

TAMIL NADU AGRICULTURAL UNIVERSITY

**PROCEEDINGS OF THE
7th AGRICULTURAL ENGINEERING SCIENTISTS' MEET 2019
30th April 2019**

**Agricultural Engineering College and Research Institute
Coimbatore – 641 003**

2019

PROCEEDINGS

7th Agricultural Engineering Scientists' Meet, 2019 (April 30, 2019)

The 7th Agricultural Engineering Scientists' Meet 2019 was held at Seminar Hall (RI Building), Tamil Nadu Agricultural University, Coimbatore on April 30th, 2019. The session was chaired by the Vice-Chancellor, in which the Director of Research, Dean, (Engg.), Coimbatore, Dean (Engg.), Kumulur, Director, WTC and Heads of Departments and Staff members of AEC&RI, Coimbatore and Kumulur and other stations of TNAU participated. The meeting started with the welcome note by the Director of Research.

Dr. K.S.Subramanian, Director of Research presented the Research Highlights of Agricultural Engineering. Dr. B. Shridar, Dean (Engg.), AEC&RI, Coimbatore presented the Action taken on the recommendations (suggestions) of the 6th Scientists' Meet 2018 (Agricultural Engineering). The Professor and Head of AMRC, FPE, REE, CPHT, PS&IT and SWCE were presented the staff pattern and progress report of URPs', core funded projects, External funded projects and AICRPs projects. They also presented the technology for adoption and multi location trails.

Review on progress of University Research Projects was taken up by the Dean (Engg.), Coimbatore and Kumulur on 29.4.2019 at Seminar hall of AEC&RI, Coimbatore. Salient findings emanated from the results of the experiments conducted by the scientists were taken up for presentation and deliberation for the next day.

The Plenary session was held on 30.4.2019. Action plan for the 2019-2020 for Farm Machinery, Renewable Energy Engineering, Food Process Engineering, Soil and Water Conservation Engineering, Post Harvest Technology and Physical Sciences and Information Technology was presented by Dr. V. Thirupathi, Dean, AEC&RI, Kumulur. Finally, the meeting was concluded with the remarks of the Vice Chancellor and Director of Research.

The proceeding of the meet is furnished below:

- I. Farm Machinery
 1. Technologies for adoption
 2. Remarks on the ongoing projects
 3. General remarks
 4. Action Plan 2019-2022
- II. Renewable Energy Engineering
 1. Technologies for adoption
 2. Remarks on the ongoing projects
 3. General remarks
 4. Action Plan 2019-2022
- III. Food Process Engineering
 1. Technologies for adoption
 2. Remarks on the ongoing projects
 3. General remarks
 4. Action Plan 2019-2022
- IV. Centre for Post Harvest Technology
 1. Technologies for adoption
 2. Remarks on the ongoing projects
 3. General remarks
 4. Action Plan 2019-2022
- V. Soil and Water Conservation Engineering
 1. Technologies for adoption
 2. Remarks on the ongoing projects
 3. General remarks
 4. Action Plan 2019-2022
- VI. Physical Sciences and Information Technology
 1. Remarks on the ongoing projects
 2. General remarks
 3. Action Plan 2019-2022
- VII. Closing remarks / Way forward (Vice-Chancellor)
- VIII. Contact details of scientists participated in the 7th Agricultural Engineering Scientists' Meet 2019

I. FARM MACHINERY

1. Technologies for adoption

(i). Laser controlled leveller for rice

Need for leveled field:

- Water may stagnate in depressions,
 - Higher parts may become dry, this results in uneven crop emergence
 - Uneven growth,
 - Uneven fertilizer distribution
 - Extra weed problems.
- A tractor with rotovator was fitted with external hydraulics that is controlled by conventional laser leveller system
 - The equipment was demonstrated at Lalgudi, Tanjore and Ponneri
 - This system can achieve perfectly levelled puddled field
 - The advantageous are
 - Uniform height of water in the field and reduction in quantity of water
 - Uniform depth of planting when using transplanters
 - Controlled depth of puddling and maintenance of sub soil hard pan

2. Remarks on the ongoing projects:

Sl. No.	Number and Title of the Projects	Name of the PI & Co-PI	Remarks
AICRP on Farm Implements and Machinery			
1.	AICRP/AGE/CBE/FMR/002-17/001 Design and development of a system for sowing pelletized rice seeds	Dr.D.Manohar Jesudas, Professor and Head Dr. B. Shridar, Dean (Engg)	After further refinement, field trial may be conducted. Manufacturer may be identified for development of commercial prototype and field trials may be conducted. The cost and capacity of the machine may be reported.
2.	AICRP/AGE/CBE/FMR/002/17/002 Design and Development of a corn cob harvester	Dr. B. Shridar, Dean (Engg) Dr. D. Manohar Jesudas, Professor & Head	The conveyance, collection and transfer system may be completed. Field trials may be conducted. The cost economics of the machine may be worked out.
3.	AICRP/AGE/CBE/FMR/002/17/003 Design and development of picker combine for field harvested groundnut	Dr. R.Kavitha, Professor Dr.B. Suthakar, Assistant Professor Dr.D.Manohar Jesudas, Professor and Head	Early action may be taken to expedite the project and complete it at the earliest.
4.	AICRP/AGE/CBE/FMR/002/17/004 Design and Development of automatic vegetable protray seedling transplanting mechanism	Dr.V.M.Duraisamy, Professor Dr.R.Kavitha, Professor	Feasibility of adoption of the developed transplanting mechanism for stationary operations in green houses may be explored. Transplanting mechanism for seven rows may be

			completed for which University Research Project or Externally Funded Projects may be proposed to continue the research and to develop a transplanter.
5.	AICRP/AGE/CBE/FMR/002/18/001 Development of a tractor operated high clearance weeder	Dr. V.M Duraisamy, Professor Dr. D.Manohar Jesudas, Professor and Head	Narrow wheels for the tractor may be purchased. Focus may be given to develop multi row weeder with foldable mechanism for easy on road mobility.
6.	AICRP/AGE/CBE/FMR/002/18/02 Development of a tractor operated planter for tissue culture banana	Dr. B.Suthakar, Asst. Dr. D.Manohar Jesudas, Professor and Head	Cost of the machine and also cost economics of banana planter may be worked out. On farm trials may be conducted at research farms and farmer's field at Theni.
AICRP on Ergonomics and Safety in Agriculture			
1.	AICRP/AGE/CBE/AMC/003/ Studies on ergonomic interventions in hand tools for selected activities in grape cultivation in Tamil Nadu	Dr. R.Thiyagarajan, Assistant Professor Dr.A.Surendrakumar, Professor	Recommended for On Multi Local Trails Mass multiplication of tool may be done and given to Grape Research Station, Anamalaiyanpatti.
2.	Vibration studies in the mini tractor with attachments	Dr.A.Surendrakumar, Professor Dr.R.Thiyagarajan, Assistant Professor	Vibration studies with rotovator and cultivator with Mitshubishi tractor may be studied.
3.	Ergonomic studies in Vegetable transplanter	Dr.A.Surendrakumar, Professor Dr. R.Thiyagarajan, Assistant Professor	Ergonomically refined semi automatic transplanter may be developed.
University Research Project			
1.	AECRI/FMC/CBE/2015/001 Mechanization for irrigated maize	Dr.A.Surendrakumar, Professor	The data may be compiled for all the field trials conducted on maize and report may be prepared.

AEC&RI, Kumulur - FMD projects

Sl. No	Number and Title of the Projects	Year	Name of the PI & Co-PI	Remarks
1	AECRI/KUM/FMPE/2018/CP 037:HA: B27NV-CP037- Design and development of power operated cono-weeder	2018-19	1.Dr. P. Dhananchezhiyan Assistant Professor (FM) 2.Dr. D.	<ul style="list-style-type: none"> Intensive field trails may be carried out in different locations after weight reduction and provision for turning at Head land.

			Asokan Professor (Farm Machinery)	
2	AECRI/KUM/FMB/2018/CP0 98: Development of Wireless Turning Indicator for Agricultural Tractor - Trailer System to Ensure Safety	Sept. 2018 - August 2020	Dr. A.P.Mohan Kumar Assistant Professor (FM)	<ul style="list-style-type: none"> • Synchronization of developed model with different tractors may be carried out. • Flashing as per ISI standards, battery operated.

3. General remarks:

- Trials may be conducted with tractor operated laser puddler at ARS, Bhavanisagar. (Action: P&H, AMRC)
- Complete mechanization of crops *viz.* rice, sugarcane and maize may be attempted. (Action : P&H, AMRC)
- Project may be formulated for mechanization of Tea plantation. (Action: P&H, Dept. of Food Processing Engineering and P&H, AMRC)
- Raised bed former and planter may be demonstrated for bulk seed production in University farms at ARS, Bhavanisagar. In collaboration with Horticultural Scientists the raised bed former may be adopted for vegetable crops like bhendi. (Action : P&H, AMRC)
- On farm trials may be conducted with tissue culture banana planter in farmers' fields at Theni. (Action : P&H, AMRC)
- Ergonomically modified grape pruning secateurs may be provided to Grape Research Station, Theni (Action : P&H, AMRC)
- Proposals may be submitted for seeking financial assistance to visit the countries like Korea, Japan and to adopt small farm machines available in such countries. (Action : P&H, AMRC)
- Focus may be given to minimize the labour requirement and increase the productivity by adopting farm machinery. Complete mechanization demonstration farms may be established at ARS, Bhavanisagar and at ARS, Kovilpatti(Action : P&H, AMRC)
- Commercialization of machineries developed may be carried out in collaboration with industries or AMMA (Action : P&H, AMRC)
- Subsequent to the development of groundnut picker combine harvester and corn cob harvester, on farm trials may be conducted at Research stations. (Action : P&H, AMRC)

4. Action Plan (2019-20)

(i). Agricultural Machinery Research Centre, AEC&RI, Coimbatore

- Farm mechanization at ARS, Bhavanisagar.
- Skill development training to TNAU tractor drivers in collaboration with AEC&RI, Kumalur

A. Machinery and technology for complete mechanization in selected crops

- Mechanization
 - Groundnut
 - Wide row spaced crops- Maize
 - Horticulture - Banana

I. Mechanization of groundnut cultivation

1. Development of picker combine for groundnut

Activities	Y1	Y2	Y3	Scientists involved
1. Design of Combine				Dr. R.Kavitha
2. Fabrication of the harvester				Dr. B. Suthakar
3. Field trials with harvester				Dr. D. Manohar Jesudas

Progress During 2018-19

The basic components of the thresher were designed. The thresher consists of the following components.

- Pickup header – Adopted from commercial baler
- Pre threshing cylinder for separation of soil
- Transfer cylinders for moving the crop in to the threshing zone.
- The primary threshing cylinder
- Beater/straw walker arrangement for separating the kernels from plants
- Cleaning system
- Conveying system and holding bin

Progress..

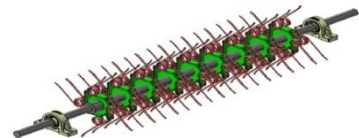
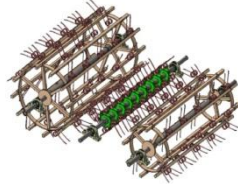
2019 – 2020 (Action plan)

- The cleaning system, pod separation system, the frame assembly and drives are under design and fabrication.

Deliverables

- A system of harvesting and threshing groundnut in the field will be developed. The system will consist of tractor operated groundnut digger and picker combine.

The threshing cylinders designed and fabricated



B. Technology for mechanization in wide spaced irrigated crops

1. Development of a corn cob harvester

	Y1	Y2	Y3	Scientists involved
1. Design of single row corn cob harvester				Dr. Manohar Jesudas Dr. B. Shridar
2. Development of Prototype harvester				
3. Field trials				

Progress

2018 – 2019

- The fabrication of proto type corn cob harvester was taken up and the picking head was fabricated and tested under lab conditions.

Action plan 2019-20

- The corn cob harvester will be provided with conveying, storage and transfer arrangement so that the corn cobs will be collected and transferred to trailer

Deliverable

- Self propelled single row corn cob harvester mounted to tractor will be developed. The machine is estimated to harvest 1.5ha/day

Single row corn cob harvester



C. Mechanization in wide spaced crops...

Development of a tractor operated high clearance weeder

	Y1	Y2	Y3	Scientists involved
1. Concept development				Dr. V.M.Duraisamy Dr.D.Manohar Jesudas
2. Design and fabrication				
3. Evaluation				
4. Field evaluation				

Progress

2018 – 2019

- A high clearance hitch frame has been used for evaluation of the concept of high clearance weeder. Provision was made to change the row to row distance between the weeding elements. Passive weeding elements are being designed with provision to meet the different crop requirement.

2019-20 (Action plan)

- Detailed design of the high clearance weeder and fabrication

Deliverable

A tractor drawn weeder with High clearance will be developed.

D. Mechanization in Horticultural Crops

Development of a tractor operated planter for tissue culture banana

	Y1	Y2	Scientists involved
1. Concept development			Dr.B.Suthakar
2. Design and fabrication			Dr.D.Manohar Jesudas
3. Evaluation			

- The conceptual design will focus on the following function of the tractor operated transplanter for tissue culture banana.
- Opening deep furrow for planting the banana plant at a depth of 200 mm
- Widening the furrow for width of 150 mm
- Dispensing banana plants on the furrow
- Earthing up the banana plants
- Compacting the soil around the plants



Progress

2018 – 2019

The concept for planting tissue culture banana was developed as a tractor drawn equipment.

The components were designed and fabricated.

The preliminary prototype without spacing control was developed and lab tested.

2019-20 (Action plan)

The mechanism to maintain the plant to plant spacing will be developed and the implement will be field tested

Deliverable

A tractor drawn single row transplanter for tissue culture banana will be developed.

(ii). Dept. of Farm Machinery & Power Engineering, AEC&RI, Kumulur, Trichy.

Action plan -1: Farm Mechanization

Development of groundnut vine cutting machine

Objectives	Y1	Scientists involved
Development of Groundnut vine cutting machine		Dr.M.Saravanakumar Associate Professor(FMP) Department of FMPE
Performance evaluation of Groundnut vine cutting machine		

Deliverables

A prototype Groundnut vine cutting machine will be developed

Action plan -2: Farm Mechanization

Power weeder for millets

Objectives	Y1	Scientists involved
Development of weeder for millets		Dr.M.Saravanakumar Associate Professor(FMP) Department of FMPE
Performance evaluation of weeder for millets		

Deliverables

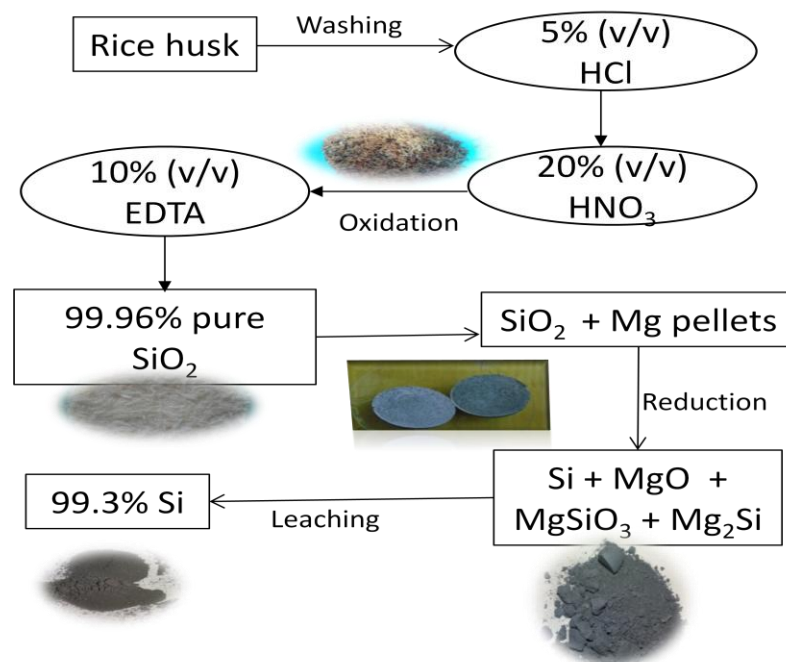
A prototype power weeder for millets will be developed

II. RENEWABLE ENERGY ENGINEERING

1. Technologies for adoption:

(i). Silica production from biomass for PV cell production

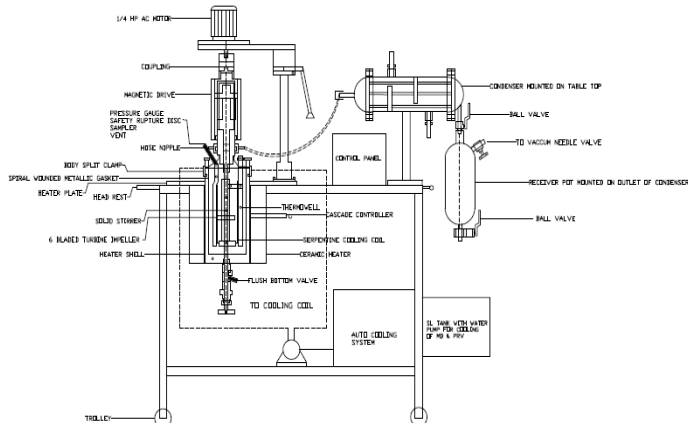
- Rice husk was used to produce Silica with purity level of 99.96%.
- The production processes used are washing of rice husk, oxidation, reduction (SiO_2 and Mg (1:2)) and leaching (Hydrochloric acid and Acetic acid (1:4)).
- Silicon retrieved after leaching had purity level of 99.3%.



Production of high purity solar grade silicon from rice husk through magnesio thermic reduction process

(ii). Hydrothermal liquefaction (HTL) reactor for biocrude production

- HTL process was developed with respect to suitable temperature, pressure and retention time. It operates from 200 to 350°C and pressures up to 20 MPa with residence time from 15 to 60 min in a wet environment.
- During distillation of biooil, petrol (5%), kerosene (25%) and diesel (45%) were observed which indicates a good scope of utilizing biocrude in transportation sector with suitable recovery and upgrading techniques.
- Energy consumption ratio for HTL was calculated as 0.7 to 0.97 and the Energy efficiency of the system was found to be 79%.



HTL reactor for biocrude production



Biocrude

2. Remarks on the ongoing research projects

Sl. No.	Number and Title of the Projects	Duration	Name of the PI & Co-PI	Remarks
1.	CMB/EAAI/DRET-TCT/2017/1 Development of hydrothermal carbonization reactor for hydrochar and chemicals production from selected lignocellulosic feedstock	01.04.2017 to 31.03.2019 Extended for 1 year (01.04.2019 to 31.03.2020)	Dr S. Pugalendhi, Professor and Head (REE)	<ul style="list-style-type: none"> Cost economics has to be carried out for the reactor.
2.	CMB/EAAI/DRET-TCT/2018/1 Design and development of activated carbon reactor for gas adsorption and	01.04.2018 to 31.03.2019 Extended for 1 year	Dr S. Pugalendhi, Professor and Head (REE)	<ul style="list-style-type: none"> Cost economics has to be carried out

	separation	(01.04.2019 to 31.03.2020)		
3.	CMB/EAAI/EMA/2017/1 Energy auditing in sugarcane cropping system	01.04.2017 to 31.03.2019 Extended upto 31.03.2020	Dr. R.Mahendiran, Associate Professor	<ul style="list-style-type: none"> Project is to be continued as per the objectives.
4.	CMB/EAAI/DRET-BCT/2017/1 Performance evaluation of high rate reactor with various packing media for treating community wastewater	01.04.2017 to 31.03.2019	Dr. S Karthikeyan, Professor (Microbiology)	Cost economic part may be incorporated in the completion report
5.	CMB/EAAI/DRET-BCT/2017/2 Development of Biomethanation system for dairy industrial liquid waste	01.04.2017 to 31.03.2019	Dr. S Karthikeyan, Professor (Microbiology)	Complete report based on confirmatory result may be done.
6.	CMB/EAAI/DRET-BCT/2017/3 ICAR-AICRP project on Remediation of tar containing wastewater generated from biomass gasification plants	April 2017 To March 2019	Dr S Karthikeyan, Professor (Microbiology)	Inoculum requirement for treatment of tar containing wastewater to be recorded
7.	CMB/EAAI/DRET-SET/2018/1 Development and performance evaluation of compound parabolic collector (CPC) based solar air heater for drying of high value agro-products	01.04.2018 to 31.03.2020 (2 Years)	Dr. R.Mahendiran, Associate Professor	Cost economics is to be included in the completion report. Maintenance aspects has to be incorporated.
8.	CMB/EAAI/DRET-LBT/2017/1 Development of a biocatalytic syngas fermentation process for the production of bioalcohol	01.04.2017 to 31.03.2019	Dr. S.Karthikeyan , Professor (Microbiology) Dr.S.Sriramajayam, Assistant Professor	Cost economics is to be included in the completion report
9.	CMB/EAAI/DRET-LBT/2017/2 Process development for Hydrocarbon fuel production from lignocellulosic biomass using co-solvents	01.04.2017 to 31.03.2019	Dr. S.Sriramajayam, Asst. Prof. Dr.K.Chandra kumar, Asst Prof. (Bio-chemistry) Dr. S.Karthikeyan , Prof. (Micro.)	Project may be continued upto 31.03.2020 as per ICAR guidelines.

10.	CMB/EAAI/DRET/LBT/2017/3 Screening laccase for the depolymerization of lignin for the production of platform chemicals	01.04.2017 to 31.03.2019 (2 Years)	Dr. K. Chandrakumar, Asst Prof. (Biochemistry) Dr. S. Sriramajeyam, Assistant Professor Dr. S. Karthikeyan, Professor (Microbiology)	Cost economics is to be included in the completion report
11.	CMB/EAAI/DRES/2017/1 Demonstration and evaluation of solar tunnel dryer in the selected users' site for drying agro-products	01.04.2017 to 31.03.2019	Dr.P.Vijayakumary, Assistant Professor	Cost economics is to be included in the completion report.
12.	CMB/EAAI/DRES/2017/2 Creation of six smokeless tribal villages through TNAU improved chulha	01.04.2017 to 31.03.2019	Dr.P.Vijayakumary, Assistant Professor	Completion report may be prepared.
13.	AECRI/CBE/BOE/2018/CP089 Comparative study of solar tunnel dryer with different cover materials for drying agricultural produce	December 2018 to November 2020	Dr.P.Vijayakumary, Assistant Professor Dr S.Pugalendhi, Prof. and Head (REE)	Works may be carried out as per the objectives.
14.	AEC&RI/CBE/BOE/2017/001 Development of a frugal engineering thermal reactor for generating energy efficient Refuse and Biomass Derived Fuels	August 2017 to July 2019	Dr.P.Subramanian, Professor	Performance evaluation of the reactor has to be carried out, after confirmatory trials with cost economics and energy calculation.
15.	AECRI/CBE/BOE/2018/CP148 Evolution of higher energy producing techniques for fuel and chemical generation from cashew nut by-products	January 2019 to December 2020	Dr. P. Subramanian, Professor	Works may be carried out as per the objectives.
16.	ICAR-CRP on EA Enhanced biomass productivity and biofuel production potential of algae cultivated in raceway ponds using agro-industrial wastewater	April 2017 To March 2020	Dr S Karthikeyan, Professor (Microbiology) Dr S Sriramajeyam, Asst. Professor	Mass cultivation of algae and studying LCA may be carried out.
17.	ICAR-CRP on EA Design and development of hydrothermal liquefaction reactor for biocrude production from lignocellulosic biomass	April 2017 To March 2020	Dr S Pugalendhi, Professor and Head (REE) Dr S Sriramajayam, Asst. Professor Dr S Karthikeyan,	<ul style="list-style-type: none"> Recommended to scale-up the reactor Cost economics is to be included

			Professor (Microbiology) Dr P Subramanian (Professor)	
18.	ICAR-National Agricultural Science Fund Eliciting soil microbiome responses of rice for enhanced water and nutrient use efficiency under anticipated climate change	July 2015 To December 2018	Dr S Karthikeyan, Professor (Microbiology)	<ul style="list-style-type: none"> • Cost economics and specific recommendations need to be included. • Results for Multi Location Trials of ICAR is awaited.
19.	ICAR-NICRA Strategies for management of rice straw and microbial carbon use efficiency under changing climate	September 2018 To March 2020	Dr S Karthikeyan, Professor (Microbiology)	<ul style="list-style-type: none"> • Project may be continued

AEC&RI, Kumulur (Bioenergy)

20.	AECRI/KUM/BIE/2018/CP035: Development of Fluidized Bed Gasifier for Leafy Biomass	Dec 2018 To Nov 2021 – 3 years	1. Dr. S.A. Ramjani, Assistant Professor (BE), AEC & RI, Kumulur 2. Dr. J.John Gunasekar, Professor (BE) AEC & RI, Kumulur 3. Dr.P.Vijayakumary, Assistant Professor (BE) Dept. of REE, AEC & RI, Coimbatore	Economical assessment for different biomasses may be made and work may be carried out as per objectives.
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3. General Remarks:

- The feasibility of silica production from rice husk may be informed to related industries. (Action : P&H, REE, Coimbatore)
- Petroleum industries (BPCL, CPCL, HP etc.) may be approached to characterize the biocrude to assess its suitability for replacing conventional fuels (Action : P&H, REE, Coimbatore).
- Renewable Energy technologies *viz* solar, wind may be demonstrated (Action : P&H, REE)

4. Action Plan (2019-20)

i. Biomass supply chain and preparation of biomass for biorefinement

Approach

- Identify biomass supply opportunities in the forestry and agricultural sectors
- Detailed characterization of biomass feed stocks, intermediates, and products
- Pretreatment of biomass *viz.*, steam treatment/ steam explosion of biomass; mechano chemical methods
- Addition of binders such as starch-based binders, plastic wastes, bio-oil, black liquor and lignin; Granulation/agglomeration of biomass using liquid binders

Deliverable

- Optimized pretreatment options for different biomass for production of biofuel
- Optimizing binder requirements for densification and modifying the surface characteristics of biomass

ii. Enhanced energy and resource recovery from biomass and wastewater

Approach

- Biomethanation of community waste water
- High rate biomethanation of dairy waste water
- Hydrothermal carbonization (HTC) of biomass and municipal biosolids for fertilizer and biocoal potential
- Development of reactor for biochar production for use in purification of gaseous biofuels by absorption

Deliverable

- Technology for biogas from community wastewater and utilization of biogas in kitchen
- Technology for energy production from dairy wastewater
- Nutrient and energy recovery system for wastewater streams
- Reduction in carbon and energy foot print in bioconversions

iii. Biorefinery for co-production of fuels and chemicals for bio-based economy

Approach

- Feasibility of using waste water for enhancing microalgal biomass productivity
- Bioabatement of fermentation inhibitors in lignocellulosic hydrolysates
- Biomass to biocrude conversion using HTL
- Biopolymer based proton exchange membrane fuel cell

Deliverable

- Enhanced microalgal biomass production systems
- Enhanced biocrude production from high moisture biomass

iv. Harness solar energy and hybrid energy options through biomass and co-products

Approach

- Energy optimization for drying biomass and other products through solar thermal energy mode and biomass energy mode
- Generation of high pressure steam for agro-processing using parabolic line solar concentrator

Deliverable

- Enhanced efficiency of SPV module and SPV operated systems
- High pressure steam generation

III. FOOD PROCESS ENGINEERING

1. Technology for Adoption:

(i). Turmeric value chain machinery



Turmeric washer

Capacity – 300 kg/h
 Cost of machine – Rs. 1.80 Lakhs
 Cost of operation – Re. 0.79/ kg



Turmeric boiler

Capacity – 300 kg / h
 Cost of machine – Rs. 1.50 Lakhs
 Cost of operation – Re. 0.91/kg



Turmeric polisher

Capacity 900 kg per batch
 Cost of machine – Rs. 3.15 Lakhs
 Cost of operation – Re. 0.70/ kg



Turmeric drier

Capacity – 300 kg/batch
 Drying time – 36 h
 Cost of machine – Rs. 4.00 Lakhs
 Cost of operation – Rs. 14/ kg

2. Remarks on the ongoing projects:

Sl. No.	Number and Title of the Projects	Duration	Name of the PI & Co-PI	Remarks
AICRP on Postharvest Engineering and Technology				
1.	AICRP/PH/CO/2015/1 Development of efficient supply chain for <i>aggregatum</i> onion	4 years April 2015 – March 2019	Dr. S. Ganapathy Professor & Head (FPE)	<ul style="list-style-type: none"> Quality of stored onion need to be compared against the natural ventilation structures installed by the Agricultural Engineering Department of Government of TN

2.	AICRP/PH/CO/2015/2 Development of integrated dhal milling system for black gram and green gram	4 years April 2015 – March 2019	Dr. P. Rajkumar Professor (FPE)	<ul style="list-style-type: none"> • Feed rate for black gram and green gram need to be calculated. • Power requirement of the unit has to be optimized.
3.	AICRP/PH/CO/2015/3 Value chain on turmeric processing	4 years April 2015 – March 2019	Dr. S. Ganapathy Professor & Head (FPE)	<ul style="list-style-type: none"> • The scientist may visit Spice Processing Unit at Thekkady for further refinement
a.	Development of a washer for turmeric rhizomes		Dr. I.P. Sudagar, Assistant Professor (FPE)	<ul style="list-style-type: none"> • Labour and cost saving of the washer have to be included.
b.	Development of boiling unit for turmeric rhizomes		Dr. P. Rajkumar Professor (FPE)	<ul style="list-style-type: none"> • Efficiency of developed unit has to be compared with CFTRI method and other turmeric boiling methods • Cost economics of the process has to be included.
c.	Development of mechanical dryer for turmeric rhizomes		Dr. S. Ganapathy Professor & Head (FPE)	<ul style="list-style-type: none"> • Cost economics of the process has to be included.
d.	Development of dust proof turmeric polisher		R. Arulmari Assistant Professor (FPE)	<ul style="list-style-type: none"> • Recommended for on farm trials
4.	AICRP/PH/CO/2016/1 CA storage of selected pulses	4 years April 2016 – March 2020	Dr. P. Rajkumar Professor (FPE)	<ul style="list-style-type: none"> • Possibility of GI sheet for making bin for pulses may be considered. • Entomology data has to be included • Instead of CO₂ cylinders CO₂ generators has to be used. • Cost economics of the process has to be included.
5.	AICRP/PH/CO/2017/1 Design and development of turmeric processor using super-heated steam for simultaneous boiling, drying, and polishing	3 years April 2017 – March 2020	Dr. P. Rajkumar Professor (FPE)	<ul style="list-style-type: none"> • Prototype of super heated steam dryer was developed • Work may be completed within the project period.

6.	AICRP/PH/CO/2017/2 Development of a portable non-destructive device to grade banana based on dielectric properties	3 years April 2017 – March 2020	Dr. I.P. Sudagar, Assistant Professor (FPE)	<ul style="list-style-type: none"> Maturity stage of the bananas used for the study and end users for the developed unit had to be considered.
7.	AICRP/PH/CO/2017/3 Design of on Farm Ventilation Storage System for Potato	3 years April 2017 – March 2020	R. Arulmari Assistant Professor (FPE)	<ul style="list-style-type: none"> Comparison of shelf life of onfarm ventilated stored potatos with shelf life of mandi stored potatos has to carried out. Performance of the developed unit has to be evaluated for summer season Cost economics of the process has to be included.
8.	AICRP/PH/CO/2017/4 Pulsed Electric field Processing of Fruit Juices	3 years April 2017 – March 2020	Dr. S. Ganapathy Professor & Head (FPE)	<ul style="list-style-type: none"> High voltage PEF treatment chamber was developed. Study may be carried out as per objective.
9.	AICRP/PH/CO/2017/5 Development of electrostatic spray coating machine for edible coating of fruits using the natural plant extracts	3 years April 2017 – March 2020	D. Amirtham Assistant Professor (Bio chemistry)	<ul style="list-style-type: none"> Edible film formulation was optimized Fabrication of electrostatic spray coating machine was completed. Storage studies of edible film coated fruits may be expedited.
10.	AICRP/PH/CO/2018/1 Identification and standardization of microbial management techniques to reduce post harvest losses in Carrot	2 years April 2018 – March 2020	Dr. P. Raja Assistant Professor (Microbiology)	<ul style="list-style-type: none"> Post harvest losses in carrot may be Included.
University Research Project – Dept. of Food Process Engineering, AEC&RI, Coimbatore				
1.	AECRI/CBE/APE/2016/001 Design of a dryer for high moisture paddy.	4 years April 2016 – March 2019	Dr. S. Ganapathy Professor & Head (FPE)	<ul style="list-style-type: none"> The efficiency of the developed dryer may be compared with mobile type paddy dryer developed by OUAT,

				<p>Bhubaneswar AICRP- PHET centre.</p> <ul style="list-style-type: none"> • QUAT mobile drier may be purchased for adopted in CDZ.
2.	AECRI/CBE/APE/2016/002 Evolving grading standards and design of graders for dehusked coconut	4 years April 2016 – March 2019	Dr. P. Rajkumar Professor (FPE)	<ul style="list-style-type: none"> • Cost economics of the process and efficiency of grader may be arrived.
3.	AECRI/CBE/FPE/VEG/2018 /CB088 RF drying of carrot	2 years April 2016 – March 2020	Dr. P. Rajkumar Professor(FPE)	<ul style="list-style-type: none"> • The benefits of RF drying may be included in terms of retention of colour, nutrition, texture and structure.

University Research Project – ADAC&RI, TNAU, Thiruchirappalli.

1.	AEC&RI/TRY/APE/2018/CP 153 Controlled atmosphere storage of paddy using Acetylene as alternate gas.	2 Years Jan 2019 to Mar 2021	Dr. R.Visvanathan, Professor (FPE) Dr. P. Yasodha, Asst. Professor (Agrl. Entomology)	<ul style="list-style-type: none"> • Started during Feb. 2019 and studies may be expedited
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AEC&RI, Kumulur -FPE projects

1	ICAR/ AEC/KUM/APC/2017/D005 Establishing APC on Millets, Pulses, Fruits and Vegetables	3 Years (Dec 2017 – Nov 2020)	Dr. P. Rajkumar Professor (FPE) Dr. S. Parveen Asst. Professor (FPE) Dr. A.Sakunthalai Asst. Professor (CS)	<ul style="list-style-type: none"> • More trainings as per objectives may be done.
2	AECRI/KUM/FPE/2018/CPO 33 Design and development of a continuous type tamarind processing machinery	2 Years Aug 2018 – Sep 2020	Dr. P. Rajkumar Professor (FPE) Dr. T. Pandiarajan Professor (FPE) Dr. S. Parveen Asst. Professor (FPE)	<ul style="list-style-type: none"> • Data on tamarind dryer testing may be provided and expedite the work

3. General Remarks:

- Chain of machinery developed for turmeric processing may be built-in as a single unit. (Action: P&H, FPE).
- Discussion may be carried out on overlapping of science on Food processing and Post

harvesting and proposal may be submitted for amalgamation as per guidelines followed by ICAR or other SAUs. (Action: P&H, FPE & CPHT)

- Project proposal may be submitted for Coconut Board on preservation of coconut water and biochar production from coconut shell. (Action : P&H, CPHT & REE)
- Problem encountered in the Mango grader available at Periakulam may be rectified. (Action: P&H, FPE & CPHT)
- Multi location trials on Onion Storage structure may be carried out. (Action : P&H, FPE)
- The performances of OUAT mobile drier and TNAU Bin Paddy driers may be assessed at Kumulur or Aduthurai. TNAU Bin Paddy drier may be scaled up (Action : P&H, FPE)
- The technology of production of Millet based beverage and sapota jam may be adopted and commercialized through ABD. Alternate pectin source may be identified for the preparation of sapota jam (Action : P&H, CPHT)

4. Action Plan (2019-20):

(i). Developing a non-thermal ultrasonic process technology for enhancing the shelf life of coconut milk

Activities	1	2	3	Scientists involved
1. To optimize the process parameters of ultrasonic treatment for extending the shelf life of coconut milk.				Dr.D.Amirtham Dr.K.Thangavel
2. To assess the effect of ultrasonic treatment on the shelf life of coconut milk by conducting storage trials using different packaging materials.				
3. To work out the cost economics of the ultrasonic process				

(ii). Sensor based size and colour grading of fruits and vegetables

Activities	1	2	Scientists involved
1. Study the engineering and physiological properties of selected fruits and vegetables			Dr.P.Rajkumar Dr.J.Deepa
2. Development of colour sensor for sorting fruits and vegetables			
3. Performance evaluation of the developed colour sorter.			

(iii). Development of detection technique and cold plasma processing method to detoxify aflatoxin in chillies

Activities	1	2	Scientists involved
1.To determine the aflatoxin content in red chili by HPLC analytical method.			Dr.S.Ganapathy Dr. Parameswara kumar Mallikarjunan (USA)
2.To assess the efficiency of Fourier transform near infrared spectroscopy to detect aflatoxin contamination in red chili.			
3.To develop a cold plasma technique for detoxification of aflatoxin in infected chillies.			

(iv). Standardization of microbial management techniques for reducing postharvest losses in carrot

Activities	1	2	Scientists involved
1. Identification of postharvest spoilage causing microbes in carrot			Dr. P. Raja Dr.S.Ganapathy
2. Identification of microbial management techniques to control postharvest losses and to improve postharvest shelf life in carrot			
3. Evaluation and Standardization of microbial management techniques to control postharvest spoilage in carrot			

(v). Development of complete processing line for *Moringa oleifera* leaves

Activities	1	2	3	Scientists involved
1. Study the engineering properties of moringa leaves of different varieties				Dr.R.Arulmari Dr.I.Geethalakshmi
2. Processing machinery for of fresh and dried moringa leaves				
3. Development of suitable packaging system for extending the shelf life.				

(vi). Ultrasound enzyme assisted extraction of turmeric leaf essential oil

Activities	1	2	Scientists involved
1. To optimize the process parameters of ultrasound assisted enzymatic aqueous extraction of essential oil from turmeric leaves.			Dr.D.Amirtham Dr.R.Arulmari
2. Development of pilot plant for oil extraction and to workout the cost economics.			

(vii). Characterization of bio- fiber reinforced epoxy bio- composites product for rigid packaging

Activities	1	2	3	Scientists involved
1. To develop bio-fiber with reinforced epoxy bio composite fiber product				Dr.I.P.Sudagar Dr.R.Arulmari
2.To characterize the bio composite product in terms of physical, mechanical and thermal properties .				

Dept. of Process and Food Engg., AEC&RI, Kumulur

(viii). Radio Frequency drying of vegetables

Activities	1	2	Scientists involved
1. Study the drying characteristics of vegetables in conventional tray dryer			Dr. T. Pandiarajan
2. Study the drying characteristics of vegetables in Radio frequency (RF) drier			
3. Evaluate the physiochemical changes taking place during different drying process			

2018 – 2019

- Drying characteristics of carrot slices at different thicknesses at 70°C in a tray dryer were studied and optimized.

2019-2020

- The drying characteristics of carrot and moringa have to be studied in Radio frequency (RF) drier
- Comparison of physiochemical changes taking place during different drying process are to be carried out.

IV. CENTRE FOR POST HARVEST TECHNOLOGY CENTRE

1. Technology for Adoption:

BANANA CABLE CONVEYOR

Components

- Prime mover, GI Pipe arch, Roller assembly, Ratchet lever hoist, C-Clamp, Steel rope, Support frame
- Specifications
 - (i) Length of the conveyor : 180 m
 - (ii) Width of the conveyor : 1 m
 - (iii) Height of the Conveyor : 3 m
 - (iv) Capacity, t/h : 2
 - (v) Speed, km/h : 5
 - (vi) Power required, hp : 4
- Cost of the operation : Rs. 50/- per batch
- Savings in time : 200 %
- Saving in labour : 250 %
- Coverage : 1 ha/day
- Cost : Rs. 4 lakhs



2. Remarks on the ongoing projects:

Sl. No	Number and Title of the Projects	Duration	Name of the PI & Co-PI	Remarks
AICRP on Postharvest Engineering and Technology				
1.	FOR/CBE/PHT/2017/R 005 Development of Cable Conveying System for Efficient Handling of Banana	01.09.2017 to 31.08.2019	Dr. N. Varadharaju, Former Dean (Agrl. Engg.). Dr.M. Balakrishnan, Assoc.Professor (FPE). Dr.Z.John Kennedy, Prof. (Agrl. Microbiology). Dr. D.Manohar Jesudas, Prof. & Head, AMRC. Dr. K. Soorianathasundaram, Controller of Examinations.	Design aspects of cable conveying operating system may be given in detail.
2.	AECRI/CBE/ PHT/ 2018 / CPO23 - Processing of fruit powder from muskmelon and its stability during storage.	01.01.2018 to 31.12.2020	Dr. P.Vennila,Professor (FSN) Dr. Z. John Kennedy, Prof. (Agrl.Micro.) and Dr.M.Balakrishnan, Assoc. Prof. (FAPE)	Optimized process for spray drying may be arrived.
3.	AECRI/CBE/PHT/FPE/2018/CP026 - Development of storage system for dehulled millets	01.10.2017 to 30.09.2019	Dr.M. Balakrishnan, Assoc.Prof.(FPE) Dr. N. Varadharaju, Former Dean (Agrl. Engg.)	Storage bin capacity and relevant details may be given in detail.
4.	AECRI/CBE/PHT/FPE/2018/CP090 - Design and Development of Pulsed Light (UV- C) Continuous Treatment System for Liquid Foods	01.11.2018 to 31.10.2020	Dr.M. Balakrishnan, Assoc.Prof.(FPE) Dr. Z.John Kennedy, Professor (Microbiology)	Design of continuous system may be developed.
5.	AEC&RI/CBE/PHT/FSN/2018/CP025 - Development of value added products from sapota	2018-2020	Dr. G. Gurumeenakshi, Associate. Professor (FSN). Dr.N.Varadharaju Former Dean (Agrl. Engg.)	Sapota jam standardized and other products may be standarised.
6.	AEC&RI/CBE/PHT/FSN/2018/CP024 - Extraction of Nutraceuticals from grape wastes for utilization as bio food additives.	August 2018- to July 2020	Dr. G. Gurumeenakshi, Associate. Professor (FSN). Dr.N.Varadharaju Former Dean (Agrl. Engg.)	Work may be expedited.
7.	AEC&RI/CBE/PHT/FSN/2017/002 - Development of Millet based	Sep 2017 - Aug 2019	Dr. S. Kanchana, Professor (FSN) Dr. P. Geetha, Assoc.	Millet milk may be standardized

	Beverage		Professor (FSN) From 22.05.2018 onwards	with cost economics.
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3. General Remarks:

- Banana cable conveyor technology may be adopted for local varieties of banana viz, Rastali, Nenthran. (Action: P&H, CPHT)

4. Action Plan (2019-20):

Value added products from coconut

P. No.	Title	Years		Scientists Involved
1.	Preservation of Neera and Tender coconut water.	2019	2020	Dr. Z. John Kennedy Dr. K. Thangavel Dr. P. Vennila
2.	Lauric acid rich fruit smoothie	2019	2021	Dr. P. Geetha Dr. K. Thangavel
3.	Pullulan from matured coconut water and incorporation in bakery products	2019	2021	Dr. P. Geetha Dr. K. Thangavel Dr. M. Balakrishnan Dr. P. Vennila
4.	Development of Hybrid system for milling of pulse in fractionates products and development and commercialization of pulse based high value functional foods	2018	2020	Dr. K. Thangavel Dr. Z. John Kennedy Dr. M. Balakrishnan Dr. G.Gurumeenakshi

V. SOIL AND WATER CONSERVATION ENGINEERING

1. Technology for Adoption:

(i). Crop Coefficients for drip irrigation Scheduling

$$ET_c = K_c \times ET_o$$

ET_c=Crop Evapotranspiration

K_c = Crop Coefficient (by field trial)

ET_o= Reference Crop Evapotranspiration

Crop Co-efficient of Brinjal

<i>Crop stages</i>	<i>Crop co-efficient (Kc) (Open field)</i>
<i>Initial (30 days)</i>	0.57
<i>Developmental (40 days)</i>	0.83
<i>Middle stage (40 days)</i>	1.03
<i>End stage (20 days)</i>	0.84

Crop Co-efficient of Chilli

<i>Crop stages</i>	<i>Crop co-efficient (Kc)</i>	
	<i>Poly house</i>	<i>Open field</i>
<i>Initial (30 days)</i>	0.48	0.52
<i>Developmental (40 days)</i>	0.74	0.80
<i>Middle stage (90 days)</i>	1.01	1.05
<i>End stage (25 days)</i>	0.70	0.78

2. Remarks on the ongoing projects:

AEC&RI, Coimbatore (SWCE)

Sl. No.	Number and Title of the Projects	Duration	Name of the PI & Co-PI	Remarks
1.	ICAR/AEC/CBE/SWC/2018/R001 "Development and Testing of Low-cost filters" in the Network project on "Engineering Interventions in Micro Irrigation Systems (MIS) for improving water productivity" under CRP on Farm Mechanization and Precision Farming	07.08.2018 to 31.03.2020	Dr. Balaji Kannan, Associate Professor	<ul style="list-style-type: none"> Trails may be carried out with the developed filters for its performance.

Water Technology Centre –SWCE projects

Sl. No	Number and Title of the Projects	Duration	Name of the PI & Co-PI	Remarks
1.	AECRI/CBE/SWC/2016/001 Hydrological evaluation of watershed by Morphometric Analysis	November 2016 - October 2019	Dr. G. Thiyagarajani, Asst. Prof. (SWCE) Dr. A. Raviraj, Prof. (SWCE) Dr. Balaji Kannan, Assoc.Prof. (SWCE)	<ul style="list-style-type: none"> Sampling procedure may be verified with sight inspection. Detailed micro area image may be included.
2.	AICRP/WTC/CBE/IWM/001/C2 Conjunctive use of surface and groundwater in the Lower Bhavani Project	April 2014- March 2019	Dr. A. Raviraj, Professor(SWE)-60% Dr. G.Thiyagarajan, Asst. Prof(SWE)-40%	<ul style="list-style-type: none"> Studies may be carried out for other distributary of LBP based on priority.
3.	ICAR/WTC/CBE/AEC/2015/R008 National Initiative on Climate	Oct 2014 - Mar 2019	Dr. A. Raviraj, Professor (SWCE) Dr. G. Thiyagarajan,	<ul style="list-style-type: none"> Variable in Water Quality

	Resilient Agriculture		Assistant Professor (SWCE)	Index may be analysed scientifically. Completion report may be prepared.
4.	AICRP/WTC/CBE/IWM-001 Optimization of depth of placement of lateral using HYDRUS for different soil types	Sep 2016 to August 2019	Dr.A.Valliammai, AP(SWCE)	<ul style="list-style-type: none"> Sensors may be incorporate in measuring the wetting pattern.
5.	AICRP/WTC/CBE/IWM-001 Application of Soil and Water Assessment Tool (SWAT) model for estimation of surface water resources and temporal water demand for sustainable water management in a selected watershed of Bhavani river basin	Sep 2018 - Aug 2020	Dr.A.Valliammai, AP(SWCE)	<ul style="list-style-type: none"> Confirmatory studies may be conducted.

AEC&RI, Kumulur – SWCE projects

Sl. No.	Number and Title of the Projects	Duration	Name of the PI & Co-PI	Remarks
1.	583/AECRI/KUM/ SWC/2018/001 Estimation of crop coefficient and Water requirement of Chilli and Cucumber under polyhouse and open field condition	April 2018 to October 2020	1.Dr. K. Arunadevi, Assistant professor (SWCE) Dept. of soil and water cons. Engg. AEC &RI, Kumulur 2. Dr. A.D. Ashok, Ap (Hort.) Instd. of Agriculture, Kumulur	<ul style="list-style-type: none"> Validation of crop coefficient value for chilli may be carried out.
2	NICRA scheme on "Temperature Gradient Modelling in a Greenhouse equipped with Evaporative Cooling Pad System in a Semi-arid Region"	September 2018 to March 2020	Dr. R. Lalitha Professor and Head, Department of Soil and Water Conservation Engineering, AEC & RI, Tamil Nadu Agricultural University, Kumulur, Trichy – 621 712. Dr. S. Vallal Kannan, Assistant Professor (Agronomy), Department of	<ul style="list-style-type: none"> Green house design at different elevation may be standardized. Meetings may be arranged in collaboration with Horticultural scientists for standardizing the green house design.

			Irrigation and Drainage Engineering, AEC & RI, Tamil Nadu Agricultural University, Kumulur, Trichy – 621 712	
3.	AECRI/KUM/SWC/2018/CP03 4 Estimation of crop coefficient and Water requirement of Capsicum under poly house and open field condition	December 2018 to March 2021	1. Dr. K. Arunadevi, Assistant professor (SWCE), Dept. of soil and water cons. Engg., AEC & RI, Kumulur 2. Dr. A.D. Ashok, Ap (Hort.), Instt. Of Agriculture, Kumulur	<ul style="list-style-type: none"> • Works may be expedited as per the project objectives
	AECRI/KUM/SWC/2018/CP03 6 Crop water requirement for drip irrigated crops	2018 – 2019	Dr. M. Manikandan Asst Professor (SWCE) Dr. V. Ravikumar Professor (SWC) and Head	<ul style="list-style-type: none"> • Methodology to be standardized • Guidelines may be incorporated in drip irrigated crops according to TNAU crop production guide
	AECRI/KUM/SWC/2018/CP15 5 Evaluation of water conservation and management techniques for field crops	3 years (2018-2021)	Dr. V. Ravikumar, Prof.(SWC) and Head, Dept. of Irrigation & Drainage Engg., TNAU, Kumulur Co-Project Leader Dr. S. Vallal Kannan, Asst. Prof. (Agronomy), Dept. of Irrigation & Drainage Engg., TNAU, Kumulur	<ul style="list-style-type: none"> • Studies may be expedited

ARS, Kovilpatti – SWCE projects

1.	AICRP/DCM/KPT/AGR/004 Catchment - storage - command area relationship for enhancing water productivity in a micro - watershed	2006 - 2019	Dr. N. Anandaraj, Associate Professor (SWC), Agricultural Research Station, Kovilpatti.	<ul style="list-style-type: none"> • Studies may be carried out as the project objectives.
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3. General Remarks:

- Research programmes may be reoriented towards groundwater recharging, efficient utilization of water, water conservation etc., (Action : Director, WTC, P&H, SWCE, Kumulur)
- Interventions like vegetative or microbiological methods may be identified for recharging and quality improvement of ground water. (Action : Director, WTC, Coimbatore)
- Multi location trials for estimation of crop coefficient and water requirement of capsicum may be conducted at Krishnagiri or Paiyur or Hosur in collaboration with Horticultural Scientists or State Dept. (Action : P&H, SWCE, Kumulur)
- Technology for removal of clogging of underground drip laterals laid for perennial crops like coconut, banana may be developed. (Action : Director, WTC)
- Collaborative research work may be carried out with Scientists of Crop Physiology and Agronomy and advanced irrigation methodology like Xylem irrigation may be introduced. (Action : Director, WTC)
- Workload of the Engineering scientist in the AICRP on IWM at ARS, Bhavanisagar may be assessed (Action : Director of Research and Director, WTC)

4. Action Plan (2019-20):

(i). Effect of Dry land Technologies on water use and yield of millet crops

Objectives	Y1	Y2	Scientists involved
To efficiently harvest and utilize rainfall by adopting in-situ methods			Dr. R. Arunadevi, Asst. Prof, Dr. M. Nagarajan, Asst. Prof. Dr. R. Lalitha Professor and Head Dept. of SWCE
To evaluate the suitability of different dry land technologies for millet crop			
To study the biological characteristics and economics in production of millet crop			

Deliverables

Best suitable dry land technology for millet production will be identified and recommended for the farmers.

(ii). Nutrient loading in ground water

Objectives	Y1	Y2	Scientists involved
1. To study groundwater fluctuation with respect to changes in hydrological parameters			Dr. A. Bharani, Assoc. Prof. (ENS), Dr. R. Nagarajan Assistant Professor Dept. of SWCE
2. To study nutrient available in the groundwater			

Deliverables

Nutrient movement into the groundwater will be reported.
Irrigation and Drainage Engineering, AEC & RI, Kumulur.

(iii). Effect of evapotranspiration on sugar content in sugarcane crop

Objectives	Y1	Y2	Scientists involved
1. To study the crop evapotranspiration using soil water balance method			Dr. S. Vallal Kannan, Asst. Prof. (Agronomy) Dr. V. Ravikumar, Prof. and Head, IDE
2. To study the crop behavior and sugar content with respect to crop evapotranspiration			
3. To study the biological characteristics and economics in production of sugarcane crop			

Deliverables

The sugar content variation with respect to evapotranspiration will be presented.

(iv). Evaluation of Water Conservation and Management Techniques for field Crops

Objectives	Y1	Y2	Scientists involved
1. Logging of soil moisture using time domain reflectometry sensors for sugarcane crop grown under SSI Method and drip fertigation.			Dr.V.Ravikumar Professor (IDE) Dr. S.Vallalkannan Assistant Professor (Agronomy)
2. Evapotranspiration estimation using meteorological data and soil moisture depletion method			
3. Economic analysis of drip fertigation to Sugarcane compared to Conventional method of Irrigation			

Deliverables

Estimated Crop Coefficient values for drip irrigated sugarcane crop will be useful in Irrigation scheduling.

(v). Subsurface drainage for waterlogged and salt affected lands in farmers field

Objectives	Y1	Y2	Scientist involved
1. To install subsurface drainage system for waterlogged and salt affected lands in farmers field.			Dr. M. Manikandan Asst. Prof. (SWC)
2. To evaluate the functional performance of the system by water table fluctuation and drain water collection, drain water quality analysis			
3. To analysis technical feasibility and economic viability in farmers field			

Deliverables

Real time experience due to implementation of drainage project in farmers field.

V. PHYSICAL SCIENCES AND INFORMATION TECHNOLOGY:

1. Remarks on the ongoing projects:

Sl. No	Number and Title of the Projects	Duration	Name of the PI & Co-PI	Remarks
1.	AECRI/CBE/CSC/2017/001 Analytical and Advisory Software for Environmental Samples	June 2017 to May 2019	Dr.V.Anandhi, Asst. Prof(CS) & TPO to VC Dr.M.Maheswari, Professor (ENS) Dr.K.Boomiraj, Assistant professor (ENS)	Include more number of scientists for validation
2	AECRI/CBE/PSC/2018/001 Design and Development of Android Application for Pest Management using Image Enhancement techniques to Cotton Farmers for Decision Making.	August 2018 - February 2020	Dr. M. Kalpana Assistant Professor(Computer Science) Dr. K. Senguttuvan Assistant Professor (Entomology) Dr. P. Latha Assistant Professor (Pathology)	Field image verification may be assessed with entomology and pathology scientists
3	AEC&RI / MTP / STA / 2017 / 001 - Construction of Growth and Yield Prediction Models for <i>Neolamarckia cadamba</i> in Western Zone of Tamil Nadu	Aug 2017- July 2020	Dr. M. VIJAYABHAMA, Assistant Professor (Statistics)	Methodology for sample selection in different places may be reported
4	AECRI/MTP/2016/001 & Prediction and validation of growth and development of <i>Melia dubia</i> using nonlinear multilevel mixed effects model	2017- Dec 2018	Dr. R. Ravi Kumar, Assistant Professor (Mathematics)	Results may be validated for different locations.
5	AECRI/PKM/MAT/2017/001 Mathematical analysis of induced resistance to control plant diseases using optimal strategies	August 2017 to July 2018	Dr. A. Eswari Assistant Professor (Mathematics) Dr. Sheela, Professor (Pathology), AC&RI, Killikulam	Validate the field level data and compare the created model
6	AECRI/CBE/CSC/2018/CP022 - Developing and Creating Ontology Consortia for Multistakeholders	August 2018 to May 2020	Dr.V.Anandhi, Asst. Prof (CS) & TPO to VC Dr.C.S.Sumathi, Asst. Prof (CS) Dr.S.K.Natarajan, Assistant Professor (Agronomy) Dr.J.Venkitapirabu, Director, Planning and Monitoring	<ul style="list-style-type: none"> To include more number of words. To include more number of scientists for validation

7	AECRI/MTP/MAT/2018/CP169 Developing Yield Predication Model for Farm Grown Teak	January 2019 to December 2019	Dr. R. Ravi Kumar Assistant Professor (Mathematics) Dept. of Basic and Social Science, FC&RI, Mettupalayam	<ul style="list-style-type: none"> The developed model may be test verified for teak tree grown in different locations.
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2. General Remarks:

- Discussion may be held with ACRC before the formulation of new projects to assess the weather data.(Action : P&H, PS&IT)
- Project on modeling may be developed for rational use of inputs like fertilizers. (Action : P&H, PS&IT)

3. Action Plan (2019-20)

(i). Investigation of characteristics of weather parameters of Tamil Nadu

Objectives	Time schedule			Scientist in-charge
	I	II	III	
<ul style="list-style-type: none"> To Study the trends analysis To assess the homogeneity of weather parameters 				Dr. Patil Santosh Asst.Prof.(Agril.Stat.) Dr. M. Radha. Asst.Prof.(Agril.Stat.)
<ul style="list-style-type: none"> To assess the detection and testing of changes occurred 				
<ul style="list-style-type: none"> To forecast using ANN and WNN 				

Deliverables:

Classification of stations and forecasting with respect to changes occurred.

(ii). Planning for optimization agricultural production for major crops in Tamil Nadu – A mathematical programming approach.

Objectives	Time schedule			Scientist in-charge
	I	II	III	
To study and workout the resource use efficiency of major crops				Dr.M.R.Duraiswamy Prof. & Head (PSIT) Dr. M. Radha. Asst.Prof.(Agril.Stat.)
To develop optimum plans for the major crops				

Deliverables:

To explore efficiency of agricultural production and develop optimum plans for maximizing the production and profit.

VII. Closing remarks / Way forward

Vice Chancellor

- The laser controller leveller available in working condition at AMRC, Coimbatore may be spared to ARS, Bhavanisagar based on the requirement.
- A team of scientists may visit all the Research stations to verify the equipments in working condition which could be transferred to the needy places (Dean (Agrl.Engg.) & Director of Research, TNAU, Coimbatore)
- Silica for PV cell production is a good finding which needs collaboration with industry for further developments.
- Discuss the overlapping of the research work of CPHT and Agrl. Processing and come out with proposal on merging as per ICAR norms (Dean, AEC&RI, Coimbatore)
- Stalk remover mechanism may be incorporated in onion harvester and go for demonstration in the farmers' fields.
- Nitrogen uptake study at AEC&RI, Kumulur has to be presented in rice scientist meet to be held during the year, 2020.
- SWCE research programme interventions may focus on ground water recharge in drought area (Dean, AEC&RI, Kumulur)
- The vine cutting tool developed at AMRC, Coimbatore may be spread to GRS, Theni for effective usage.
- The outcome from the department of Bioenergy/Renewable Energy need to be commercialised.
- The natural pectin of jack can be thought of for use in the preparation of millet based beverage rather than synthetic pectin (P&H, PHTC, Cbe)
- The ADH, Krishnagiri and the horticulture scientist at RRS, Paiyur may be integrated for taking up the crop co-efficient study in horticultural crops (Professor and Head, Dept. of SWCE, AEC&RI, Kumulur)
- Solution to be found out to protect clogging during fertigation and inclusion of pesticides in laterals laid under soil depth in consultation with Director (CPPS) and Director (Crop Management) for refining the methodology.

- The SWCE experiments at ARS, Bhavanisagar need to be reviewed critically by Director of Research and Director, WTC.
- Take all the tools developed at AMRC to all the needy research stations and have a demo for farmers
- Proto types of small gadgets in need may be obtained from other countries
- The value added products developed from millets need to be taken for commercial scale through ABD
- Project on Artificial Intelligence and product development may be proposed for external funding.

Director of Research

Way forward

- Complete mechanization for rice, sugarcane and banana should be attempted
- Energy conserving technologies (Solar and Wind) may be demonstrated
- Food processing machines to reduce the drudgery and loss of food grain qualities
- Post-harvest technologies to minimize losses in fruits and vegetables using economically feasible methods
- Research on Artificial Intelligence, Robotics and Automation in agriculture may be anchored

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