been done at NCL, Pune. About 65 VOCs have been identified in Alphonso mangoes. Both qualitative and quantitative analysis have been completed. The data analysis and result interpretation have to be done.

B. On-farm testing for dip treatment of fruits (eg. Banana) in Hexanal formulation to extend the shelf-life of fruits stored in different pack houses to enable technology release in 2018

Center(s) : A Pack house in Theni (for Banana) and Krishnagiri (for Mango) will be identified by NST for dip experiment

Scientist (s) in-charge : Dept. of Nano Science and Technology
Dr. K.S. Subramanian, DNST, TNAU, Coimbatore
Dr.G.J.Janavi, DNST, TNAU, Coimbatore

The OFTs will be conducted at pack houses at different locations of Tamil Nadu *viz*., Krishnagiri, Dharmapuri and Theni districts. Mango and banana fruits harvested from / collected from farmers' field will be dipped in hexanal formulation (2% for 5 minutes) and shade dried for 30 minutes. Treated fruits will be stored under ambient storage and cold storage conditions to assess the shelf life extension by taking sample periodically at every third day till the fruits turned unfit for consumption.

C. 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 pack houses

Center(s) : A Packhouse in Theni (for Banana) and Krishnagiri (for Mango) will be identified for conducting OFTs for Sticker and Sachet

Scientist (s) in-charge : Dept. of Nano Science and Technology
Dr. K.S. Subramanian, DNST, TNAU, Coimbatore
Dr.G.J.Janavi, DNST, TNAU, Coimbatore

Different delivery system(s) of hexanal*viz*., electrospunfibre matrix (Stickers) and cyclodextrin inclusion complex (nano-pellets / Sachet) loaded with hexanal to extend the shelf-life of fruits (mango and banana) at large scale in pack houses will be studied. Mango and banana fruits will be harvested from / collected from farmers' field. After the development of perfect nano-matrix, the matrices will be cut into 5 x 5 cm squares and the hexanal would be passively loaded. The stickers will be kept in the cartons of mango and analyzed for the shelf life extension.

D. 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.

Center(s) : 1. DNST, TNAU, Coimbatore

Scientist (s) in-charge : Dept. of Nano Science and Technology
Dr. K.S. Subramanian, DNST, TNAU, Coimbatore
Dr.G.J.Janavi, DNST, TNAU, Coimbatore

The hexanal technology has been released for adoption in 2017. In order to scale up the technology, Pilot Plant has been sanctioned by IDRC (Rs. 40 Lakhs) for the production and supply of the EFF formulation. Pilot Plant comprises of a High Pressure Homogenizer costing Rs. 20 lakhs and dedicated three rooms on the first floor of the NST Building. High Pressure Homogenizer has already been purchased. As per the plan, dedicated three rooms on the first floor have to be constructed for establishing a Pilot plant with a capacity to produce 50 litres of hexanal formulation (concentrate) per day which is equal to 2500 L of actual spray formulation (2%) used for pre-harvest spray (or) postharvest dip treatments to extend the shelf-life of fruits.

Action plan for 2017-2020 on the identified themes

ThemeNo.1		Design and fabrication of nano-agri inputs				
ThemeLeader		Dr. K.S. Subramanian , NABARD Chair Professor, DNST				
Project 1		New : Nano-based smart delivery of agri-inputs to promote pulses productivity				
S.No	**Activity**	**Name of the Scientist(s)**	**Year2017-18**	**Year2018-19**	**Year 2019-2020**	**Deliverables/expected outcome**
1	Seed encapsulation with nano-fibre for improved germination and ensured plant population	Dr. K. Raja Dr. S. Haripriya Dr. PonSathya Moorthy	Hormones GA3 & IAA) and 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	Kinetics of input release from the encapsulated forms of nano-agri inputs Nano-matrix loaded with hormons, bioinoculants and insecticide can be tested independently and in	Greenhouse and field experiments to evaluate the seed encpaulated with nano-matrix Economic analysis of nano-matrix with conventional	Encapsulated forms of hormones, bioinoculants and insecticide can be achieved Encapsulation of pulses seeds with Nano-matrix will be released to the farming communities 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 Dr. S. Marimuthu Dr. M. Kannan	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 by 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	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 encapsulated capability and in vitro	Nano-fertilizer composite formulation and / or with hydrogel will be released to the farming communities for use and commercialization of the products Evaluation of toxicity of Bt encapsulate can be studied

3	Mechanisms of uptake and translocation of nano-inputs in plant system (Nutrition tracking)	Dr.Jeya Sundara Sharmila	Nutrient absorption pattern (P & Zn) of pulses plants 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
4	Prototype for commercialization and scale up technology	Dr.AmitRastogi Coromandel International	The Coromandel will be closely involved in the project during the design, fabrication and characterization of nano-matrix for seed encapsulation and capsules for nutrient delivery. They intend to design a machine that can assist in producing pelletized fertilizer fortified with macro, micro and trace elements.			Nano-matrix for seed encapsulation and capsules for nutrient delivery. They intend to design a machine that can assist in producing pelletized fertilizer fortified with macro, micro and trace elements.

ThemeNo1		Design and fabrication of nano-agri inputs				
ThemeLeader		**Dr. Pon Sathya Moorthy**				
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)**	**Year2017-18**	**Year2018-19**	**Year 2019-2020**	**Deliverables/expected outcome**
1	Nano encapsulation of Plant Growth Promoting Rhizobacteria to improve its shelf life.	Dr.Pon. Sathya Moorthy	Standardization of protocol for extraction, isolation and purification of sericin protein from silkworm cocoon and characterization using Native & SDS PAGE, SEM, EDAX, TEM, FT-IR, XRD, DSC & TG-DTA and CD, MALDI-TOF, Anti-oxidant activity, may be carried out.	Standardization of Nano sericin encapsulation of *P. fluorescens* and *B. subtilis* using by spray drying. Structural morphology of sericin encapsulated *P. 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 access the growth after encapsulation.	Sericin encapsulated *P. fluorescens* and *B. subtilis* will be packed as spray dried powder & as well as pellet and packed in LDPP bags and stored at RT and 4°C to access its viability & efficacy, periodically.	Media less PGPRs Extreme reduction in bulkiness Easy to store and transport Soil treatment. Shelf life improvement of PGPRs Site directed delivery of high density PGPRs

ThemeNo 1	**Nano inputs for Agriculture**
ThemeLeader	**Dr. M. Kannan**
Project 3	URP NO: NRM/CBE/NST/2013/002 Developing Nano matrices to regulate the release of pheromone to monitor Yellow stem borer, *Scirpophagaincertulas*in Rice

S.No	**Activity**	**Name of the Scientist(s)**	**Year2017-18**	**Year2018-19**	**Year 2019-2020**	**Deliverables/expected outcome**
1	Evaluation of nano pheromone formulation for controlled release of sex pheromone to monitor Yellow stem borer, Scirpophagain certulas in Rice	Dr. M. Kannan	On farm trial will be conducted with best performing nanoparticle loaded pheromone septa in comparison with normal rubber septa to assess the efficacy in the attracting the males of yellow stem borer in three rice growing areas *viz.,* TRRI, Aduthurai, TNAU, Coimbatore and ARS, Thirupathisaram	-	-	The best controlled release delivery system will be identified for yellow stem borer pheromone and further, included as component of IPM in rice.

ThemeNo 1	**Nano inputs for Agriculture**
ThemeLeader	**Dr. M. Kannan**
Project 3.	URP NO: NRM/CBE/NST/2015/004 Smart delivery of *Bacillus thuringiensis* through nano encapsulation for enhanced self-life and toxicity against the Diamondback moth, *Plutellaxylostella* L.

S.No	Activity	Name of the Scientist(s)	Year2017-18	Year2018-19	Year 2019-2020	Deliverables/expected outcome
1	Evaluation of nano pheromone formulation for controlled release of sex pheromone to monitor Yellow stem borer, Scirpophagain certulas in Rice	Dr. M. Kannan	To study the toxicity and persistence of *Bt* encapsulated formulation against Diamondback moth, *Plutellaxylostella* L. under laboratory and field condition	-	-	Development of encapsulated *Bacillus thuringiensis* formulation with enhanced self-life and toxicity against the Diamondback moth, *Plutellaxylostella* L.

Theme No 2	**Nano-Food Systems**
Theme Leader	**Dr. K.S. Subramanian**
Project 1	**Enhanced Preservation of Fruits using Nanotechnology**

S.No	Activity	Name of the Scientist(s)	Year2017-18	Year2018-19	Year 2019-2020	Deliverables/expected outcome
1	Horticulture Pre-harvest spray Post-harvest dip	Dr. G.J. Janavi Dr. M. Kannan Dr. I. Muthuvel Dr. A. Subbiah	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	Electrospunnano-fibre matrix (Stickers)	Dr. K.S. Subramanian Dr. M. Kannan Dr. K. Raja	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 Dr. K.S. Subramanian	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	Extraction of nano-fibrillated cellulose from banana *pseudostem*	Nano-film effects shelf-life of cut fruits and vegetables	Cost-economics and commercial level nano-film development	Nano-film can be developed as a commercial product

ThemeNo. 3	Development of Biosensor
ThemeLeader	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)	Year2017-18	Year2018-19	Year 2019-2020	Deliverables/expected outcome
1	Nano-drop for Foliar Diagnosis	Dr. K.S. Subramanian Dr. S. Marimuthu Dr.Pon. SathyaMoorthy	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
2	E-nose for seed quality testing	Dr.K.Raja Dr.N.Natarajan Dr. K.S. Subramanian Dr.Pon. SathyaMoorthy	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

ThemeNo. 4	**Bio-safety studies of nanomaterials**
ThemeLeader	**Dr. G.J.Janavi**
Project(s)	**Evaluation of nano-materials / nano-products for bio-safety**

S.No	Activity	Name of the Scientist(s)	Year2017-18	Year2018-19	Year 2019-2020	Deliverables/expected outcome
1	Studies on bio-safety of nano-materials / nano-products	Dr. K.S. Subramanian Dr. S. Marimuthu Dr.Pon. SathyaMoorthy Dr.K.Raja Dr.M.Kannan Dr.S.Haripriya Dr.Jeya Sundara Sharmila	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

Action taken on the Action plan proposed during 4th CSM 2016

S.No.	ProjectNo.andTitle	Scientistsin charge	Duration	Remarks
1	**DST/NRM/CBE/NST/2014/R005** Development of Sulphur Nano Fertilizer Formation for Sunflower to Enhance Productivity, Use Efficiency and Environmental Safety **Recommendation** Response studies on nano-S may be taken up in sunflower to determine the unique benefit of nano-fertilizer in comparison to conventional sulfate fertilizers	**Dr.R.Rajeswari Dr. K.S. Subramanian**	**June, 2014 to May,2017**	Nano-S wassynthesized using aqueous precipitation method. The nano-S was uniform and possesses the dimension of 35-45 nm. A pot culture study was performed using sunflower hybrid. During the experiment, growth, yield and S uptake pattern were studied. The data revealed that nano-S fertilized plants had registered significantly higher biomass, seed yield and oil content than gypsum fertilized. The unique advantage of nano-S is the targeted delivery that assisted in economizing the S dose from 40 kg to 20 kg S ha^{-1}.
2	**NRM / CBE / NST /2012/ S.01** Enhanced Preservation of Fruits using Nanotechnology **Recommendation** 1.Kinetics of hexanal vapour is to be studied to optimize the critical concentration for delayed ripening of fruits	Dr. K.S. Subramanian Dr. S.Ganapathy	Dec. 2014 to March, 2018	A Ph.D scholar Ms.Ashwini (FPE) has studied the kinetics of hexanal vapour to optimize the Critical concentration for extending shelf-life of mango and banana. Kinetics vapour diffusion at varying concentrations of hexanal (300,600,900,1200ppm) was studied in a plexiglass chamber (27L) under ambient (28˚C) and cold (14˚C) conditions. The diffusion pattern was depicted using software (Origin –8). Banana fruits (G-9) exposed to 800ppm for 3hrs had extended shelf-life by 14days under ambient conditions while control fruits decayed within 6 days. Further, post-harvest disease causing pathogens

	2. Various smart delivery systems may be developed for biomolecules (eg.hexanal) for extending shelf-life of fruits	Dr.K.S.Subramanian Dr. S.Marimuthu		Hexanal is a highly volatile compound, vapourized within few hour seven under room temperature condition. This warrants development of smart delivery systems. Two approaches namely electro spunnano-fibre and β cyclodextrin inclusion complex were developed.
	3. Volatile profile of Alphonso mango maybe studied to assess the unique flavor that can be exploited for value addition of other varieties of mangoes	Dr.S. Haripriya		The National Chemical laboratory (NCL), Pune, has standards for 57 esters that constitutes unique flavor of Alphoso. Dr.S.Haripriya and Ms.Chitrahad undertaken the analysis at NCL, Pune Alphonso fruits harvested from Manjalar Farm were harvested and brought to the lab for diptreatment in 2% EFF. After the treatment, both control and dipped fruits were shipped out to NCL, Pune, for volatile organic compound (VOC) profile analysis. Dr. Haripriya and Ms.Chitra went to NCL, Pune, for a week tolerant he extraction and analytical procedure. They had hands on experience with the qualitative analysis using GC-MS. About 65 VOC has been identified in Alphonso mangoes. Atleast 300 Chromatograms were run to undertake the qualitative analysis. On the inside, NCL Pune, has undertaken the quantification of dominant VOC using GC-FID. Both qualitative and quantitative analyses have been completed and the data analysisis in progress.

	4.Pilot plant may be set upto produce and supply of hexanal formulation to the users as a pre-harvests prayorpost-harvest dipto extend shelf-life of fruits.	Dr.K.S.Subramanian		The Hexanal Technology has been released for adoption in 2017. In order to scale up the technology, Pilot Plant has been sanctioned by IDRC (Rs. 40 Lakhs) for the production and supply of the formulation. Pilot Plant comprises of a High Pressure Homogenizer costing Rs.20 lakhs and dedicated three rooms on the first floor of the NST Building. The Pilot plant has a capacity to produce 50 litres of Hexanal formulation (concentrate) per day which is equal to 2500 L of actual spray formulation (2%) used for pre-harvests prayorpost- harvest diptreatments to extend the shelf-life of fruits

Work Load of each scientist (Themewise)

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.	Nameofthescientist	Theme1	Theme2	Theme3	Theme4	Total
(man hours/ week)						
1	Dr. G.J. Janavi	-	15	-	5	20
2	Dr. K.S. Subramanian	5	15	5	5	30
3	Dr.S. Marimuthu	5	10	5	5	25
4	Dr. M. Kannan	15	5	-	5	25
5	Dr. K.Raja	5	5	5	5	20
6	Dr.S. Haripriya	5	5	-	5	15
7	Dr. Pon Sathya Moorthy	10	-	5	5	20
8	Dr. Jeya Sundara Sharmila	10	-	-	-	10

Work Load of DNST Scientists for the year 2017-18 (% Of Time Allotted)

S.No.	Particulars	G.J.Janavi	K.S.Subramanian	S. Marimuthu	M. Kannan	S. Haripriya	K. Raja	Pon Sathya Moorthy	Jeya Sundara Sharmila
Research									
1	University Sub – Project(s)	-	-	20	30	25	25	10	10
2	Externally Funded Scheme(s)	30	60	15	10	10	15	20	5
Education									
3	Teaching	20	10	35	30	40	35	60	65
4	Students guide	5	10	10	20	15	10	-	10
Extension									
5	Technology Transfer / Dissemination	5	5	5	-	-	-	-	-
6	Organizing trainings / Seminars / Symposia/ Conferences/ Etc.,	5	5	5	-	-	-	-	-
Administration									
7	As Head / Staff Advisor/ Deputy Warden / etc.,	35	-	-	-	-	5	-	-
8	**Other Activities**		10	10	10	10	10	10	10

REMOTE SENSING & GIS APPLICATIONS

Scientists' Meet on Modern Tools and Technologies for Remote Sensing& GIS Applications in Agriculture was held on 10.05.2017 under the Chairmanship of Dr.M.Maheswaran, Director of Research, TNAU. The following scientists attended the meet:

Dr. S. Pazhanivelan, Prof.& Head (RS&GIS)
Dr. R. Sivasamy, Prof. (SS&AC), Dept of RSGIS
Dr. BalajiKannan, Assoc. Prof (SWCE), Dept of RSGIS
Dr. R. Jagadeeswaran, Asst. Prof. (SS&AC), Dept of RSGIS
Dr. K.P. Ragunath, Asst. Prof. (SS&AC), Dept of RSGIS
Dr. R. Kumaraperumal, Asst. Prof. (SS&AC), Dept of RSGIS
Dr. V. Balasubramanian, ADA, Dept of RSGIS
Dr. P. Kannan, Asst. Prof. (SS&AC), DARS, Chettinad
Dr. E. Subramanian, Asst. Prof. (Agron), AC&RI, Madurai
Dr. V. Arunkumar, Asst. Prof (SS&AC)AC&RI, Killikulam
Dr. K. Manikandan, Asst. Prof (SS&AC) AC&RI, Madurai
Dr. D. Jayanthi, Assoc. Prof (SS&AC), SS&AC, Coimbatore
Dr. A. Valliammai, Asst. Prof (SWCE), Water Technology Centre, Coimbatore
Dr. S. Ramesh, Asst.Prof (Agron), ADAC&RI, Tiruchirapalli
Dr. S. Elamathi, Asst. Prof.(Agron), ARS, Kovilpatti

A pre-review meet was held on the day before the Scientists' Meet (09.05.2017) on Modern Tools and Technologies. It was chaired by Dr. D. Jawahar, Special Officer (NRM). Presentations were made on the action taken on the recommendations of the previous Scientists' meet, progress made under various themes and the action plan formulated for 2017-18. In the presentation, the Professor and Head (RS&GIS) briefed about the various projects and their progress in the year 2016-17. The following is the abstract of the projects and scientists involved in the domain of Remote Sensing and GIS:

Total number of projects : 12
University sub-projects : 07
Externally funded projects : 05
No. of scientists involved : 12
(Remote Sensing & GIS, SS&AC & WTC)

On 10.05.2017, Dr. S. Pazhanivelan, Professor and Head (RS&GIS) presented the progress of research made in the thematic area of remote sensing and GIS and the action plan for the year 2017-19.

The following observations were made during the Scientists' Meet:

- The Director of Research insisted that scientists from Centre for excellence on Soil Health, Trichy may be included for action plan on Soil and Land resources mapping.
- Yield data generated from RIICE technology may be validated against Government CCEs and discussion may be held with scientists from Directorate of CARDS with special reference to Yield gap analysis
- More collaborative work may be taken up in association with Agro meteorologists and Environmental scientists on spatial analysis of Rainfall and pollutant mapping.

Proceedings of the Scientists' Meet on Modern Tools and Technologies for Remote Sensing & GIS Applications are presented below:

1) Staff Pattern

Station	Designation	Discipline						Total
		Agronomy	Soil Science	Agrl. Engg.	ENS	ACRC	Hort.	
Coimbatore	Professor	2	1 + 1 (AICRP)		1	1		16 (12 + 4)
	Associate Professor			1				
	Assistant Professor	1 + 1 (AICRP)	3 + 2 (AICRP)		1			
	ADA on Deputation	1						
Madurai	Professor	1						3
	Assistant Professor	1	1					
Chettinad	Assistant Professor		1					1
Killikulam	Assistant Professor		1					1
Tiruchirapalli	Assistant Professor	1	1					2
Kovilpatti	Assistant Professor	1 (AICRP)						1
Kudumianmalai	Professor	1						1
Vazhavachanur							1	1
Echankottai				1				1
Thanjavur				1				1
Cuddalore	Professor	1						1
		11	**11**	**3**	**2**	**1**	**1**	**29**

Twenty nine scientists are from 11 campuses / stations of TNAU which includes 24 scientists working in Non Plan Main and rest 5 in AICRP .Under 24 scientists of Non Plan Main four are Professor and Heads.

2) Remarks on the Ongoing University Research Projects

S.No.	Project Number and Title	Remarks
1.	**AECRI/CBE/SWC/RSG/2016/001** **Dr.BalajiKannan** Comparing pixel based and object based approaches for mapping coconut farms using high resolution remote sensing data	The pixel based classification results are encouraging. To obtain information on coconut area and health, the object based classification may be completed during the year 2017-18. The project is to be continued.
2.	**NRM/CBE/ SAC /RSG/2016/002** **Dr.R.Kumaraperumal** Integration of optical and synthetic aperture imagery for maize and cotton crop mapping	Analysis may be done with different polarization modes of SAR imagery and the difference in cropping area may be studied. The project is to be continued
3.	**NRM/CBE/ SAC /RSG/2016/003** **Dr.K.P.Ragunath** Assessing the impact of climate change on the growing period of rainfed crops in Tamil Nadu using Remote Sensing data	Blockwise remote sensing based LGP has to be worked out based on the last fifteen years' time series data. A validation exercise may be done on comparing with the meteorologically derived LGP. The project is to be continued
4.	**NRM/CBE/ SAC/RSG/ 2016/004** **Dr.R.Jagadeeswaran** Detection of water stress in Groundnut through Remote Sensing Technique	Spectral indices viz., NDVI, NDWI, SAVI and EVI indicating water stress may be evolved. The project is to be continued.
5.	**DCM/CBE/AGR/RSG/2016/005** **Dr S.Pazhanivelan** Area mapping and yield estimation of Groundnut, Maize and Rice fallow pulses using SAR data and crop growth models	Area mapping of Rice Fallow Pulses may be initiated. The modelling and interface work for Maize and Groundnut yield estimation may be taken up as per the technical program. The project is to be continued.
6.	**NRM/CBE/AGC/RSG/2015/001** **Dr.K.Senthil** Determination and Quantification of ʎ-Cyhalothrin, Chlorpyrifos, Imidacloprid using Hyperspectral Technique.	Since the major objectives were completed and the Principal Investigator has been transferred to AC&RI, Madurai the sub project may be closed and the completion report may be submitted
7.	**NRM/PAI/SAC/2016/001** **Dr.A.Renukadevi** Soil fertility evaluation for major jasmine growing areas of Kaveripattinam block, Krishnagiri District.	The project may be continued.

8.	**GOTN/NRM/CBE/RSG/2016/R003** **Dr. R. Sivasamy** Creating GIS database of soil nutrient status and generating nutrient maps with cadastral base for Tiruvarur District	Digital cadastral map of Thiruvarur District may be completed by including the nutrient database. Completion report may be submitted once the project is completed.
9.	**GOI/NRM/CBE/RSG/2016/R004** **Dr.R.Jagadeeswaran** Land degradation mapping (II cycle) in Tamil Nadu	The project may be completed in time and the district wise map on Land Degradation may be generated.
10.	**AICRP/NRM/CBE/SAC/004** **Dr. T.Chiteswari** Reassessment and Mapping of Micronutrients status in soils of Various districts of Tamil Nadu – Project 1	Mapping of micronutrient status in soils of remaining districts may be carried out.
11.	**AICRP/NRM/CBE/SAC/004** **Dr. T.Chiteswari** Reassessment and Mapping of Secondary nutrients status in soils of Various districts of Tamil Nadu – Project 2	Mapping of secondary status in soils of remaining districts may be carried out.
12.	**AICRP/NRM/TRY/SAC/005** Dr.M.Baskar Survey and characterization of ground water quality of Tamil Nadu	Survey may be continued for water quality mapping. The project may be continued to cover the remaining districts.

3) ACTION PLAN PROPOSED FOR 2017-19

Theme No. 1		**Crop Area Mapping and Yield Estimation**			
Theme Leader		Dr. S. Pazhanivelan, Prof.& Head (RS&GIS)			
Project		DCM/CBE/AGR/RSG/2016/005, NRM/CBE/ SAC /RSG/2016/002, AECRI/CBE/SWC/RSG/2016/001			
S.No	**Activity**	**Name of the scientist and centre**	**Year 2017-18**	**Year 2018-19**	**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. K. Boomiraj, Asst. Prof(ENS) - 3 hrs/week Dr.M.Jayachandran, Prof. & Head, SRS, Cuddalore – (3 hrs/week) Dr.A.Nagarajan, Asst. Prof. (SWCE), SWMRI, Thanjavur – (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, groundnut, sugarcane at state level	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 and pest and disease incidence using UAV /drones	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

Theme No. 2		**Soil and Land Resource Mapping**			
Theme Leader		Dr. R. Sivasamy, Professor(SS&AC), Dept of RS &GIS			
Projects		GOTN/NRM/CBE/RSG/2016/R003, AICRP/NRM/CBE/SAC/004, NRM\PAI\SAC\2016\001			
S.No	**Activity**	**Name of the scientist and centre**	**Year 2017-18**	**Year 2018-19**	**Deliverables/ expected out come**
1	**Soil and Land Resource Mapping**	Dr. R. Sivasamy, Professor (SS&AC), Dept of RS &GIS (10 hrs/week) Dr. R. Jagadeeswaran, Asst. Prof. (SS&AC) (10 hrs/week) Dr. V. Balasubramanian, ADA, Dept of RS &GIS (3 hrs/week) Dr. T. Chiteswari, Prof. (SS&AC), Dept of SS&AC (3 hrs/week) Dr. D. Jegadeeswari, Asst. Prof (SS&AC), Dept of SS&AC (3 hrs/week) Dr. P. Malathi, Asst Prof (SS&AC), Dept of SS&AC (3 hrs/week) Dr.T.SherineJenithaRajammal, Asst Prof (SS&AC), AC&RI Tiruchirappalli (3 hrs/ week)	Cadastral level soil nutrient mapping Monitoring the soil micro and secondary nutrient status and groundwater quality assessment.	Converting web-based fertilizer Recommendation tool to mobile application	• Cadastral level soil nutrient map • Block level available nutrient status • Mobile application on fertilizer recommendation

Theme No. 3		**Land degradation Mapping**		
Theme Leader		Dr. R. Sivasamy, Professor(SS&AC), Dept of RS &GIS		
Projects		GOI/NRM/CBE/RSG/2016/R004		
S.No	**Activity**	**Name of the scientist and centre**	**Year 2017-18**	**Deliverables/ expected out come**
1	**Land degradation Mapping**	Dr. R. Sivasamy, Professor (SS&AC), Dept of RS &GIS (5 hrs/week) Dr. R. Jagadeeswaran, Asst. Prof. (SS&AC) (10 hrs/week) Dr. V. Balasubramanian, ADA, Dept of RS &GIS (5 hrs/week)	Creating digital map of land degradation for Tamil Nadu using LISS3 sensor data (2015-16). Assessing decadal changes in land degradation due to pressure on land resource Generating area statistics on land degradation and mapping changes	Land degradation map at 1:50,000 scalefor the entire state.

Theme No. 4	**Assessing impact of climate change and Environmental monitoring**			
Theme Leader	Dr. S. Pazhanivelan, Prof.& Head (RS&GIS),			
Projects	**NRM/CBE/ SAC /RSG/2016/003**			
Activity	**Name of the scientist and centre**	**Year 2017-18**	**Year 2018-19**	**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) Dr. K. Boomiraj, Asst. Prof(ENS) (3 hrs/week) Dr. S. Elamathi, Asst. Prof.(Agron), ARS Kovilpatti (3 hrs/week)	Assessing spatial changes in LGP and cropping pattern in consequence to climate change Spatial estimation of methane emission using remote sensing and GHGs using FAO EXACT model	Trace analysis of pollutants in the Noyyal river Validating AWS rainfall data using satellite based precipitation products	• Changes in LGP and Cropping pattern due to climate change • Spatial estimation and quantification of methane emission from rice ecosystem. • Thematic maps of effluent contaminated soils

Theme No. 5	**Water resources monitoring and irrigation water management**			
Theme Leader	Dr. S. Pazhanivelan, Prof.& Head (RS&GIS),			
Projects	NRM/CBE/ SAC/RSG/ 2016/004			
Activity	**Name of the scientist and centre**	**Year 2017-18**	**Year 2018-19**	**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. K.P. Ragunath (3 hrs/week) Dr.R.Kumaraperumal, (3 hrs/week) Dr. S. P. Ramanathan, Prof. (Agron), WTC – (3 hrs/week) Dr. G. Senthilkumar, Asst. Prof. (Agron), WTC – (3 hrs/week) Dr. Raghavan, Prof. (Agron), AC&RI, Madurai – (3 hrs/week) Dr. A. Gurusamy, Prof. (Agron), AC&RI,Kudumianmalai – (3 hrs/week) Dr. M. Easwaran, Assoc. Prof (Horti.), AC&RI, Vazhavachanur – (3 hrs/week) Dr. S. Ramesh, Asst. Prof. (Agron.) ADAC&RI, Tiruchirapalli – (3 hrs/week) Dr. A. Nagarajan, Asst. Prof. (SWCE), SWMRI, Thanjavur- (3 hrs/week) Dr. S. Tiruvarasan, Asst. Prof. (Agron.) SRS, Cuddalore – (3 hrs/week) Dr. P. Kannan, Asst. Prof. (SS&AC), DARS, Chettinad – (3 hrs/week) Dr. V. Arunkumar, 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 Spectral indices viz., NDVI, NDWI, SAVI and EVI indicating water stress may be evolved.	Spatial estimation of soil moisture in cropped fields using SAR data and validation with network of field sensors.	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 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 Land degradation Mapping
Theme No. 4 Assessing impact of climate change and Environmental monitoring
Theme No. 5 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**	**Theme 5**	**Total**
1.	Dr. S. Pazhanivelan	15			5	5	25
2.	Dr. R. Sivasamy		10	5			15
3.	Dr.Balajikannan					5	5
4.	Dr. R. Jagadeeswaran		10	10			20
5.	Dr. K.P. Ragunath	5			3	3	11
6.	Dr.R.Kumaraperumal	5			3	3	11
7.	Dr. V. Balasubramanian		5	5			10
8.	Dr. A.P. Sivamurugan	3					3
9.	Dr. K. Boomiraj	3			3		6
10.	Dr.M.Jayachandran	3					3
11.	Dr.A.Nagarajan	3					3
12.	Dr.A.Kamaraj	3					3
13.	Dr.P.Kannan	3				3	3
14.	Dr.E.Subramanian	3					3
15.	Dr. T. Chiteswari		3				3
16.	Dr. D. Jegadeeswari		3				3
17.	Dr. P. Malathi		3				3
18.	Dr.T.Sherine Jenitha Rajammal		3				3
19.	Dr. S. Panneerselvam				3		3
20.	Dr. S. Avudainayagam				3		3
21.	Dr. S. Elamathi				3		3
22.	Dr. S. P. Ramanathan					3	3
23.	Dr. G. Senthilkumar					3	3
24.	Dr.Raghavan					3	3
25.	Dr. A. Gurusamy					3	3
26.	Dr. M. Easwaran					3	3
27.	Dr. S. Ramesh					3	3
28.	Dr. S. Tiruvarasan					3	3
29.	Dr. V. Arunkumar					3	3

WORK LOAD OF SCIENTISTS WORKING IN THE DEPARTMENT OF REMOTE SENSING AND GIS FOR THE YEAR 2017-18

S.No.	Scientists	% of time
1.	**Dr. S. Pazhanivelan**	
	Univ. Sub Project-1	20
	Teaching	10
	Students guide	20
	Administration	25
	Other Activities	25
2.	**Dr. R. Sivasamy**	
	Univ. Sub Project-1	20
	Administration	30
	Other Activities	50
3.	**Dr.BalajiKannan**	
	Univ. Sub Project-1	20
	Teaching	20
	Students guide	15
	Other Activities	45
4.	**Dr. V. Balasubramanian**	
	Teaching	10
	Other Activities	90

S.No.	Scientists	% of time
5.	**Dr. R. Jagadeeswaran**	
	Univ. Sub Project-1	20
	Teaching	15
	Students guide	15
	Other Activities	50
6.	**Dr. K.P. Ragunath**	
	Univ. Sub Project-1	20
	Teaching	15
	Students guide	15
	Other Activities	50
7.	**Dr.R.Kumaraperumal**	
	Univ. Sub Project-1	20
	Teaching	15
	Students guide	15
	Other Activities	50

AGRO CLIMATIC RESEARCH CENTRE

The 5th Scientist Meet on Modern Tools and Technologies for Agriculture - 2016 was held on 10th May, 2017 at Seminar Hall-I, TNAU, Coimbatore. The Programme was chaired by the Dr. C.R.Anandakumar, Registrar and Co-chaired by Dr. M. Maheswaran, Director of Research. The following scientists working in Agricultural meteorology were participated in the meet.

ACRC, Coimbatore
Dr. S. Panneerselvam
Professor and Head
Dr.Ga. Dheebakaran
Asst. Professor (Agronomy)
Dr. S. Kokilavani
Asst. Professor (Ag. Met)

TRRI Aduthurai
A. Anuratha,
Asst. Professor (SS&AC)

Crop Physiology
Dr. N. Sritharan
Asst. Prof. (CRP)

ARS, Kovilpatti
Dr. M. Joseph
Asst. Professor (Agronomy)
Dr. B. Arthirani
Asst. Prof. (Agrl. Met.)
Dr. S. Subbulakshmi
Asst. Professor (Agronomy)
Dr. S. Elamathi
Asst. Prof. (Agronomy)

WTC, Coimbatore
Dr. A. Raviraj
Professor (SWE)

HRS, Ooty
Dr. P. Raja
Asst. Prof. (Ag. Microbiology)

Dept. of SS & AC, TNAU
Dr. N. Chandrasekaran
Professor (SS&AC)

On 10.05.2017 by 9.30 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). 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 4th Meet, 2016 and action plan for 2017-20 were presented by Dr. S. Panneerselvam, 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 scientist. Suggestions made by the Director, DCM and the Director, WTC were incorporated, accordingly.

Dr. S. Panneerselvam, Professor and Head, ACRC made the consolidated presentation of pre reviewed action taken on recommendations of 4th scientist meet,salient findings for information and adoption from the agro meteorological research during 2016 -17 and action plan 2016 - 19 at the 5th Scientist Meet on Modern Tools and Technologies for Agriculture during the afternoon session on 10th May, 2017 at Seminar Hall-I, TNAU, Coimbatore.

Proceedings of the 5thScientists' Meet on modern tools and technologies for agriculture in Agricultural Meteorologyare presented in the following order.

A. Staff Pattern
B. Status of ongoing research projects
C. Remarks on the individual research projects (University & External Funded)
D. Remarks of the chair person
E. Action Plan: 2017-2019

A. STAFF PATTERN

Category	AGR	AMT	CRP	SAC	SWC	AGM	Total
ACRC Coimbatore							
Professor	1						**1**
Asst. Prof	1	1					**2**
TRRI Aduthurai							
Professor	1						**1**
Asst. Prof				1			**1**
ARS, Kovilpatti							
Asst. Prof	3	1					**4**
Dept. of Crop Physiology, Coimbatore							
Asst. Prof			1				**1**
Dept. of SS & AC, TNAU							
Professor				1			**1**
WTC, Coimbatore							
Professor					1		**1**
HRS, Ooty							
Asst. Prof						1	**1**
AC&RI, Madurai							
Professor	1						**1**
Total	**7**	**2**	**1**	**2**	**1**	**1**	**14**

B. STATUS OF ONGOING RESEARCH PROJECTS

Type of project	URP	AICRP	External funded Projects	PG & Ph.D Research	Total
Rice				2	**2**
Millets		1		2	**3**
Minor millets	3			1	**4**
Pulses	1		1	1	**3**
Horticulture				1	**1**
IFS			1		**1**
Poultry				1	**1**
Basic meteorology & Micrometeorology	1			1	**2**
Climate change & Crop models	1		4	4	**9**
Drought, Forecast & Astrometeorology				2	**2**
Agro Advisory			4		**4**
Ground Water			1		**1**
RS & GIS				1	**1**
Total	**6**	**1**	**11**	**16**	**34**

D. PROJECTWISE REMARKS

a. UNIVERSITY RESEARCH PROJECTS

SN	Project Title	Remarks
1.	**DCM/KPT/AMT/SMM/2015/001** Light interception study for optimizing biophysical requirements of Kudiraivali (*Echinochloafrumentacea*) by altering the sowing window and plant geometry to achieve higher yields under dry land Dr. B. Arthirani, Asst. Prof. (Agrl. Met.), ARS, Kovilpatti, Sep. 2015 - May 2017	Project may be shifted from "CSM-Millets" to "Modern Technology and Tools for Agriculture – Agricultural Meteorology" **To be continued** up to March 2018 for confirmation trial.
2.	**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) July 2016 to Mar, 2018	Identify the reason for inefficient crop zone districts. **To be continued**
3.	**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	Work has been completed for nine districts as per programme schedule. Complete the balance district as per schedule. **To be continued**
6.	**DCM/CBE/AGR/SMM/2016/001** Effect of elevated temperature on nutria-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, CBE Sep 2016 – Mar. 2019	Climate control chamber studies for pulses have been completed as per schedule. Studies on minor millets will be initiated during this year. **To be continued**

a. EXTERNALLY FUNDED PROJECTS

S.N	Project Title	Project Leader(s)
1.	**IMD/DCM/ADT/AGR/2011/R001** Yield Forecasting for rice in Cauvery Delta Zone of Tamil Nadu using Space, Agro meteorology and Land based observations (FASAL) PI : Dr. K. Subrahmaniyan, Prof.(Agronomy) Co-PI : Dr. A. Anuratha, Asst. Professor (SS&AC) TRRI, Aduthurai, Apr. 2013 – Mar. 2018	Yield forecasting, sowing window and variety suitability studies were done during this year. Project is extended up to March 2018. **To be continued**
2.	**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, Prof.(Agronomy), AC&RI, Madurai. Jan. 2011 – Mar. 2018	Yield forecasting through Crop Growth Model and statistical model were deviated -2 to 15 per cent with Dept. of Agricultural crop cutting experiments. **To be continued**.

3.	**NCMRWF/DCM/ADT/AGR/2013/R003** GOI – IMD – Agromet –Gramin Krishi Mausam Sewa (GKMS) - Experimental Agro-Met Advisory Services (AAS), Aduthurai. Dr. A. Anuratha, Asst. Prof. (SS&AC), TRRI, Aduthurai Apr. 2016 - Mar. 2020	Economic analysis may be done for a whole crop instead of single operation.Project extended upto 2020. **To be continued**
4.	**IMD/DCM/CBE/ACR/2014/R006** GOI – IMD – Agmet – Gramin Krishi Mausam Sewa (GKMS) - Weather based agro advisory services for farm decision making for western zone of TN. Dr. Ga. Dheebakaran, Asst. Prof. (Agronomy), ACRC, Apr. 2016 – Mar. 2020	Economic analysis may be done for a whole crop instead of single operation. Project extended upto 2020. **To be continued**
5.	**IMD/ DCM/ KPT/ AGR/ 1995/ R001** GOI – IMD - Agromet – Gramin Krishi Mausam Sewa (GKMS) – Rural Agro meteorological Advisory Service for Southern zone Dr. M. Joseph, Asst. Prof. (Agronomy), ARS, Kovilpatti. Apr. 2016 – Mar. 2020	Economic analysis may be done for a whole crop instead of single operation. Project extended upto 2020. **To be continued**
6.	**GOI/DCM/OTY/ACRC/2016/R003** Agrometeorology Field Unit (AMFU) for Agrometeorological Advisory Services (GKMS – Gramin Krishi Mausam Sewa) under IMD, GOI at HRS, Ooty Dr. P. Raja, Asst. Prof. (Ag. Microbiology),HRS, Ooty Mar. 2014– Mar. 2019	Economic analysis may be done for a whole crop instead of single operation. Project extended upto 2020. **To be continued**
7.	**AICRP/ DCM/ KPT/ AGR/003** All India Coordinated Research Project on Agrometeorology (ICAR- partly financed). Dr. A. Solaimalai, Asst. Prof. (Agronomy), ARS, Kovilpatti Sep. 2015 - Mar. 2021	Field experiments with sowing window and maize hybrids is in progress. **To be continued**
8.	**NIAER/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, Prof. (Agronomy), AC&RI, Madurai Jun. 2012 –Dec. 2017	Project will be completed by Dec. 2017. A compilation on the outcome of the project from the inception should be made along with completion report.

E. REMARKS MADE BY THE CHAIR PERSON

During the 5th scientist meet on modern tools and technologies for agriculture in Agricultural Meteorology, the Registrar Chair person of the meet had given following remarks

1. Study the possibilities of integrating remote sensing tools with meteorology for increasing crop yield prediction (ACRC)
2. Validate the accuracy of weather forecast given by TNAU's block level and IMDs district level forecast (All GKMS Centers for their respective zones)

E. APPROVED ACTION PLAN FOR YEAR 2017-2019

Theme Area 1: Weather based response farming					
S.No	**Activity - 1**	**Name of the Scientist**	**Year 2017-18**	**Year 2018-19**	**Deliverables/ Expected Out come**
01	Weather based soil and crop management intervention for enhancing rainfed crop productivity	**Lead Centre** Dr. S. Panneerselvam P&H, ACRC, Coimbatore **Sub Centre 1** Dr. T. Myrtle Grace P&H, DARS, Chettinad Dr. N. Satheeshkumar Asst. Prof. (Agron), DARS Dr. P. Kannan Asst. Prof.(SS&AC), DARS **Sub Centre 2** Dr. V. Babu Rajendra Prasad Asst. Prof. (Crop Phy.), NPRC	• Generation of location specific seasonal and medium range weather information • Assess the weekly soil moisture availability in the selected farmers field • Development and dissemination of weather based agro advisories to selected farmers • Observation on physio-chemical properties of soil, crop physiology and crop responses related to moisture stress.	• Generation of location specific seasonal and medium range weather information • Ensure the implementation of interventions in farmers field as response farming • Farmers participatory On-Farm Trial • Rollout of technologies •	• Sowing time will be optimized based on weather forecast • Comprehensive soil and crop management technologies popularized to rainfed farmers • Need based technology will be pinpointed to the farmers as mid-term correction • Weather aberration and yield loss will be assessed • Balckgram, redgram and groundnut productivity will be enhanced

WORK LOAD OF SCIENTISTS FOR THE YEAR 2017-18

Theme 1: Weather forecast and weather based agro advisory
Theme 2: Rainfall and drought analysis
Theme 3: Basic &micro meteorology
Theme 4: Climate change: Impact, adaptation & mitigation options
Theme 5: Crop Efficient Zonation

S. No	Scientists	Work load	Hours /week	Time allotted for Theme Area (%)				
				1	2	3	4	5
1	**Dr. S. Panneerselvam, P&H, ACRC, CBE**							
	Research	University Sub Project - 1	2				100	
		Externally funded project - 2	8	100				
		Students Guide–4 Ph.D, 1 PG	10	20	20	20	20	20
	Teaching	2 Ph.D & 1 PG	14					
	Administration	Prof. & Head	15					
	Other Activities	Meeting	5					
2	**Dr. Ga. Dheebakaran, Asst. Prof., ACRC, CBE**							
	Research	University Sub Project -1	4		100			
		Externally funded project – 3 GKMS -1, NADP - 2	20	100				
		Students Guide – 2 (PG)	8	50			50	
	Teaching	2 PG & 1 Ph.D	10					
	Research coordinator		5					
	Other Activities	Vehicle Incharge, PG Co-Ord	5					
		Observatory & Stock	5					
3	**Dr. S. Kokilavani, Asst. Prof., ACRC, CBE**							
	Research	University Sub Project -3	12	20	40			40
		Externally funded project - 2	8	100				
		Students Guide - 1	4					100
	Teaching	2 PG & 2 Ph.D (Assoc.)	14					
	Other Activities	ACRC Library, UG coordinator	2					
4	**Dr. V. Geethalakshmi, Prof., AC&RI, MDU**							
	Research	University Sub Project						
		Externally funded project - 3	25		20		80	
	Teaching	1 PG, 1Ph.D	10					
	Students Guide	2 PG,4 Ph.D	12	20	20	20	40	
	Extension		10					
5	**Dr. A. Laxmanan, Prof., PBS, TNAU, CBE**							
	Research	University Sub Project Others - 1	6					
		Externally funded projects Agmet – 2, Others - 1	25				60	
		Students Guide - 2	4				50	
	Teaching		5					
	Other Activities							
6	**Dr. P. Subramanian, Prof, TRRI, Aduthurai**							
	Research	University Sub Project						
		Externally Funded Projects Agmet – 2, Others - 3	24	20			20	

		Students Guide						
	Teaching							
	Res. Coordination		6					
	Others	Farm Management	10					
7	**A. Anuratha, Asst. Prof., TRRI, Aduthurai**							
	Research	University Sub Project Others -1	6					
		Externally Funded Project GKMS - 1	24	100				
		Students Guide						
	Teaching							
	Extension		2					
	Other Activities	Observatory & Stock	8					
8	**Dr. N. Sritharan, Asst. Prof., CRP, Coimbatore**							
	Research	University Sub Project -1	4				100	
		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					
9	**Dr. M. Joseph, Asst. Prof., ARS, Kovilpatti**							
	Research	University Sub Project -3	8					
		Externally Funded Projects - 1	17	95				
		Network trials & OFT	2					
	Student guide	PG - 2	6					
	Teaching	Diploma						
	Other Activities	Research & Diploma co-ord.						
10	**Dr. B. Arthirani, Asst. Prof., ARS, Kovilpatti**							
	Research	University Sub Project -2	12			100		
		Externally Funded Projects - 2	12			100		
		Network trial – OFT - 1	6					
	Teaching	Diploma - 1	5					
	Other Activities	Dept. Activities	10					
11	**Dr. S. Subbulakshmi, Asst. Prof., ARS, Kvpt**							
	Research	University Sub Project -2	4	50				
		Externally Funded Projects -2	20	80				
		Students Guide - PG	3					
	Teaching	Diploma	5					
	Dept. Activities	Farm Manager, Yard Manager	25					
	Other Activities	Instrument incharge, Venture Capital scheme	3					
13	**Dr. S. Karthikeyan, Asst. Prof., HRS, Ooty**							
	Research	University Sub Project - 3	12					
		Externally Funded Projects-2	24	80				
		Students Guide (Member)	2					
		Farm Management	10					
		Dept.Extn. activities						

DEPARTMENT OF SUSTAINABLE ORGANIC AGRICULTURE

Crop scientist meet -2017 on Modern tools and Technologies was held on 10.05.2017 at seminar Hall, TNAU, Coimbatore under the chairmanship of Dr.C.R.Anandakumar, Registrar and Dr.M.Maheswaran**,** Director of Research. Previously Pre review meeting was held at Freeman hall on 09-05-17. Dr.C.Jayanthi, Director (Crop Management), Dr.B.J.Pandian, Director (W.T.C) reviewed the University research projects and it was assisted by the special officer Dr.P.Selvaraju (seeds). The technical remarks were made by Director (Crop Management) and Director (W.T.C) and the list of participants for the scientists' meet are appended.

Organic agriculture action taken report carried out on the recommendations of previous meet, progress made under University research projects and the action plan formulated for 2017-18 were presenated by Dr.E.Somasundram, Professor and Head, DSOA, TNAU. In his presentation, he highlighted the outcome like cropping system suited for Organic Agriculture. He emphasized Beet root-Maize cropping system found to be superior among the different system tested. Organic 75% with 25% inorganic approaches resulted higher yield in the maize cropping system tested. Among the traditional rice varieties CB 05022 responds well in Organic cropping system. Since Long term organic manurial experiment and rice cropping system were in third year and fourth year of experimentation, it will be continued for another two years. The meeting was sensitized by Director of Research on agricultural problems, prospects and expectations on the deliverable outcome to be focused for another two years. Suggestions made by The Registrar were included as new thrust area for the year 2017-18.

1. Staff pattern

Among 11 scientists, a total of 6 scientists from SOA, Coimbatore and 5from other campuses viz.,one professor and Head from CRS, Veppanthattai**,** two scientists from CRS, Srivilliputhur and one scientist from ARS, Kovilpatti and one scientist from HC& RI were attended the meet.

2. Remarks on the ongoing University Research Projects

General Comments (All Scientists)

S. No.	Project Number	Remarks
1	**ICAR/DCM/CBE/SOA/2015/R001** Network Project on Organic Farming : Experiment I :Organic Farming : Evaluation of organic, inorganic and integrated production systems Experiment II : Evaluation of response of different varieties of major crops for organic farming – Rice Experiment III: Development of organic Farming System model Dr.E.Somasundaram Professor and Head	All the three trials may be continued

2	**CARDS/CBE/EXT/2016/001** Determination of adoption of organic farming practices in different agro climatic zones of Tamil Nadu Dr.R.Jansirani Professor (Agrl. Extension)	• The salient research findings of the project was presented in the pre review meeting of social scientists meet recently held at CARDS on 05.05.17 and 09.05.17 and also 5th Social Scientists meet 2017 on 10.5.17. • The completion report of the University Research Project (URP) is submitted for approval.
3	Long term organic manurial experiment in a rice based cropping system 1. Dr.E.Somasundaram **2.** Dr.A.Bharani	Project number should be obtained by submitting proposal through RPAC .The project may be continued
4	**CPPS/AEN/CBE/2014/050:** Evaluation of eco friendly pesticides against major insect pests of rice under organic ecosystem. Dr.K.Ganesan	Project is completed. Completion report may be sent.
5	**MFPI/NRM/CBE/AGM/2015/R016** - Lactic acid bacteria of functional interest in nutrition of finger millet. Dr.R.Subhashini ,Assistant Professor	Project may be continued

Action Plan proposed during th CSM on modern Tools and Techniques 2017

l. No.	**Project No. and Title**	**Scientists incharge**	**Remarks**
1	**NRM/CBE/ENS/VEG/2016/001** Enhancing the productivity of vegetables in an organic production system Aug 2016 – July 2018	Dr.A.Bharani Assistant Professor (ENS) Department of SOA TNAU, Cbe-3 Dr.M.P.Kavitha Assistant Professor (Agronomy) Dept. of Vegetable Crops HC & RI, Periyakulam	Project may be continued
2	**NRM/CBE/AGM/SMM/2016/001** Strategies for enhancing productivity of organic foxtail millet (*Setaria italica*) under rainfed situation Sept 2016 – Aug 2018	Dr.R.Subhashini AP (Micro), SOA, TNAU, Coimbatore Dr.R.Parasuraman, Prof & Head, CoE in Millets, Athiyandal Dr.S.Krishnakumar & Dr.E.Jamuna AC & RI, Vazhavachanur	Project may be continued

3.	**CPPS/CBE/ENT/COT/2016/001:** Strategies for enhancing quality and productivity of organic cotton. June 2016 - May 2019	**SOA, Coimbatore** Scientists In-charge : Dr. K. Ganesan Asst. Prof. (Agrl. Ento.) Dr. E. Somasundaram Prof. (Agronomy) & Head Dr. S. K. Manoranjitham Asst. Prof. (Pl. Patho.) Dr. R. Subhashini Asst. Prof. (Agrl. Mico.) **CRS, Veppanthattai** Dr. N. Meyyazhagan Prof. (Agron.) & Head **ADAC & RI, Trichy** Dr. Sheeba Jayee Roseleen Asst. Prof. (Agrl. Ento.) Dr. M. Sundar, Prof (Micro.) Dr. K. Chitra Asst. Prof. (Pl. Patho.) **CRS, Srivilliputhur** Mr. K. Sasikumar Asst. Prof. (Agrl. Ento.) Dr. R. Vimala, Prof.(Pl. patho.) Dr. R. Veeraputhiran Asst. Prof. (Agronomy) **ARS, Kovilpatti** Dr. P. Anandhi, Asst. Prof.(Ento) Dr. G. Sudhakar Associate Prof. (Agronomy) **AC & RI, Killikulam** Dr. L. Srimathi Priya Asst. Prof. Agrl. Micro) Dr. R. Akila, Asst. Prof. (Patho.) (The above two scientists will be collect data from ARS, Kovilpatti) Dr. B. Jeberlin Prabina Asst. Prof. (Agrl. Micro.) (The above scientist will collect data from CRS, Srivilliputhur)	Project may be continued
4.	**CPPS/CBE/PAT/VEG/2016/001** Combating pandal vegetable (Snake gourd) diseases by organic approaches June 2016 - June 2018	Dr.S.K.Manoranjitham**,** Assistant Professor (Pl.Path.) SOA,TNAU Dr.J.Sheela, Prof. (Pl.Path.) HC&RI, Periyakulam	Project may be continued

Action plan for 2017-2019 on the identified themes

Theme No. 1 Mapping of the areas suited to organic agriculture					
Theme Leaders Dr.E.Somasundaram,Professor and Head ,SOA, Dr. K.Arulmozhiselvan, Professor and Head, SS&AC Dr.S.Pazhanivelan, Professor and Head, Dept.of Remote Sensing and GIS					
S.No	**Activity**	**Name of the scientist and centre**	**Year 2017-18**	**Year 2018-19**	**Deliverables/ expected out come**
1.	Identification of areas under organic farming district wise in Tamil Nadu	Dr.E.Somasundaram.-10hrs/week Dr. K.Arulmozhiselvan -6hrs/week S.Pazhanivelan -6 hrs /week	Identification of areas suitable for organic farming.	• Analysis of organic carbon content • Mapping of areas suitable to organic farming • Report preparation and submission	The report will enlighten on the spatial essentials, measures to improve soil organic carbon content.

Action plan for 2017-2019 on the identified themes

Theme No. 2 • Suitability of organic seed treatment packages for greengram and blackgram					
Theme Leaders Dr.E.Somasundaram,Professor and Head ,SOA, Dr.R.Umarani, Professor and Head, Seed Science &Technology Dr.S.K.Manoranjitham,Assistant Professor (Pl.Pathology)					
S.No	**Activity**	**Name of the scientist and centre**	**Year 2017-18**	**Year 2018-19**	**Deliverables/ expected out come**
1.	Bio priming of seeds with Organic inputs	Dr.E.Somasundaram- 10 hrs /week Dr.R.Umarani - 6 hrs /week Dr.S.K.Manoranjitham - 12 hrs /week	Testing the seed (Green gram, Black gram) compatibility with *Trichoderma* sp. *Pseudomonas fluorescens*, Herbal insect repellant along with biofertilizers and stickers.	• Seed viability • Testing growth promotion by roll towel technique and grow out test. • Assessment of seed vigour index will be studied.	The output will be utilized in the package of practices recommended to Organic farmers

Action plan for 2017-2019 on the identified themes

Theme No. 3 Package of practices for organic crops.					
Theme Leaders Dr.E.Somasundaram, Prefesser and Head ,SOA, Dr.K.Ganesan, Assistant Professor,(Agrl.Ento) Dr. A. Bharani, Assistant Professor (ENS),SOA Dr. R.Subhashini, Assistant Professor (Agrl. Micro)					
S.No	**Activity**	**Name of the scientist and centre**	**Year 2017-18**	**Year 2018-19**	**Deliverables/ expected out come**
1.	To develop organic package of practices for Maize based cropping system.	Dr.E.Somasundaram - 15 hrs /week Dr.K.Ganesan - 15 hrs /week A. Bharani -12 hrs /week Dr. R.Subhashini -12 hrs /week	Green manure- cotton –maize. Green manure –chillies – sunflower Green manure-beet root-maize will be studied.	Maize-Green manure cropping system will be studied.	The booklet containing the package of practices will be useful to the organic farmers of Tamil Nadu.

Action plan for 2017-2019 on the identified themes

Theme No. 4 Cost of cultivation for organic crop production.					
Theme Leaders Dr.E.Somasundaram,Prefesser and Head ,SOA, Dr. R. Jansirani, Profossor (Agrl.Extension),SOA					
S.No	**Activity**	**Name of the scientist and centre**	**Year 2017-18**	**Year 2018-19**	**Deliverables/ expected out come**
1.	• Identification of Areas under organic farming	R. Jansirani -15 hrs /week Dr.E.Somasundaram -12 hrs /week	• Identification of core major crops in Agriculture in all the districts of Tamil Nadu • Assess the existing marketing channel for organic products to study availability of organic product at local markets. • Work out cost of cultivation as a balance sheet for selected core major crops in Agriculture and Horticulture.	• Identification of core major crops in horticulture in all the districts of Tamil Nadu • Assess the existing marketing channel for organic products to study availability of organic product at local markets. • Work out cost of cultivation as a balance sheet for selected core major crops in Agriculture and Horticulture.	To find out benefit cost ratio of organic product.

List of Participants

S.No.	Place	Name and Designation
1	Department of Sustainable Organic Agriculture, Coimbatore	Dr.E.Somasundaram, Professor and Head
2		Dr.R.Jansi rani, Professor (Extension Education)
3		Dr.A.Bharani, Assistant Professor (Env.Science)
4		Dr.R.Subhashini, Assistant Professor (Agrl.Microbiology)
5		Dr. S.K.Manoranjitham, Assistant Professor (Pl.Pathology)
6		Dr.K.Ganesan,Assistant Professor (Agrl.Entomology),
7	CRS, Veppanthattai	Dr. N. Meyyazhagan, Prof. (Agron.) & Head
8 9	CRS, Srivilliputhur	Mr. K. Sasikumar Asst. Prof. (Agrl. Ento.) Dr. R. Veeraputhiran,Asst. Prof. (Agronomy)
10	ARS, Kovilpatti	Dr. P. Anandhi Asst. Prof. Agrl. Ento.)
11	HC & RI,Periyakulum	Dr.M.P.Kavitha,Assistant Professor

WORK LOAD OF SCIENTISTS FOR THE YEAR 2017-18

Theme 1. Mapping of the areas suited for organic agriculture
Theme 2. Suitability of organic seed treatment packages for greengram and blackgram.
Theme 3. Package of practices for organic crops
Theme 4. Cost of cultivation for organic crop production.

S. No	Scientists		Hours /week	% of time allotted for Theme Area			
				1	2	3	4
1	**Dr.E.Somasundaram , Professor & Head**			10	10	15	12
	Research	University Sub Project -1	7				
		Students Guide	3				
	Teaching		5				
	Administration	Professor and Head(SOA),PRO	18				
	Other Activities	Training,Visitors	7				
2	**Dr.R.Jansi rani, Professor**			-	-	-	15
	Research	University Sub Project -1	8				
		Students Guide - 1	5				
	Teaching		5				
	Research Coordination		5				
	Other Activities		12				
3	**Dr.A.Bharani Assistant Professor**			-	-	12	-
	Research	University Sub Project -1	5				
		Venture Capital scheme	15				
		Students Guide	5				
	Teaching		5				

	Others Activities		5				
4	**Dr. R.Subhashini, Assistant Professor**			-	-	12	-
	Research	University Sub Project -1	5				
		Externally funded	5.5				
	Teaching		10.5				
	Students Guidance		3.5				
	UG Coordination		3.5				
	Other Activities		7				
5	**Dr.S.K.Manoranjitham, Assistant Professor**			-	12	-	-
	Research	University Sub Project -1,Action plan	10				
		Teaching	5				
		Research Coordination,	7				
		Students Guidance	5				
	Teaching		5				
	Other Activities	Terrace garden maintanence	2				
6	**Dr. K. Ganesan Assistant Professor**			-	-	15	-
	Research	University Sub Project -1, Validation of Herbal extract	8.5				
		ICAR-NPOF trials-3	14.0				
		Students Guide	2.0				
	Teaching		3.5				
	Extension activities	Training	3.5				
	Other Activities	Purchase,maintanence of pest repellant /Green manure cafeteria,website updation,Academic counselor etc)	3.5				

DEPARTMENT OF AGRICULTURAL MICROBIOLOGY

Crop Scientists Meet 2017 on "Modern Tools and Technologies"was held on 10/5/2017 at Seminar Hall I under the chairmanship of Dr.C.R.Anandakumar, Registrar and Dr.M.Maheswaran, Director of Research, TNAU, Coimbatore. Dr D.Jawahar, the Special Officer, Directorate of Natural Resources Management convened a prereview meeting on the same day at 9.30 AM in the Golden Jubilee Hall to review both externally funded and University sub-projects operating in various disciplines of the Directorate. The review was assisted by Head of the Department of different disciplines *viz*., Agricultural Microbiology, Soil Science and Agricultural Chemistry, GIS and Remote Sensing and Nanotechnology. Totally seven microbiologists including from Coimbatore, 1 from Madurai and 1 from Kudumianmalai have attended the meeting.

About nine projects, six externally funded and three University sub projects of Agricultural Microbiology, one each from Coimbatore, Madurai and Kudumianmalai were reviewed. The externally funded projects include three DBT, one DST, one MHRD and one CIRCOT–ICAR funded projects. The outcome of externally funded projects (3DBT+1MHRD+1CIRCOT-ICAR) was briefly presented by Dr.U.Sivakumar, Professor of Microbiology and Principal Investigator of the projects. He has made presentations on the outcome of action taken on the recommendations made during 2015-2016 as well. In one of the action taken recommendations, he has highlighted the importance of newer microbial isolates producing Xylitol from corncob.

Outcome of the externally funded project on "Plant-Microbe Interactions" funded by MHRD was as well presented briefly by the project co-ordinator. Proteins, small molecules and volatiles mediating plat- microbe interaction were unveiled. Some of the proteins *viz*, harpins and flagellins were identified for plant defense priming and further work on this line is in progress. Newer endophytic yeasts from apoplastic fluid of rice and root nodule of balckgram were also isolated and their interactions with plants and other microorganisms in the niche were also analysed. Drought tolerant *Bacillusmegaterium* FD48 showed better root system architecture modification by producing IAA and other growth promoting substances. He has also discussed about the bacterium producing natural fibre - cellulose. In another externally funded project (DST), indigenous isolates of *Bacillus thuringiensis* from North Western Zone of Tamil Nadu against some Lepidopteron and Coleopteran insects and a root knot nematode *Meloidogyneincognita* were screened and two indigenous BT strains were found to have greater nematicidal activity over reference BT strains. Suggestions given by the Special Officer, DNRM and other staff members of the Directorate were included and presented in the review meeting of CSM 2017 held on 10/5/2017 between 2.00 and 7.00 PM.

1. Action taken on action plan proposed during 4th meet and Action plan proposed for 5th on Modern Tools and Technologies

Sl. No	Project No. and Title	Scientists in charge	Duration	Remarks
Action taken on action plan proposed during 4th meet on Modern Tools and Technologies				
1.	Biomass derived chemicals; xylitol production by yeasts	Dr.U.Sivakumar, Professor (Agrl.Micro)	June 2016-May 2019	The action plan project is to be continued
Action plan proposed during 5th meet on Modern Tools and Technologies (New)				
2.	Surfactin producing *Bacillus amyloliquifaciens* SR1 for phytoprotection	Dr.P.Marimuthu, Professor and Head	June 2017-May 2020	New action plan proposed. The project is to be initiated
3.	HpaG, Harpin protein from *Xanthomonas* spp. as multifunctional elicitors for disease resistance and plant health	Dr.U.Sivakumar, Professor (Agrl.Micro)	June 2017-May 2020	New action plan proposed. The project is to be initiated

2. University Research projects and Externally funded Schemes

S.No.	Project number	Title of the project	Project Leader/PI	Funding agency	Duration	Remarks
University Research projects						
1.	NRM/CBE/AGM/2017/001	Development of gamma mutants of oleaginous mixotrophic microalgae for higher lipid productivity	Dr.T.Kalaiselvi Professor	University sub project	Jan. 2017 to Dec. 2019	The project may be continued.
2.	NRM/MDU/AGM/2014/001	Identification of novel probiotic microflora with bacteriocin production and resistance to drugs and antibiotics for functional foods	Dr. T. Sivasankari Devi Asst. Professor	University sub project	April 2014 to March 2017	Extension proposal may be sent upto September 2017.
3.	NRM/KDM/AGM/2016/001	Development of sea weed extract based mineral solubilising microbial consortium for liquid biofertilizer production.	Dr. G.Gayathry Asst. Professor	University sub project	April 2016 to March 2019	The project may be continued.

Externally funded Schemes						
1.	DBT/NRM/CBE/AGM/2014/R 016	Development of integrated (biotechnological and nanocatalytic) biorefinery for fuels and platform chemicals production from lignocellulosic biomass (crop/wood residues)	Dr.U.Sivakumar Professor	DBT-Indo-Russia joint project	November 2014 to October 2017	The project may be continued. The existing action plan 2016-17 may be continued for 2017-18 to meet the target.
2.	DBT/NRM/CBE/AGM/2014/ R015	DNA Fingerprinting of lignocelluloses degrading microbes isolated from protected forest areas of Assam and Mizoram **(**Multi-institutional project with NEIST, Assam, MizorumUniv, Mizorum, & IMTECH, Chandigarh)	Dr.U.Sivakumar Professor	GOI- DBT	April 2014 to March 2017	The project may be closed.
3.	DBT/NRM/CBE/AGM/2015/ R018	Biodiesel production: Sago processing industrial wastewater as feedstock's for the microbial production of oil and derived co-products	Dr.U.Sivakumar Professor	GOI- DBT	March 2015 to April 2018	The project may be continued.
4.	CIRCOT/NRM/CBE/AGM/ 2016/R020	Production and Characterization of Bacterial Cellulose	Dr.U.Sivakumar Professor Dr. G.Gayathry Asst. Professor	CIRCOT	August 2016 to March 2018	The project may be continued for another year.

5.	MHRD/NRM/CBE/AGM/2014 /R015	Centre of Excellence in Frontier areas of Science and Technology (FAST) on *MICROBES TO FEED THE WORLD*: Plant-Microbe interactions to boost Agricultural Production	Dr.U.Sivakumar Professor	MHRD	Oct-2014 To Nov-2018	Identified action plans may be proposed based on the findings in this project. The project may be continued.
6.	DST/CPPS/PYR/AGM/2014/ R004	Exploration of indigenous *Bacillus thuringiensis*crystal proteins targeting different insect pests and characterization of nematicidal crystal protein(s) against root knot nematode*, Meloidogyneincognita*	Dr. A.Ramalakshmi Asst. Professor	DST-SERB	Augst. 2014 to July 2017	The project may be continued to achieve the target.

LOAD OF EACH SCIENTIST (Action Plan wise)

Sl.No.	Name of the Scientist	Action plan 1	Action Plan 2	Action Plan 3	Total
Man hours/week					
1.	Dr.U.Sivakumar	20			**20**
2.	Dr.P.Marimuthu		20		**20**
3.	Dr.U.Sivakumar			15	**15**

WORK LOAD FOR THE SCIENTISTS 2017-18

Sl. No	Scientists	% of time	Sl, No	Scientists	% of time
1.	**Dr.P.Marimuthu**		**2.**	**Dr.U.Sivakumar**	
	Teaching	15		Teaching	30
	Students guidance	20		Students guidance	20
	Externally funded project	20		Externally funded project	30
	Administration	35		Other activities	20
	Other activities	10			
Sl. No	**Scientists**	**% of time**	**Sl, No**	**Scientists**	**% of time**
3.	**Dr.T.Kalaiselvi**		**4.**	**Dr.A.Ramalakshmi**	
	Teaching	40		AICRP	40
	Students guidance	20		Externally funded project	25
	University research project	20		Teaching	25
	Other activities	20		Other activities	10
5.	**Dr.T.Sivasankaridevi**		**6.**	**Dr.G.Gayathry**	
	Teaching	30		University research project	50
	University research project	30		Externally funded project	25
	Biofertilizer production	20		Other activities	25
	Other activities	20			