

PROCEEDINGS OF THE 6th AGRICULTURAL ENGINEERING SCIENTISTS' MEET, 2018

The 6th Agricultural Engineering Scientists' Meet 2018 was held at Seminar Hall (RI Building), Tamil Nadu Agricultural University, Coimbatore on May 22, 2018. The session was chaired by the Vice-Chancellor, in which the Director of Research i/c, Dean, (Engg.) i/c, Coimbatore, Dean i/c, Kumulur, Director, WTC, Director, SCMS, Director, NRM, Special Officer (Seed), Director (CPMB), Director, CARDS and Heads of Departments and Staff members of AEC&RI, Coimbatore and Kumulur, TNAU participated.

MEMBERS PRESENT

Sl. No	Name	Designation
1.	Dr. K. Ramaraju	Director of Research, i/c
2.	Dr. N. Varadharaju	Dean (Engg.) i/c, AEC&RI, CBE
3.	Dr. V. Rajendran	Dean (Engg.) i/c, AEC&RI, Kumulur
4.	Dr. B.J. Pandian	Director i/c, WTC, Coimbatore
5.	Dr. C. Jayanthi	Director i/c, CMS, TNAU, Coimbatore
6.	Dr. R. Gnanam	Director i/c, CPMB, TNAU, CBE
7.	Dr. D. Jawahar	Special Officer, NRM
8.	Dr. P. Selvaraju	Special Officer, SEEDS
9.	Dr. K. Sathiyamoorthy	Professor, O/o the Director Research
10.	Dr. K.N. Raghumoorthy	Professor, O/o the Director Research
11.	Dr. N. Meenakshi Ganesan	Professor, O/o the Director Research
12.	Dr. Balaji Kannan,	Associate Professor (SWCE)
13.	Dr. D. Manohar Jesudas,	Professor & Head
14.	Dr. B.Shridar	Professor, AMRC
15.	Dr. V.M.Duraisamy	Professor, AMRC
16.	Dr. A.Surendrakumar	Professor, AMRC
17.	Dr. R.Kavitha	Professor, AMRC
18.	Dr. B. Suthakar	Assistant Professor, AMRC
19.	Dr. R. Thiyagarajan	Assistant Professor, AMRC
20.	Dr. S. Pugalendhi	Professor and Head, Dept. of Bioenergy
21.	Dr. S.Karthikeyan	Professor (Agrl. Microbiology) , Dept. of Bioenergy
22.	Dr. P. Subramanian	Professor, Dept. of Bioenergy
23.	Dr. R.Angeeswaran	Assistant Professor, Dept. of Bioenergy
24.	Dr. R. Mahendiran	Assistant Professor, Dept. of Bioenergy
25.	Dr. S. Sriramajeyam	Assistant Professor, Dept. of Bioenergy
26.	Dr. K. Chandrakumar	Asst. Professor (Biochemistry) , Dept. of Bioenergy
27.	Dr. P. Vijayakumary	Assistant Professor, Dept. of Bioenergy
28.	Dr. S. Ganapathy	Professor and Head, Dept. of F&APE
29.	Dr.T.Pandiarajan	Professor, Dept. of F&APE
30.	Dr. I.P. Sudhagar	Assistant Professor, Dept. of F&APE
31.	Dr. R. Arul Mari	Assistant Professor, Dept. of F&APE
32.	Dr. Raja	Assistant Professor (Microbiology) , Dept. of F&APE
33.	Dr. D.Amirtham	Assistant Professor (Biochemistry) , Dept. of F&APE
34.	Dr. Z. John Kennedy,	Professor, PHTC
35.	Dr. P. Vennila,	Professor (FSN), PHTC
36.	Dr. Kanchana,	Professor (FSN), PHTC

37.	Dr. M. Balakrishnan,	Associate Professor, PHTC
38.	Dr. G. Gurumeenakshi,	Associate Professor (FSN), PHTC
39.	Dr. M. Chellamuthu,	Professor (SWCE), WTC, TNAU, Coimbatore
40.	Dr. A. Raviraj,	Professor (SWCE), WTC, TNAU, Coimbatore
41.	Dr. K. Nagarajan,	Professor (SWCE), WTC, TNAU, Coimbatore
42.	Dr. G. Thiyagarajan	Assistant Professor (SWCE), WTC, TNAU, CBE
43.	Dr. M.R. Duraisamy	Professor and Head, Dept. of PS&IT, TNAU, CBE
44.	Dr. S. Sridevy	Assistant Professor, Dept. of PS&IT, TNAU, CBE
45.	Dr. D. Uma	Professor and Head, Dept. of Biochemistry, TNAU
46.	Dr. P. Rajkumar,	Professor and Head, Dept. of Processing & BS, AEC&RI, Kumulur
47.	Dr. D. Asokan,	Professor and Head, Dept. of Farm Machinery, AEC&RI, Kumulur
48.	Dr. V. Ravikumar,	Professor and Head, Dept. of SWCE & AST, AEC&RI, Kumulur
49.	Dr. M. Manikandan,	Assistant Professor (SWCE), AEC&RI, Kumulur
50.	Dr. M. Nagarajan,	Assistant Professor (SWCE), AEC&RI, Kumulur
51.	Dr. N. Anandaraj,	Assistant Professor (SWCE), ARS, Kovil Patti.
52.	Dr. A. Valliammai,	Assistant Professor (SWCE), ARS, Bhavanisagar.
53.	Dr. P. Sudha,	Assistant Professor, FC&RI, Mettupalayam.
54.	Dr. V. Ananthi,	Assistant Professor (CS), TPO to VC, TNAU, Coimbatore
55.	Dr. A. Eswari,	Assistant Professor (Maths), HC&RI, Periyakulam.
56.	Dr. M. Vijayabhama,	Asst. Professor (Stat.), FC&RI, Mettupalayam.
57.	Dr. R. Ravikumar	Assistant Professor (Maths), FC&RI, Mettupalayam
58.	Dr. R. Sunitha	Assistant Professor, Dept. of ENS, TNAU, CBE
59.	Dr. J. Geethanjali	Teaching Assistant, Dept. of Bioenergy, TNAU
60.	Dr. Prabha	Teaching Assistant, Dept. of Bioenergy, TNAU

I. DETAILS OF STAFF AND PROJECT

Sl. No.	Name of the department / station	No. of staff				No. of projects
		P	AsP	AP	T	
1.	PFDC, O/o the Dean (Engg.)	-	1	-	1	Externally funded – 1 No.
2.	Department of Bioenergy	3	-	5	8	AICRP projects – 11 Nos. Externally funded – 5 Nos. TNAU project – 1 No.
3.	Precision Farming Development Centre	1	-	-	1	PFDC - 4 Nos.
4.	Water Technology Centre	4	-	1	5	AICRP – IWM - 3 Nos. NICRA – 1 No.
5.	Department of Food and Agrl. Process Engineering	3	-	5	8	AICRP project – 11 Nos. Externally funded – 1 No. TNAU project – 4 Nos.
6.	Post Harvest Technology Centre	6	1	-	7	Externally funded – 3 Nos. TNAU project – 4 Nos.
7.	Agricultural Machinery Research Centre	5	-	1	6	Externally funded – 1 No. AICRP on FIM – 6 Nos. AICRP on ESA – 4 Nos.
8.	Water Technology Centre	3	-	1	4	TNAU project – 4 Nos. AICRP on IWM – 1 Nos.

9.	Physical Sciences and Information Technology	3	-	25	28	TNAU project – 5 Nos.
10. AEC&RI, Kumulur						
a	Department of Farm Machinery & Bioenergy, Kumulur.	2	-	5	7	-----
b	Department of Soil and Water Conservation, Kumulur.	4	-	3	7	TNAU project – 1 No.
c	Department of Agri. Process Engineering, Kumulur.	1	-	1	2	Externally funded – 1 No.
11.	ARS, Kovilpatti	-	-	1	1	AICRP project – 2 Nos.
12.	ARS, Bhavanisagar	-	-	1	1	TNAU project – 1 No.
13.	SWMRI, Thanjavur	-	-	1	1	TNAU project – 1 No.
14.	AC&RI, Madurai	1	-	1	3	----
15.	CSC&RI, Madurai	1	-	-	1	---
16.	KVK, Virinjipuram	-	-	1	1	----
17.	AC&RI, Eachankottai	-	-	1	1	----
18.	KVK, Sirugamani	-	-	1	1	----
19.	AC&RI, Kudumiyanmalai	-	-	1	1	----
20.	KVK, Kanyakumari	-	1	-	1	----
21.	ADAC&RI, Trichy	1	-	-	1	----
22.	AC&RI, Vazhavechaur	-	-	1	1	----
23.	HC&RI (Women), Trichy	-	1	-	1	----
24.	Controller of Exams, CBE	1	-	-	1	----
25.	KVK, Aruppukottai	-	-	1	1	----
26.	FC&RI, Mettupalayam	-	-	1	1	TNAU project – 1 No.

II. REMARKS ON THE ONGOING RESEARCH PROJECTS

S. No.	Title of the Project	PI	Period	Remarks
1	AEC&RI/CBE/APE/2016/001 Development of dryer for high moisture paddy	Dr. S. Ganapathy, Professor and Head, Dept. of F&APE	June 2016 - April 2019	Trials may be carried out for high moisture paddy drying at Nagapattinam.
2	AECRI/CBE/APE/2016/002 Evolving grading standards and design of graders for dehusked coconut	Dr.T.Pandiarajan, Professor, Dept. of F&APE	June 2016 to March 2019	Coating may be done in the coconut (after removing the husk) to improve the self life
3	CPMB/CBE/BIC/2017/001 Developing a non thermal ultrasonic process technology for enhancing the shelf life of coconut milk	Dr.D.Amirtham Assistant Professor (Biochemistry), Dept. of F&APE	December 2017- November 2019	Safety measures may be ensured.
4	HCRI/CBE/HOR/VEG/2017/001 Evaluation and standardization of postharvest curing methods and curing parameters to increase the shelflife of aggregatum onion during storage	Dr. C. Indurani Assistant Professor (Horticulture), Dept. of F&APE Dr. S. Ganapathy Professor and Head, Dept. of F&APE	June 2016 to March 2019	Recirculation of air / Nitrogen system may be developed for aggregatum onion drying. Quality of

				aggregatum onion during storage may be studied
5	AEC&RI/CBE/BOE/2017/001 Development of a frugal engineering thermal reactor for generating energy efficient Refuse and Biomass Derived Fuels	Dr. P.Subramanian Professor, Dept. of Bioenergy	August 2017 – July 2019	Performance evaluation may be carried out with biomass.
6	HSCRI/CBE/FSN/2017/001 Development of Millet based Functional Milk Beverag	Dr.S.Kanchana Professor (FSN), PHTC	Sep 2017 - Aug 2019	Millet based health flour balls may be developed
7	AECRI/CBE/ PHT/ FSN / 2018 / 001- Processing of fruit powder from muskmelon and its stability during storage.	Dr. P.Vennila, Professor (FSN), PHTC	01.01.2018 to 31.12.2020	Musk odour may be avoided in the product.
8	AECRI/CBE/FAP/2017/001 Development of storage system for dehulled millets	Dr.M. Balakrishnan, Assoc.Prof.(F&APE) PHTC, AEC&RI, TNAU, Coimbatore Dr. N. Varadharaju, Dean (Agrl. Engg.), AEC&RI, TNAU, Coimbatore	01.10.2017 to 30.09.2019	Suitable technology may be developed to have the shelf life of one year.
9	HSCRI / CBR / FSN / 2017 / 001 Value added products from sapota	Dr. G. Gurumeenakshi, Associate. Professor (FSN) Dr. N. Varadharaju Dean (Ag,Engg)	Jan 2017- Jan 2019.	Technology may be developed for uniform ripening of sapota. Sapota jam may be prepared
10	AECRI/CBE/SWC/2016/001 Hydrological evaluation of watershed by Morphometric Analysis	Dr.A.Valliammai, AP(SWCE) Dr.A.Raviraj,Prof(SWCE) Dr.Balaji Kannan Asso Prof(SWCE)	Nov 2016- Oct 2019	Morphometric parameters with hydrological information for site suitability may be developed.
11	AECRI/CBE/SWC/2017/001 Studies on the Efficacy of Ground Level Water Tanks Vs Open Wells as Temporary Storage for Small Water Discharges from Bore wells	Dr. M.Chellamuthu, Professor (SWCE)	June 2017 to March 2019	Change in groundwater level due to artificial discharge may be studied.
12	WTC/CBE/SWC/2017/002 Standardizing Irrigation scheduling based on different types of automated drip Irrigation System	Dr.K.Nagarajan, Professor (SWCE) and Dr.SP.Ramanathan, Professor (Agronomy), Water Technology Centre		Drip irrigation scheduling for different crops may be developed.

13.	AECRI/KUM/SWC/2017/001 - Crop water requirement for drip irrigated crops for different agro climatic zones of Tamil Nadu	Dr. M. Manikandan Asst Professor (SWCE) Dr. V. Ravikumar Professor (SWC) and Head	Dec 2017 – Nov 2019	Crop coefficient used for different crops may be verified.
-----	--	--	------------------------	--

III. RECOMMENDATIONS (Suggestions of the 6th Agrl. Engg. Scientists Meet 2018)

1. PG and Ph.D. students name should be included in the projects **(Action: All the HoDs’)**
2. Farm machinery / equipment available in the market may be modified to suit our condition. **(Action: All the HoDs’)**
3. Wet land laser leveler may be commercialized **(Action: P&H, AMRC).**
4. Performance of the seed drill may be improved **(Action: P&H, AMRC).**
5. Vegetable seedling transplanter demonstration may be conducted in collaboration with Horticultural department **(Action: P&H, AMRC).**
6. Red gram transplanter demonstration may be arranged at RRS, Paiyur **(Action: P&H, AMRC and Director of Research).**
7. Groundnut picker combine may be demonstrated at ORS, Tindivanam **(Action: P&H, AMRC)**
8. Seamless tube may be used to produce uniform seed pellets **(Action: P&H, AMRC)**
9. Paper cups may be used for vegetable / sugarcane seedling production in portrays **(Action: P&H, AMRC)**
10. Turmeric ryzhome planter and harvesting machine may be included in turmeric value chain project **(Action: P&H, AMRC and F&APE)**
11. Raised bed green gram planter may be developed **(Action: P&H, AMRC)**
12. Stalk remover may be incorporated in onion harvester **(Action: P&H, AMRC)**
13. Survey may be conducted for usage of Chula **(Action: P&H, Bioenergy)**
14. Biofuel production technology may be developed using lignocelluloses biomass **(Action: P&H, Bioenergy)**
15. Continues operation of gasifier may be tried **(Action: P&H, Bioenergy)**
16. Arecanut husk may be analysed for the production of pith **(Action: P&H, F&APE)**
17. Palm fruit cutter may be demonstrated at AC&RI, Killikulam **(Action: P&H, F&APE)**
18. Water harvesting structure maps prepared during British period, may be collected from PWD for research activities **(Action: Director, WTC, Coimbatore)**
19. Suitable structures may be developed to avoid deposition of silt in water bodies **(Action: Director, WTC, Coimbatore)**

20. Recharging of open / bore well may be monitored by installing piezometer and Lysimeter
(Action: Director, WTC, Coimbatore)
21. Weeders for millets may be developed in collaboration with Directorate of Crop Management Studies **(Action: Dean, AEC&RI, Kumulur / Director (CMS), TNAU)**
22. Groundnut vine cutting machine may be developed **(Action: Dean, AEC&RI, Kumulur)**
23. Millet chaffing and balleing machine may be developed **(Action: Dean, AEC&RI, Kumulur)**
24. Integrated tamarind processing system may be developed **(Action: Dean, AEC&RI, Kumulur)**
25. Effect of evapo-transpiration on sugar content in sugarcane crop may be studied **(Action: Dean, AEC&RI, Kumulur)**
26. Nitrogen uptake and losses in paddy field may be quantified **(Action: Dean, AEC&RI, Kumulur)**
27. Nutrient enrichment or depleting in the ground water may be studied **(Action: Dean, AEC&RI, Kumulur)**
28. Studies may be conducted by creating artificial drought **(Action: Dean, AEC&RI, Kumulur)**
29. Cloud seeding may be tried **(Action: Dean, AEC&RI, Kumulur)**

IV. WORK DONE FOR THE ACTION PLAN (2016-2019)

Farm Machinery

Theme: Development of Machinery and technology to provide complete mechanization in selected crops.

1. Mechanization of groundnut cultivation - Development of groundnut harvester with collection bin

Activities	Y1	Y2	Y3	Scientists involved	
1. Design of a harvester with collection arrangement				Dr. B. Shridar Dr. A. Surendrakumar	25% 25%
2. Fabrication of the harvester				Dr. R.Kavitha	25%
3. Field trials with harvester				Dr. B. Suthakar	25%

- Planting of groundnut had already been mechanised - Tractor drawn cultivator planter developed by AMRC is being used by farmers extensively.
- TNAU had also developed tractor operated groundnut digger. This implement has been adopted by various firms and different types of diggers are available commercially.

Development of groundnut harvester with collection device

- To eliminate the need to collect the plants dug, a conveyer type collection device was developed and attached to the existing digger.

Development of picker combine for groundnut

- A research project to pick the dried ground nut vines and separate the pods from the groundnut vines had been proposed. The groundnut vines dugout by the digger will be deposited in windrows and allowed to dry in the field.

- After drying for four to five days the dried vines will be picked and threshed by a picker combine. The picker part of the unit was adopted from the picker head of a commercial straw baler. Preliminary trials were conducted with the picker head.

2. Technology for mechanization in wide spaced irrigated crops (Cotton, maize and Redgram)

Activities	Y1	Y2	Y3	Scientists involved	
1. Raised bed forming suitable for furrow irrigated /drip irrigated systems				Dr. Monohar Jesudas Dr. A.Surendrakumar Dr. B. Shridar	40 % 20 % 20 %
2. Development of modular raised bed former cum seeder				Dr. R.Kavitha	20%
3. Field trials with Raised Bed planter					

- Mechanization trials were conducted under
 - i. Drip irrigated field (Drip tape) and
 - ii. Conventionally irrigated field
- In the drip irrigated plots, the main pipelines were laid under the ground and the laterals were laid for each row after sowing. The laterals were shifted during mechanized weeding and harvesting operations.
- Since there is no cross channels, the machinery could be operated conveniently.

Following operations were mechanized under cotton and maize crop (drip irrigated field)

- Mechanized land preparation - primary tillage with disc plough and secondary with rotavator.
- Sowing with inclined plate planter at the required row to row spacing and plant to plant spacing with appropriate seed plate.
- Spraying the pre-emergence weedicide with tractor operated air sleeve boom sprayer.
- Irrigation with drip tape system.
- Mechanical weeding with self propelled power weeder.
- Cutting of the maize stalk with self propelled vertical reaper conveyer.

Mechanization in Conventional irrigated cotton crop

- Mechanized land preparation - Primary tillage with disc plough and secondary with vertical rotary harrow.
- Land shaping to raised bed configuration with bed former with bed spacing of 73 cm in order to enable standard tractor to move through the field with regular tyre size.
- Sowing with inclined plate planter at the required row to row spacing and plant to plant spacing with appropriate seed plate (sowing at the side of the beds).

Mechanization in Conventional irrigated cotton crop

- Spraying the pre emergence weedicide with tractor operated air sleeve boom sprayer.

Mechanization in Conventional irrigated cotton crop

- Irrigation in the furrows with limited cross channels.
- Weeding of the cotton crop with standard tractor and modified hoe setting.

3. Mechanization of vegetable crop

Development of a vegetable transplanter with variable row spacing

Activity	Y1	Y2	Y3	Scientists involved	
1. Design of Vegetable Transplanter				Dr. D. Monohar Jesudas Dr. C. Divaker Durairaj	60 % 20%
2. Fabrication of Transplanter				Dr. R. Kavitha	20%
3. Field trials					

Mechanization of vegetable crops

Two different vegetable transplanting implements have been developed by TNAU viz., gripper chain type transplanter for bare root seedlings, cassette type transplanter for protray grown seedlings

Fully automatic vegetable transplanter (Experimental)

- The protray was held vertically and the seedlings were ejected by ejection pins that were driven by miniature geared motors. The synchronization of the seedling ejection and the tray traverse were made possible by microprocessor control.
- Preliminary trials were conducted with this device to transplant tomato seedlings.

Drum type automatic transplanter

- An automatic vegetable transplanter with similar seedling ejection device, but with a drum type protray holding and indexing arrangement had been designed.
- A research project to develop an fully automatic vegetable transplanter with suitable plant gripping and removal arrangement is also proposed.

Bioenergy

Theme: Enhanced energy and resource recovery from biomass and wastewater

Thrust area: Biomass Refinement and Resource Recovery for Sustainable Energy Management

Workdone

- Developed a Hydrothermal carbonization (HTC) reactor for the production of biocoal
- Developed a reactor for biochar production for use in purification of gaseous biofuels by absorption

Deliverable

- Nutrient and energy recovery system for wastewater streams
- Reduction in carbon and energy foot print in bioconversions

Food And Agricultural Process Engineering

Themes: 1. Development of improved drying technologies

Objectives	Timeline			Scientists
	Y1	Y2	Y3	
Project 1. Design of improved dryer for high moisture paddy				
1. Design and fabrication of improved on farm dryer				S. GANAPATHY
2. Performance evaluation of dryer				
3. Model development and improvising the design				

Work done

- In bin drying with near ambient air of high moisture paddy is feasible for tropical weather conditions
- Grain quality is retained to the maximum when the temperature of air held at 50° C
- Temperature and moisture front velocities at 50° C and 0.2 m³/s.m² were found to be 3.21 cm/h and 2.81 cm/h respectively.

Works to be done

An in bin dryer for 1 tonne of paddy has been designed and fabrication works in progress

Themes: 2. Improved post harvest handling of fruits and vegetables

Objectives	Timeline			Scientists
	Y1	Y2	Y3	
Project 2. Development of a grader for dehusked coconuts				
1. Assessment of grading parameters of dehusked nuts	■			T. Pandiarajan
2. Design of grader based on physical properties		■	■	
3. Field evaluation and improvisation			■	

Work done

- Grading machines for dehusked coconut based on weight has been developed.

Works to be done

- Performance evaluation of developed weight grading machine

Post Harvest Technology Centre

Thematic area: Sapota and value addition of Sapota

Project (1): Developing a process for uniform ripening and enhancing the shelf-life and quality of sapota (*Manilkara achras* (Mill.) Fosberg.)”

Objectives	Y1	Y2	Y3	Scientist involved
To standardize the pre harvest spray to obtain quality fruits	■			Dr. K. Venkatesan Dr. N. Varadharaju Dr. Z. John Kennedy Dr. M. Balakrishnan
Development of a sensor to assess the maturity index of sapota based on its latex content.		■		
Optimization of application of ethylene for uniform ripening.		■		
Development of process to enhance the shelf life by vacuum packaging and Controlled atmospheric storage.			■	

Work Done

- Standardized the Pre harvest treatment to obtain the uniform ripening.
- Optimized modified atmospheric packaging and storage condition for enhancing the

Work to be done

- Development of a sensor to assess the maturity index of Sapota based on its latex content.
- Optimization of application of ethylene for uniform ripening.
- Development of process to enhance the shelf life by vacuum packaging and Controlled atmospheric storage.

Project (2): Development and quality evaluation of value added products from sapota

Objectives	Y1	Y2	Y3	Scientist involved
Development and quality evaluation of sapota jam and sapota candy				Dr. G. Gurumeenakshi Dr. N. Varadharaju
Development and quality evaluation of sapota blended jam, sapota flakes and sapota powder				
Development and quality evaluation of Sapota fruit bar and concentrated sapota pulp				
Popularisation and commercialization of the products				

Work done

Developed following products from sapota

- Sapota flakes.
- Sapota fruit bar.
- Concentrated Sapota pulp and
- Sapota powder.
- Sapota blended jam.

Work to be done

Popularisation and commercialization of the product.

Water Technology Centre

Theme:- Climate Proofing and Sustainable Watershed Development

Project 1:- To study the effectiveness of artificial recharge techniques in increasing the recharge rate and to improve the ground water quality

Objective	Timeline			Scientists involved
	Y1	Y2	Y3	
To study the stage volume relationship of the identified recharge structures in the study area by topographical survey				Dr.A.Valliammai, AP(SWCE),WTC-60% Dr.A.Raviraj, Prof(SWCE),WTC-40%
Estimation of natural and artificial recharge due to artificial recharge structures				
Assessment of groundwater quality before and after monsoon				
Study on impact of various recharge structures in increasing the recharge rate and to improve the ground water quality				

Study area

- Thondamuthur watershed(4B2B3d3) , Coimbatore district
- Over exploited category
- Noyyal sub basin
- Area-76.93 sq kms
- Average rainfall - 600 mm

- The hydrological soil group 'C' with a slow rate of infiltration and moderate runoff covers about 60% of the area
- The area has very gentle slope (1–2%).
- The major land use of the Thondamuthur block is Agricultural land
- The rock types include charnockite and gneiss.
- Thickness of the weathered zone ranges from 10 to 40 m

Work to be done

- Estimation of recharge in the study area
- Estimation of recharge rate due to artificial recharge structures
- Assessment of ground water quality before and after monsoon

Project 2: Hydrological evaluation of Watershed by Morphometric Analysis

Objective	Timeline			Scientists involved
	Y1	Y2	Y3	
Preparation of hydrological thematic maps of the study area Viz. land use/cover, land forms, geology, Geomorphology and soil in the GIS domain				1. Dr.A.Valliammai, AP(SWCE),WTC,TNAU (50%) 2. Dr.A.Raviraj, Prof(SWCE), WTC,TNAU(25%) 3. Dr.Balaji Kannan, AP(SWCE), Dept' of RS & GIS, TNAU(25%).
Estimation of morphological parameters of the watershed				
Integration of morphological parameters with hydrological information for the site suitability analysis of soil and water conservation structures in the basin and technology transfer				

Study area-Koraiyar watershed

- Koraiyar watershed (5A2B5a) Kinathukadavu block, Coimbatore district
- Over exploited category
- Walayar sub basin,PAP
- 10°43'07" to 10°55'27" N latitude and 76°53'32" to 77°09'27" E longitude
- Four toposheets (58B/13,58B/14,58 F/1,58 F/2)
- Area-289.83 sq.kms
- Weighted average rainfall of the study area is 688.69 mm

Work done

- Base line survey of the study area
- Preparation of various hydrological thematic layers of the study area
- Delineation of micro watersheds in the study area
- Morphometric parameters of the watershed

Delineation of Micro watersheds

- 14 micro watersheds are delineated in the study area for morphometric analysis
- Morphometric parameters
- Average basin length-9.085 km
- Mean stream length:-198.1m
- Drainage density-93.2
- Stream frequency-1.88
- Circulatory ratio-0.0014

Work to be done

- Estimation of morphometric parameters of the micro watersheds
- Integration of morphological parameters with hydrological information in GIS domain

Soil and Water Conservation Engineering

Thematic area: Water Flow & Nutrient transport Studies in Paddy fields

Project (1): Estimation of Water uptake of Paddy by soil moisture estimation by sensors

Objectives	Y1	Y2	Y3	Scientist involved
To measure soil moisture by Time Domain Reflectometry sensors in Drip irrigated Paddy				Dr. V.Ravikumar Ms.Ankaleeswari, Ph.D student
To estimate Evapotranspiration by soil moisture modelling and by Penman-Montieth method				
To estimate crop coefficients for Drip irrigated Paddy				

Work Done

- Paddy crop planted on 17.3.2017
 - short duration (CO-15)
- Soil moisture data logged
 - Every 15 minutes
- Evapotranspiration estimated

Work to be done

- To estimate Evapotranspiration for drip irrigated paddy by soil moisture modelling for different crop seasons
- To estimate crop coefficients for drip irrigated paddy

Project (2): Estimation of nutrients uptake and transport by field studies and modeling

Objectives	Y1	Y2	Scientists involved
To estimate reaction rate constants of Urea reactions in soil by field experimentation and modelling			Dr. V.Ravikumar Ms.Vanitha, Ph.D student
To compare urea, ammonium & nitrate dynamics by field observations and modelling			

Work Done

- Paddy Crop raised under
 - Continuously flooded
 - Alternate and Wet & Dry
- Urea, Ammonium and Nitrate in soil
 - sampled at three depths 7.5 cm, 22.5 cm, 37.5 cm at different times

S. No.	Observation	Continous Flood Irrigation	Alternate Wet and Dry Irrigation
1	Depth of water	1164 (mm)	1020 (mm)
2	Total yield of paddy (Variety - CORH4)	8.74 (t/ha)	8.25 (t/ha)

Work to be done

Find the reaction rate constant by modelling using field collected data

Thematic area: Subsurface drainage for water logged & salt affected lands

Project (1): Subsurface drainage for waterlogged and salt affected lands in farmers field

Objectives	Y1	Y2	Y3	Scientist involved
To collect water and soil samples in the study area and to characterize the soil				Dr.M.Manikandan Asst.Prof (SWCE)
Implement chemical soil treatment methods and installation of drains at pilot scale				Dr.K.Sivasubramanian Asst.Prof (Env. Sc.)
Performance Evaluation of the Project				Dr.Baskar, Associate Prof (Soil Science)

Study area

- Lalgudi Taluk
- Villages : Thinniam, Sembarai, Mullal,
- Total affected area: 300 ha

Work done

Soil and water samples collected

Villages	Soil		Water	
	pH	EC (dS/m)	pH	EC (dS/m)
Thinniam	8.6	1.98	8.4	0.98
Sembarai	9.2	1.32	7.9	0.95
Mullal	8.5	1.67	8.1	1.3

Work to be done

- To collect water and soil samples in the study area and to characterize the soil
- Implement chemical soil treatment methods and installation of drains at pilot scale
- Performance Evaluation of the Project

Thematic area: Estimation of Soil Erosion from Cropped Fields and using Rainfall Simulator

Project: Estimation of Soil Erosion from Cropped Fields and using Rainfall Simulator

Objectives	Y1	Y2	Y3	Scientist involved
To assess the uncertainty of topographic factor (LS Factor) using Geostatistical Techniques				Dr. R. Lalitha, Professor
To estimate annual soil erosion of the watershed by RUSLE model				Ms.Anjitha Krishna, PG student
To estimate soil loss using rainfall simulator				

Study Area

- Trichy District in Tamilnadu state
- Lalgudy Taluk in Trichy district
- Kullakudi watershed in Lalgudi taluk

Soil Erosion Class

Sl. No.	Av. Annual Soil Loss (t/ha)	Area (ha)	% of Total Area
1	0.02 – 1.00	2860	79
2	1.0 – 3.5	663	18
3	3.5 – 10.0	86	2
4	10.0 – 24.0	12	< 0.5 (0.34)
5	24.0 – 51.0	2	< 0.5 (0.04)
		3623	100

Erosion Class	Annual Soil Loss (t/ha)
None to slight	< 10
Moderate	10 to 50
High	50 to 200
Very high	> 200

Work to be done:

- To estimate soil loss using rainfall simulator

V. ACTION PLAN PROPOSED FOR 2018-19

(Action: AMRC, TNAU, Coimbatore)

1. Mechanization of groundnut cultivation
 - Development of picker combine for groundnut
2. Technology for mechanization in wide spaced irrigated crops (Cotton, Maize and Redgram)
 - Development of a corn cob harvester
 - Demonstration of complete mechanization in maize and cotton
 - Commercialization of automatic red gram protray seeder
3. Mechanization of vegetable crops
 - Development of a vegetable transplanter

(Action: Department of Bioenergy)

1. Silica production from biomass for PV cell production

(Action: Department of F&APE)

1. Design of improved dryer for high moisture paddy
2. Radio frequency drying of selected vegetables
3. Development of a grader for dehusked coconuts
4. Development of moringa pod cutting machine
5. Ohmic heating of liquid foods

(Action: Post Harvest Technology Centre)

1. Development of hybrid system for milling of pulses into fractionate products.
2. Development and commercialization of pulse based high value functional foods.

(Action: PFDC, AEC&RI, Coimbatore)

1. Standardization of cladding materials for its endurance
2. Drip fertigation and mulching for moringa

(Action: Water Technology Centre, Coimbatore)

1. Hydrological evaluation of Watershed by Morphometric analysis in PAP Basin
2. Effectiveness of Artificial Recharge Techniques in increasing the recharge rates and to improve the groundwater quality

(Action: AEC&RI, Kumulur)

1. Crop water requirement for drip irrigated crops for different agro climatic zones of Tamil Nadu.
2. Estimation of Crop Coefficient and Water requirement of Chilli and Cucumber under poly house and open field condition.

VI. WORK LOAD OF SCIENTISTS

Name of the scientist	% of time				
	Research (URP / AICRP/ Extn. Funded)	Teaching	Students guidance	Administration	Other activities
Dr. N. Varadharaju, Dean (Engg.) i/c, AEC&RI, CBE,	--	--	20	80	--
Dr. V. Rajendran, Dean (Engg.) i/c, AEC&RI, Kumulur	--	--	20	80	--
Dr. Balaji Kannan, Associate Professor (SWCE)	30	30	20	--	20
Dr. D. Manohar Jesudas, Professor & Head	65	08	05	22	-
Dr. V.M.Duraisamy Professor, AMRC	75	10	10	-	05
Dr. B.Shridar Professor, AMRC	65	15	05	15	-
Dr. A.Surendrakumar Professor, AMRC	69	20	-	10	01
Dr. R.Kavitha Professor, AMRC	68	22	-	09	01
Dr. B. Suthakar Assistant Professor, AMRC	65	28	02	04	01

Dr. R. Thiyagarajan Assistant Professor, AMRC	85	08	05	02	-
Dr. S. Pugalendhi Professor and Head, Dept. of Bioenergy	30	30	15	15	10
Dr. S.Karthikeyan Professor (Agrl. Microbiology) , Dept. of Bioenergy	30	30	15	05	20
Dr. P. Subramanian Professor, Dept. of Bioenergy	15	60	15	-	10
Dr. R. Mahendiran Assistant Professor, Dept. of Bioenergy	20	30	30	-	20
Dr. R.Angeeswaran Assistant Professor, Dept. of Bioenergy	30	30	20	-	20
Dr. S. Sriramajeyam Assistant Professor, Dept. of Bioenergy	30	30	20	-	20
Dr. K. Chandrakumar Asst. Professor (Biochemistry) , Dept. of Bioenergy	30	40	15	-	15
Dr. P. Vijayakumary Assistant Professor, Dept. of Bioenergy	30	30	20	-	20
Dr. S. Ganapathy Professor and Head, Dept. of F&APE	30	30	15	15	10
Dr.T.Pandiarajan Professor, Dept. of F&APE	30	25	20	5	20
Dr. I.P. Sudhagar Assistant Professor, Dept. of F&APE	15	30	10	20	25
Dr. R. Arulmari Assistant Professor, Dept. of F&APE	10	25	0	15	50
Dr. Raja Assistant Professor (Microbiology) , Dept. of F&APE	10	15	0	20	55
Dr. D.Amirtham Assistant Professor (Biochemistry) , Dept. of F&APE	10	30	0	10	50
Dr. Z. John Kennedy, Professor, PHTC	20	30	20	20	10
Dr. P. Vennila, Professor (FSN), PHTC	20	30	--	20	30
Dr. M. Balakrishnan, Associate Professor, PHTC	30	30	10	--	30
Dr. G. Gurumeenakshi, Associate Professor (FSN), PHTC	30	30	--	--	40

Dr.P.Geetha Asst Professor (FSN), PHTC	30	30	-	--	40
Dr. M. Chellamuthu, Professor (SWCE), WTC, TNAU, Coimbatore	20	70	-	-	10
Dr. A. Raviraj, Professor (SWCE), WTC, TNAU, Coimbatore	50	20	20	-	10
Dr. K. Nagarajan, Professor (SWCE), WTC, TNAU, Coimbatore	20	60	10	-	10
Dr. G. Thiyagarajan Assistant Professor (SWCE), WTC, TNAU, CBE	50	20	10	-	20
Dr. V. Rajendran, Dean (Engg.), AEC&RI, Kumulur	-	-	10	80	10
Dr. P. Rajkumar, Prof.& Head, Dept. of Processing & BS, AEC&RI, Kumulur	40	40	10	10	-
Dr. S. Kulanthaisamy, Professor (Physics), Dept. of Processing & BS, AEC&RI, Kumulur	-	50	-	25	25
Tmt. R. Suguntha Kunthalambigai, Asst. Professor (Maths), Dept. of Processing & BS, AEC&RI, Kumulur	-	100	-	-	-
Dr. P. Jeyalakshmi, Assistant Professor (English), Dept. of Processing & BS, AEC&RI, Kumulur	-	80	10	-	10
Dr. D. Soundararajan, Assistant Professor (Physics), Dept. of Processing & BS, AEC&RI, Kumulur	-	50	-	10	10
Dr. D. Asokan, Professor and Head, Dept. of Farm Machinery, AEC&RI, Kumulur	-	30	30	30	10
Dr. J. John Genasekar, Professor (Bioenergy), Dept. of Farm Machinery, AEC&RI, Kumulur	30	45	20	-	05
Dr. S.A. Ramjani, Asst. Professor (Bioenergy), Dept. of Farm Machinery, AEC&RI, Kumulur	-	50	20	-	30
Dr. P.K. Padmanathan, Asst. Professor (FMP), Dept. of Farm Machinery, AEC&RI, Kumulur	22	33	22	05	18
Dr. S. Thambidurai, Asst. Professor (FMP), Dept. of Farm Machinery, AEC&RI, Kumulur	-	40	30	-	30

Dr. A.P. Mohankumar, Asst. Professor (FMP), Dept. of Farm Machinery, AEC&RI, Kumulur	-	35	20	15	30
Dr. P. Dhanchezhiyan, Asst. Professor (FMP), Dept. of Farm Machinery, AEC&RI, Kumulur	-	50	30	10	10
Dr. V. Ravikumar, Professor and Head, Dept. of SWCE & AST, AEC&RI, Kumulur	10	60	20	05	05
Dr. K. Shamugasundaram, Professor, Dept. of SWCE & AST, AEC&RI, Kumulur	-	60	20	10	10
Dr. R. Rajendran, Professor, Dept. of SWCE & AST, AEC&RI, Kumulur	-	70	20	-	10
Dr. R. Lalitha, Professor, Dept. of SWCE & AST, AEC&RI, Kumulur	-	50	25	10	15
Dr. K. Arunadevi, Asst. Professor, Dept. of SWCE & AST, AEC&RI, Kumulur	20	50	10	10	10
Dr. M. Manikandan, Asst. Prof. (SWCE), AEC&RI, Kumulur	15	55	10	05	15
Dr. M. Nagarajan, Asst. Prof. (SWCE), AEC&RI, Kumulur	15	50	10	05	20
Dr. N. Anandaraj, Asst. Prof. (SWCE), ARS, Kovil Patti.	40	35	-	-	25
Dr. A. Valliammai, Asst. Prof. (SWCE), ARS, Bhavanisagar.	70	-	-	-	30
Dr. P. Sudha, Asst. Professor, FC&RI, Mettupalayam.	30	50	05	05	10
Dr. R. Visvanathan, Professor (Agrl. Processing), ADAC&RI, Trichy.	-	80	-	-	20
Dr. V. Thirupathi Professor (F&APE), Dept. of Human Development, Community Science College & RI, Madurai	30	40	20	-	10
Dr. A. Kamaraj, Assistant Professor (Bioenergy), AC&RI, Eachangottai, Thanjavur	10	60	10	-	20
Dr. R. Mythili, Assistant Professor, AC&RI, Vazhavachanur, Tiruvannamalai	Nil	60	20	-	20
Dr. A. Mani, Assistant Professor (SWC), SWMRI, Kattuthottam, Thanjavur	20	20	10	-	50
Dr. D. Ramesh, Associate Professor (Bioenergy), HC&RI (Women), Trichy	14	56	Nil	-	30

Dr. V. Thirupathi, Professor (F&APE), CSC&RI, Madurai	30	40	20	-	10
Dr. M. R. Duraiswamy, Professor and Head, Dept. of PS&IT	-	30	30	30	10
Dr. R. Sathy, Professor (Maths), Dept. of PS&IT	-	50	30	-	20
Dr. S. Sridevy, Asst. Prof.(Comp. Sci.), PS&IT	11	66	11	-	12
Dr. R. Vasanthi, Asst. Prof.(Maths.), Dept. of PS&IT	-	60	20	-	20
Dr. M. Nirmala Devi, Asst. Prof.(Maths.), Dept. of PS&IT	-	62	20	-	18
Dr. P. G. Saravanan, Asst. Prof.(Agril. Statistics), Dept. of PS&IT	-	60	20	-	20
Dr. M. Radha, Asst. Prof.(Agril. Statistics), Dept. of PS&IT	-	64	16	-	20
Dr. Patil Santosh Ganapati Asst. Prof.(Agril. Statistics), Dept. of PS&IT	10	62	22	-	6