

# **TAMILNADU AGRICULTURAL UNIVERSITY**

## **42<sup>nd</sup> RESEARCH COUNCIL MEETING**

### **Agenda No.1**

#### **Confirmation of the proceedings of the 41<sup>st</sup> Research Council meeting**

The proceedings of the **41<sup>st</sup> Research Council** meeting held on **April 4, 2008** were communicated to all the members. There was no exception to the minutes from the members and therefore it is requested that the Research Council may be pleased to confirm the proceedings of the 41<sup>st</sup> meeting.

## Agenda No.2

### ACTION TAKEN ON THE RECOMMENDATIONS OF 41<sup>ST</sup> RESEARCH COUNCIL MEETING (APRIL, 2008)

1. **Since germplasm play a vital role in the breeding programme, special thrust should be given to strengthen germplasm in all the crops (Action: Director, CPBG)**
  - More than 30,000 germplasm accessions in agriculture, horticulture and forestry crops are available for maintenance and utilization. The cold storage is being now strengthened for long term storage and maintenance of more than one lakh accessions. The germplasm of all crops are being evaluated and characters are computerized and documented. New accessions are also explored and collected.
2. **Various cost effective, ecofriendly composting techniques may be developed (Action: Director, SCMS)**
  - Vermicomposting of municipal solid wastes, composting techniques of crop residues, sugarcane trash, paper mill sludge were developed
  - Substrate specific Effective Mycorrhiza (EM) cultures were also developed for rapid composting of various solid wastes including municipal solid wastes
  - Trainings on vermicomposting and other composting techniques (sugarcane trash, cotton stock, sorghum straw, wheats, coir dust etc.) are being given regularly to farmers, SHGs and NGOs of nine districts viz., Salem, Coimbatore, Dharmapuri, Krishnagiri, Namakkal, Perambalur, Dindigul, Ramnad and Villupuram
  - The following two books (Tamil and English) on composting techniques were published and the techniques are being popularized.
    - Composting techniques and organic waste utilization in agriculture (English)
    - Compost Ura Tholizh Nutpam (Tamil)
3. **Drip fertigation may be worked out for multiple cropping for effective supply of nutrients and water to suit to physiological requirement of base and intercrop and also to sustain soil fertility (Action: Director, SCMS)**
  - **Maize: At Coimbatore**, drip irrigation recorded an yield increase of 13.0 per cent with water saving of 36.0 per cent over surface irrigation under sandy clay loam soil. **In Madurai**, yield increase in drip irrigation over surface irrigation was 32.0 per cent with water saving of 17.0 per cent. **At Bhavanisagar**, the yield increase was 52.0 per cent with water saving of 15.5 per cent in sandy soil. In general there is a yield advantage of 13.0 - 51.8 per cent with water saving of 10.7 - 36.0 per cent depending upon the soil type.

- **Sunflower:** Sunflower hybrid TCSH 1 under drip fertigation recorded highest yield (2.8 t ha<sup>-1</sup>) with oil content of 40.50 per cent, better growth, income benefits, shorter payback period, substantial quantity of water saving (40.40 per cent) and higher water use efficiency.

**4. Research efforts may be strengthened in pulses and oilseeds to augment productivity (Action: Directors, SCMS; CPBG & CPPS)**

- New crop varieties developed are introduced to farmers through demonstrations and field trials organized through IAMWARM and NADP schemes. In Oilseeds new varieties are developed and introduced through ICRISAT- TNAU collaborative Projects. Seed multiplication and popularization are being done simultaneously for new varieties through farmers' participatory approach.
- A new groundnut semi spreading variety VRI (Gn) 7 with an yield advantage of 19.0 per cent over TMV 1 and 14.7 per cent over TMV 10 was released for the rainfed tracts of Namakkal, Salem, Erode, Dhamapuri and Perambalur districts. **(CPBG)**
- A research scheme on "Management of pod borer complex and bruchid using biotechnological tools" has been proposed for funding by Dept. of Science & Technology, New Delhi and is in the process of acceptance. **(CPPS)**

***Pulses***

- Screening of efficient genotypes of pigeon pea for phosphorus utilization.
- Evaluation of efficient genotypes of green gram for inter cropping with maize.
- Studies on post emergence herbicide in combination with mechanical weeding in irrigated and rice fallow green gram, Black gram and Red gram crops

***Moisture stress management***

- Study on supplemental irrigation through mobile sprinkler in rain fed and rice fallow Green gram and Black gram is in field level testing.

***Altering crop geometry to suit mechanization***

- Experiments are in progress with a spacing of 60x10 cm and 60x5 cm against the normal spacing of 30x10 cm to suit mechanization.

***Oil seeds***

- Research on organic farming, fertility management and cropping systems are initiated in sunflower, groundnut and gingelly.
- A technical bulletin on best management practices for different crops has been published by the Directorate of **SCMS**. In that the most important good agricultural practices / best practices for pulses and oilseeds both under irrigated and rainfed conditions were documented.

**5. Basic studies on involvement of resistant genes for pest & diseases may be strengthened (Action: Director, CPPS)**

Regular resistance breeding program is in progress on various crops against major pests and diseases. To cite a few: yellow stem borer and blast resistance in rice, bollworm resistance in cotton and pod borer resistance in pulses. **(CPPS)**

***CMD resistant transgenic cassava***

- Research work on developing CMD resistant cassava has been initiated in collaboration with Rasi Seeds Limited under DBT supported 'Small Business Innovation Research Initiative' programme. Regeneration protocol standardized for the cassava cultivars as first step in engineering virus resistance. RNAi technology targeting viral replicase gene will be employed to impart resistance.

***PRSV resistant transgenic Papaya***

- This is a new collaborative research programme with M/s. Mansanto India Pvt. Ltd. This aims at engineering resistance to papaya ring spot virus through transgenic technology. Transformation protocol standardized for the Co7 cultivar and RNAi technology targeting viral replicase and/or coat protein gene will be employed to impart resistance

**6. Farmers are using several rounds of sprays for the control of pest and diseases in vegetable crops viz., brinjal, bhendi, tomato etc. Hence research work may be taken up by TNAU to develop varieties which are resistant to major pests and diseases in vegetables. Biotechnological aspects may also be attempted to develop fruit borer resistant brinjal variety (Action: Director, CPPS / Dean, HC&RI, CBE)**

- Brinjal variety resistant to fruit borer is in the advanced stage field trials and it requires only few insecticidal sprays. **(CPPS)**
- Research work had been taken up at the Department of Vegetable crops to develop varieties which are resistant to major pests and diseases.

***Bhendi:***

- CoBh H 1 hybrid Bhendi has been released for the resistance of yellow vein mosaic disease which recorded an average yield of 22 tonns / ha without any pesticides spray. It is now widely adopted in many districts of Tamil Nadu

***Tomato:***

- a) Leaf Curl Virus resistance COTH 2 hybrid tomato is released for its resistance to TLCV with an average yield of 90.2t/ha without any pesticides spray. Further hybridization work is in progress.
- b) Root Knot nematode resistance: A culture COCLNRH 1 is identified for its resistance to root knot nematode and is under multi location trials. Two lines have been identified for resistance to root knot nematode

***Brinjal:***

- CBH2 brinjal variety is in pipeline for release in 2009 for its resistance to shoot and borer. In addition, four cultures have been identified using *Solanum viarum* crosses and two of them (BC<sub>3</sub> F<sub>6</sub> & BC<sub>3</sub> F<sub>9</sub>) is under evaluation.

**7. During production glut the farm gate price as well as the market price decline. To help the farmers from such eventualities the price forecasting and advisory cell relating to allocation of area and after harvest selling decision may be given. Price forecasting has to be made for vegetables and fruits (Action: Director, CARDS)**

- Price forecasting for major vegetables like onion, tomato, bhendi, brinjal are being done. In case of onion, forecasting is done twice a year. For other vegetables it is done once in a year. The forecasts are published through all Tamil and English newspapers, Websites, Journals, KVKs and Market committees etc so as to maximize the reach out. For banana, forecasting is done in every year. With regards to mango, Domestic and Export Market Intelligence Cell (DEMIC) is taking steps to do the price forecasting.
  - Analysis of Farm and Market Risk in selected Agricultural Commodities, Market survey for agricultural products in abroad and promotion of Agricultural Exports in Tamil Nadu and Market Access and Training intervention to improve net profitability of agricultural commodities in Tamil Nadu are the new research projects which represent the market demand, export and global competition.
- 8. Demonstration of production oriented technologies may be made for mango and tapioca by RRS, Paiyur and T&CRS, Yethapur respectively (Action: Dean, HC&RI, CBE)**
- **Mango:** A model on double hedge row system of planting (10 x 5 x 5m) in mango was demonstrated during the Mango Show held at Krishnagiri from 08.06.2008 to 30.06.2008
  - **Tapioca:** Multiplication of virus free tapioca variety MNGA-1 setts were planted in 25 cents for multiplication and distribution to farmers.
  - **Cassava:** The trials on production oriented technologies like split application of fertilizers in cassava and Integrated Nutrient Management in cassava were conducted. The best treatments will be forwarded to FLD and it will be conducted in farmer's field.
- 9. When tamarind is grown as a pure crop as a garden the fruit set is very poor. Hence, suitable variety of tamarind may be developed for this purpose (Action: Dean, HC&RI, CBE)**
- The Horticultural college and Research Institute, Periyakulam has developed high yielding varieties PKM- 1 and Urigam. They are successful in Tamil Nadu and other parts of India. Studies on management practices to overcome the poor fruit set in tamarind is taken up by the Horticultural college and Research Institute, Periyakulam.
- 10. In tapioca, for better tuberization the recommended fertilizers are to be applied strictly within three months of planting. This recommendation should be reiterated for adoption (Action: Dean, HC&RI, CBE)**
- The fertilizer recommendation for irrigated crop (90:90:240 kg NPK/ha) in two split applications, one as basal and top dressing on 90 days after planting and for rainfed crop (50:65:125 kg NPK/ha) full dose as basal during the receipt showers was given in Crop Production Techniques of Horticultural Crops 2004.
  - This recommendation was given to farmers through AIR programmes and farmers meetings.

- The same recommendation was also published in Tamil in Maravalli News Letter and given to farmers for their reference and adoption. The training on, "Production Technology of Tapioca" also given to field staffs (35 nos.) of SPAC Tapioca Products Pvt. Ltd., Poonachi in 2007-2008
- The fertilizer recommendation for tapioca is reiterated through various farmers meet and demonstrations by TCRS, Yethapur.

**11. Tissue culture / hybridization work may be attempted for major horticultural crops (Action: Dean, HC&RI, CBE)**

Plant tissue culture have been taken up in the following crops at the tissue culture laboratory of Horticultural College & Research Institute, Coimbatore and the plants have been produced

<b>Crops</b>	<b>Tissue culture plants in incubation in the culture room of lab (Nos.)</b>	<b>Tissue culture plants in hardening stage (Nos.)</b>
<b>Banana varieties</b>		
Grand Naine	200	279
Red banana	80	186
Rasthali	34	20
Robusta	20	-
Ney Poovan	35	10
Hill banana	68	-
Orchids Dendrobium var. Sonia - 17	1075	573
Red Anthurium	800	55
Cordyline	150	255
Syngonium	176	75
Bougainvilla	120	63

**Hybridization of Horticultural crops:** Hybridization work has been initiated to evolve hybrids in all important vegetable crops.

<b>Crop</b>	<b>Hybrids released</b>	<b>Hybrids in pipe line</b>
Tomato	2	2
Brinjal	1	2
Okra	1	-
Bottle gourd	-	2
Ash gourd	-	2
Bitter gourd	1	-

**12. Germplasm has to be maintained in jatropha to strengthen the breeding programme (Action: Dean, AEC&RI, CBE)**

Centre of Excellence in biofuels is maintaining 10 species of jatropha and 280 germplasm accession for further breeding purpose.

Jatropha species germplasm assemblage

S.No.	Species	No. of accessions
1.	<i>Jatropha curcas</i> CPTs	105
2.	<i>Jatropha curcas</i> (Non toxic)	5
3.	<i>Jatropha gossypifolia</i>	32
4.	<i>Jatropha glandulifera</i>	28
5.	<i>Jatropha tanjorensis</i>	30
6.	<i>Jatropha multifida</i>	26
7.	<i>Jatropha podagrica</i>	9
8.	<i>Jatropha integerrima</i>	20
9.	<i>Jatropha villosa</i>	12
10.	<i>Jatropha villosa</i> var. <i>ramnadensis</i>	6
11.	<i>Jatropha maheswarii</i>	5
12.	<i>Jatropha nana</i>	2
	<b>Total</b>	<b>280</b>

Further, 10 jatropha species, 50 seed sources, 33 clones & 35 hybrid clones are being maintained at FC&RI, Mettupalayam.

**13. TNAU should develop labour saving and cost effective farm implements to suit to various conditions of Tamil Nadu (Action: Dean, AEC&RI, CBE)**

**14. Manually driven equipments should be replaced by self propelled and mechanized equipments and machineries (Action: Dean, AEC&RI, CBE)**

- TNAU has so far released 143 machinery, implements, processing equipments and energy gadgets for adoption by farmers of Tamil Nadu. During the year 2008 TNAU has developed 4 farm implements.
- Labour saving and cost effective farm implements to suit various conditions of Tamil Nadu are being developed for different crops. The requirement of machines to specific conditions and crops are being continuously monitored and projects such as SRI mechanization, sugarcane and horticultural mechanization are all being addressed.
- Since there is an acute labour shortage, all the manually driven equipment have almost been replaced by appropriate self - propelled machines so far. More such machines are now being innovated to do away with human drudgery and labour requirement.

**15. TNAU may take steps for supply of virus free cassava planting material (Action: Dean, HC&RI, CBE / Director, CPPS)**

- The virus free tissue culture plants of cassava are under production at the tissue culture laboratory of Horticultural College & Research Institute, TNAU, Coimbatore through Meristem culture of varieties H-226 and MVD- 1. Plants produced through tissue culture are indexed for virus using PCR.
  1. MVD- 1 (124 plants)
  2. H-226 (322 plants)
 Cassava Meristem cultures are under incubation for further growth and development.

- Virus free setts (Produced through tissue culture) obtained from HC&RI, Coimbatore were multiplied at T&CRS, Yethapur in shade net house and about 7000 setts distributed to farmers.

**16. The dryfarming activity should be strengthened by providing latest farm equipments and machineries with subsidy support (Action: Dean, AEC&RI, CBE)**

- With the assistance from NADP and model mechanization programme in dryfarm areas was taken up providing available farm implements and machines at 50 per cent subsidy in selected blocks of 18 selected districts.

**17. Post harvest and value added technologies may be developed (Action: Dean, AEC&RI, CBE)**

- **Anola seed remover :** A new gadget was designed to remove anola seeds mainly to meet large scale demand of the farmers and traders.
- **Storage of banana:** The banana fruits can be stored in using diffusion channel up to a period of one month without any changes in the physiological characteristics of the fruit.
- **Value added products:** New products from amla have been developed and trainings are offered to popularize the technologies, vitamin A enriched pastha products has been standardized.
- **Food testing lab:** A food testing lab was established in the post harvest technology centre with the financial assistance from Ministry of Food Processing Industries to a tune of Rs.18 million mainly to test the constituents of food products prepared by the entrepreneurs.

Ongoing research programmes

- Development of diversified bakery products from minor millets
- Value addition and storage studies on moringa pods
- Management of post harvest diseases and development of storage techniques for enhancing the shelf life of moringa
- Analysis of the awareness and the extent of consumption of food products of the small and tiny industries and Self Help Groups
- Extraction of bio colour from beet root and its stability in processed food
- Development and evaluation of high barrier nano composite films for food packaging
- Development of technology for the preservation of tender coconut water
- Exploitation of green lentil as a substitute for Indian pulse
- Estimation of post harvest losses through field surveys and use of collapsible crates in vegetable handling systems
- Assessment on quality and safety of the processed food products
- Development of enriched cassava products
- Post harvest pest management in export oriented commodities



**18. Water storage studies may be carried out. Aspects of silt deposition may be studied and policy suggestions may be made for removal of silt from all tanks of Tamil Nadu to increase water storage capacity because most tanks are silted with 1/3<sup>rd</sup> of its original capacity (Action: Director, WTC; Dean, AEC&RI, CBE)**

- Siltation of reservoirs and tanks take place year after year. This problem is further aggravated by the serious soil erosions from mountainous catchment area due to heavy rainfalls during monsoon periods. Recent studies have shown that most of these water bodies have lost their dead storage capacity. The State and Central Governments have formulated various schemes to tackle these problems. The Government of India implemented River Valley Projects (RVP) in major river catchments so as to reduce soil erosion. Similar programmes like Soil Conservation scheme and Watershed Development programmes are implemented by Government of Tamil Nadu to reduce soil erosion in plains. Also, the State Government is desilting irrigation tanks through PWD with the aid from World bank, European Union and NABARD. They have identified 365 tanks for this purpose. Under the control of local bodies, desiltation is carried out in tanks through programmes like Rural Employment Guarantee Scheme. **(WTC)**
- Sedimentation Analysis and optimal water use planning of a cascade systems of tanks carried out. The trap efficiency of the study tanks was found to be in the range of 99.64 to 100%. The measured annual average EC and pH values indicated the suitability of sediment load for land application. In the case of all tanks the existing nutrient load of N, P and K was found to be at marginal level with increasing trend of N and K but decreasing trend of P. The modified Morgan Finney, a lumped sediment yield model under predicted sedimentation rate in the year of average rainfall (2004) by 0.34 to 0.89 Kg/m<sup>2</sup> whereas it over predicted during excess rainfall year 0.43 to 1.17 Kg/m<sup>2</sup> (2007). **(AEC&RI, Coimbatore)**

**19. In dry farming areas water storage structures are to be established to strengthen the water supply during water scarcity period (Action: Director, WTC; Dean, AEC&RI, CBE)**

- In NADP - Dryland Development project, project comprising moisture conservation measures and water storage structures like unlined and lined farm ponds at a cost of Rs. 630 lakhs are being operated. The implementing agency is identified as Department Agricultural Engineering and 90 plastic lined farm pond and 80 unlined farm pond have been completed with a storage capacity of 2500 m<sup>3</sup> and 1350 m<sup>3</sup> respectively in 9 focus districts namely Salem, Dharmapuri, Krishnagiri, Coimbatore, Dindigul, Namakkal, Perambalur, Ramanathapuram and Villupuram (40 blocks). Portable sprinkler are also supplied for supplemental irrigation in the water scarcity period in the cascade of lined farm ponds.

**20. Research should be reoriented in such a way that the output should suit to tackle market needs and should be globally competitive (Action: All University Officers)**

- Need based research such as SRI transplanter, Battery operated Wetland weeder, Processing of fruits and vegetables are being taken up in Kumulur.
- New crop varieties are released after thorough study of all the quality parameters that suit the market preference and consumers' preference.

Those varieties which suit the preference of end users and market value alone are accepted for release.

- During this period, TNAU Magic Trap is patented and some more products are in the process of patenting.
- Need based research such as SRI transplanter, battery operated wetland weeder, processing of fruits and vegetables are being taken up in Trichy.
- The new scheme proposals are prepared in such a way that the outcome of the scheme work is directly used by stakeholders. **(Madurai)**
- The existing research projects in such a way to include the gaps and constraints in domestic and export market and also it will include the importance of value addition in fresh and dry commodities. Market analysis are being made to assess the potentiality of fruits like mango, guava, grapes, vegetables viz., moringa and gourds for domestic and global market. **(Periyakulam)**

**21. Important research findings made by TNAU may be patented (Action: All University Officers)**

***Patents obtained***

S.No.	Name of the Invention
1	A device to remove insect eggs from stored pulse seeds
2	A multi purpose device for the management of insects and rodents
3	Anaerobic microbial dissolution of lead and production of organic acids
4	A process of preparing a bio-fertilizer cum bio-fungicidal composition
5.	Process for preparation of coconut fertilizer briquette.
6.	Sugarcane detrasher

***Patent applications filed***

S.No.	Name of the Invention
1.	CDNA gene encoding a protein with plant anti-viral property from Bougainvillea
2.	Bed disinfectant for management of silkworm diseases
3.	Neem sweet P-60 EC for the management of insect pests
4.	A micro-processor controller stepper motor driven electro mechanical seed metering system.
5.	A chimeric cry2A protein of Bacillus thuringiensis with higher insecticidal activity and a method for its development.
6.	Optimization of Process parameters for the protection of ready to cook mix and food from pearl millet
7.	An Equipment to continuously remove the seeds from Aonla Fruit
8.	Biominerallizer for composting of different agro waste
9.	Bio-capsule for influencing Rhizosphere of plant system for better crop growth and agricultural productivity
10.	Doubling the productivity of crops and enhancing the weight per unit volume of produce by 25 per cent through precision protocol

**22. Protocol may be developed for new research needs in the existing system. Research may also reorient to export / market demand (Action: All University Officers)**

- The proposals by the individuals are peer reviewed by the Heads of respective departments and also by the Dean before sending for funding. **(AC&RI, Madurai)**
- Protocol will be developed for new research projects oriented towards export and market demand. **(HC&RI, Periyakulam)**
- Protocols are decided in the Annual Research Meet (ARM) after detailed discussion every year to reorient to export / market demand and the research programmes are formulated. **(Horticulture)**
- Project on "Market survey for agricultural products in abroad and promotion of agrl. exports from Tamil Nadu" is undertaken in CARDS. Under this project, data on export of agricultural commodities from Tamil Nadu through sea and airports for the period 1997-2006 collected and analysed. Share of agricultural exports from Tamil Nadu (air and seaports) are estimated for 10 years. Preliminary arrangements are being made for conducting a 'Meet of Agrl. Commodities for Exporters' in second week of April 2009 involving exporters from Tamil Nadu besides representatives from EXIM bank, Directorate of Foreign trade, Export Credit Guarantee Corporation etc. The export potentials of major agrl. commodities from Tamil Nadu are to be analysed in Europe, USA and United Arab Emirates by visiting the different markets in these countries besides discussing with import traders, trade bodies, consumers etc. The visit to above countries will be taken up during June 2009. **(CARDS)**
- Due importance is being given to evolve crop varieties to find better market demand and export values. **(CPBG)**
- Demand based paddy seed production and pulses production are taken up. **(AEC&RI, Kumulur)**

## Agenda No.3

New Schemes sanctioned from March 2008 to February 2009

### I. ICAR FULLY & PARTLY FINANCED SCHEMES

(Rs. in lakhs)

Sl. No.	Title of the Project	Location	Date of Start	Date of Closure	Budget
1.	Development of early maturing red rot resistance sugarcane clones through induced <i>in vitro</i> mutagenesis	SRS, Cuddalore	2008-2009	2010-2011	8.00
2.	Technology Development on Sub Surface Drip Fertigation for Higher Productivity in Sugarcane & Coconut	-do-	2008-2009	2010-2011	10.00
3.	Molecular characterization of <i>Colletotrichum falcatum</i> Went, causal organisms of sugarcane red rot disease	-do-	2008-2009	2010-2011	16.00
4.	Non-Destructive classification based on physical properties of selected fruits	AEC&RI, Kumulur	1.7.2008	30.6.2010	10.00
5.	Design and development of on farm cooling system for fruits and Vegetables	-do-	1.7.2008	30.6.2010	8.00
6.	Customizing Nano particles and Quantum dots for monitoring live and dead seeds	-do-	1.7.2008	30.6.2011	5.84
7.	Vision – policy analysis and gender	CARDS, Coimbatore	Apr. 2008	Mar. 2012	15.35
8.	Impact farm women group on technology adoption, productivity enhancement and improvement of farm household livelihood security	-do-	Apr. 2008	Mar. 2011	12.34
9.	Analysis of farm and market risk in selected agricultural commodities (Tomato, banana, groundnut)	-do-	Apr. 2008	Mar. 2010	5.00
10.	Market survey for agricultural products in abroad and promotion of agricultural exports in Tamil Nadu	-do-	Apr. 2008	Mar. 2011	65.00

11.	Developing a new operational model for agricultural extension – synergetic extension model for profitable and sustainable farming	-do-	Apr. 2008	Mar. 2011	10.00
12.	Evaluating water soluble fertilizer for important market analysis and policy development	-do-	Apr. 2008	Mar. 2010	10.00
13.	Risk assessment models and insurance products in agriculture	-do-	Apr. 2008	Mar. 2012	30.41
14.	Development of hybrids in tomato, brinjal and gourd	Dept. of Veg. Crops, CBE	7.6.2008	31.3.2011	40.00
15.	Virus elimination in cassava through tissue culture	-do-	7.6.2008	31.3.2011	15.00
16.	Molecular breeding for keeping quality in tomato	-do-	4.6.2008	31.3.2011	20.00
17.	Formulation of design fertilizer mixtures for balanced fertilization to crops	-do-	7.6.2008	31.3.2011	3.60
18.	Root wilt in coconut management – Development of biotechnology based tools and methods for early detection and management of root wilt disease of coconut palms in Tamilnadu	CPPS, TNAU, Coimbatore	1.4.2008	31.3.2011	25.00
19.	Development of hybrid in coconut with high copra and oil for chocolate making	CRS, Aliyarnagar	1.4.2008	31.3.2011	6.00
20.	Regenerative studies in coconut	-do-	1.4.2008	31.3.2011	10.00
21.	Scaling of water productivity in agricultural for livelihood through teaching cum demonstration training of trainers and farmers	ARS, Bhavanisagar	Apr. 2008	Mar. 2009	7.11
22.	Development popularization of integrated management of purple blotch the thrips in onion in Perambalur & Coimbatore districts at ADAC&RI, Trichy with sub centres at ARS, Bhavanisagar	-do-	Apr. 2008	Mar. 2011	0.98

23.	Development of superior hybrids in sunflower at Dept. of Oilseeds, CPBG, Coimbatore with sub centre	-do-	Apr. 2008	Mar. 2011	4.00
24.	Development of seed hardening technique & designer seed technology for pulses, millets, cotton, tomato, hybrid & Bt. brinjal of TNAU & demonstration at Seed Centre, TNAU, Coimbatore with sub-centre at ARS, Bhavanisagar	-do-	Apr. 2008	Mar. 2011	2.00
25.	Technology development on sub-surface drip fertigation for higher crop productivity in sugarcane and coconut	-do-	Apr. 2008	Mar. 2011	5.00
26.	Basic understanding of organic agriculture in rice, maize and tomato at Dept. of Agronomy, TNAU, Coimbatore with sub-centre, ARS, Bhavanisagar	-do-	Apr. 2008	Mar. 2011	1.00
27.	Climate change and ecosystem dynamics : Integrated assessment of soil, plant, water and atmosphere interactions and impact of climate change on agro-ecosystems	Agri. Entomology	March 08	March 11	5.00
28.	Technology and product development for upscaling pheromone technology in Tamil Nadu	-do-	March 08	March 11	1.00
29.	Development and popularization of integrated management of purple blotch and thrips in onion in Perambalur and Coimbatore districts	-do-	March 08	March 11	5.00
30.	Neem based nano pesticide for the management of insect Pests	-do-	March 08	March 11	20.00
31.	Development of genetically modified groundnut resistance to drought stress and aflatoxin	Dept. of Plant Pathology, CBE	March 08	March 11	3.00
32.	Molecular characterization of <i>Colletotrichum falcatum</i> Went, causal organism of sugarcane red rot disease	-do-	March 08	March 11	3.00

33.	Biodegradation of agrl. waste by white rot fungus and its utilization for the management of soil borne diseases of pulses in rainfed agriculture and developing organic mulch by utilizing different agro wastes by partial composting and evaluation of organic mulch effect on rainfed crops	-do-	March 08	March 11	30.00
34.	Development of biotechnology based tools and methods for early detection and management of root wilt disease of coconut palms in Tamil Nadu	-do-	March 08	March 11	25.00
35.	Ecofriendly management of pests and disease occurring in fruits of mango and ber in Tamil Nadu	-do-	March 08	March 11	25.00
36.	Development of early manuring, red rot resistant sugarcane clones through induced in vitro mutagenesis	-do-	March 08	March 11	5.00
37.	Silkworm disease management through bioprospecting of plant molecules and probiotics	Sericulture	March 08	March 11	15.00
38.	Special grant project on Design and Development of on farm pre-cooling system for extending Economic life of harvested fruits and vegetables	Main Centre – AEC&RI, Kumulur Sub centre- HSC&RI, Madurai	03.07.08	03.07.2010	8.00 5.00
39.	Development of hybrid in coconut with high copra and oil for chocolate making	Main Centre – CRS, Veppankulam Sub center- HSC&RI, Madurai	25.07.08	25.06.2011	30.00
40.	Application of Nano technology to enhance the bio availability of phyto chemicals in health foods	HSC&RI, Madurai	23.07.08	23.07.2011	10.00
41.	Evaluation of Noon Meal Centers and its Effect on Nutritional-Health Status and Improvement on other Dimensions among school Children in Madurai West Block of Madurai District, Tamil Nadu.	-do-	November 2008	October 2009	1.00

42.	Occupational health hazards of women workers in call centres.	Chennai	Feb.2009	March 2011	9.13
43.	Development and popularization of integrated management of purple blotch and thrips in onion in Perambalur and Coimbatore districts	ADAC&RI, Trichy	2008	2011	9.00
44.	Fermented products from fruits and vegetables	Dept. of Microbiology, CBE	1.4.08	31.3.09	6.39
45.	Soil organic carbon dynamics vis-à-vis anticipatory climatic changes and crop adaptation strategies	-do-	July 2008	July 2012	21.24
46.	Improving the capacity for integrated pest management of insect borne viral diseases in Indian vegetables production	Dept. of PMB&B, CBE	17.10.2008	16.10.2010	24.34
47.	Special grant for research and development activities of TNAU	HRS, Thadiyankudisai	2008	2009	4.10
48.	FLD on hybrid rice	Dept. of Rice, CBE	2005	2006	3.93
49.	FLD on promote high rice technology	-do-	2005	2006	6.00
50.	FLD on promote non-hybrid rice technology	-do-	2005	2006	1.80
51.	Evaluation of private hybrids in maize	Dept. of Millets, CBE	2005	2006	0.50
52.	Seed production in agrl. in crops	-do-	2006	2007	39.5
53.	Technology mission on cotton MM I	Dept. of Cotton, CBE	1.4.2000	2008	329.15
54.	Technology developing on surface drip fertigation for higher crop productivity in sugarcane	CRS, Veppankulam	2008	2010	5.00
55.	Cocoa	-do-	2008	2010	0.35
56.	Designer fertilizer mixtures for balanced fertilization to crops	-do-	2008	2010	3.00
57.	Development of hybrid in coconut with high copra and oil for chocolate making	-do-	2008	2011	10.00
58.	TN-IAMWARM – Agniyar sub-basin project	-do-	2008	2013	81.23



59.	Scaling up of water productivity in agriculture for livelihood through teaching cum demonstration, training of trainers and farmers	AC&RI, Madurai	2007	2012	124.00
60.	Evaluation on the performance of liquid biofertilizers for higher sugarcane productivity under surface and subsurface drip fertigation system	-do-	2008	2010	6.43
61.	Voluntary centre for conducting breeding trials for cowpea	-do-	2008	2009	0.20
62.	Biodegradation of agricultural wastes by white rot fungus and its utilization for the management of soil borne diseases of pulses in rainfed agriculture and developing organic mulch by utilizing different agrowastes for partial composting and evaluation of organic mulch effects on rainfed crops	-do-	2008	2011	30.00
63.	On-farm demonstration of TNAU nutrient consortia and seed drill / harvester in rainfed groundnut	Dept. of Agronomy, CBE	April 08	March 10	45.00
64.	Altering crop geometry of dryland crops to suit farm mechanization	-do-	April 08	March 10	40.00
65.	Project on basic understanding of organic agriculture in rice, maize, cotton and tomato	-do-	April 08	March 10	30.00
66.	Studies on the Principles of Root Rhizosphere – Water – Nutrient – Management interactions of Rice Ecosystems in the context of drip and aerobic system	-do-	April 08	March 10	25.00
67.	Hormonal manipulation for the control of flower and boll shedding in relation to abiotic stress tolerance in cotton	Dept. of Crop Physiology, CBE	April 08	March 10	20.00

68.	Development and evaluation of eco-friendly fertilizer product from poultry wastes	Dept. of ENS, CBE	April 08	March 10	17.00
69.	Biosynthesis of nanoscale zero valent iron (Fe <sup>0</sup> ) for the remediation of polluted soil and ground water	-do-	April 08	March 10	35.00
70.	Nano Fertilizer formulations for promoting balanced crop nutrition and sustainable soil productivity	Dept. of SS&AC, CBE	April 08	March 10	30.00
71.	Formulation of Designer fertilizer mixtures for balanced fertilization of crops	-do-	April 08	March 10	30.00
72.	A value chain on industrial agro forestry in Tamil Nadu	FC&RI, Mettupalayam	1.6.2008	1.6.2012	307.91
73.	AICRP on tropical fruits, Coimbatore	Dept. of Fruit Crops, CBE	April 1971	continued	27.31
74.	Improvement of sweet tamarind	-do-	26.5.04	26.05.09	10.81
75.	Standardization of mat system of cultivation for continuous harvest of banana Cv. grand naine	-do-	Sept. 2008	Aug. 2009	5.00
76.	Study on nutrient requirement for higher productivity in banana Cv. grand naine	-do-	Sept. 2008	Aug. 2009	5.00
77.	Development of e-course for B.Sc (Hort.) degree program	-do-	Nov. 2008	Mar. 2011	60.53
78.	Deployment of RNAi technology for engineering against plant viral diseases and greengram improvement for yellow mosaic virus resistance	Dept. of Pulses, Coimbatore	2007-08	2009-10	20.00
79.	Development of rice hybrids with higher heterosis for better grain quality	Dept. of Rice, Coimbatore	2007-08	2009-10	10.00
80.	Maintenance breeding of the parental lines and popularization of CORH 3 rice hybrid in Tamil Nadu	-do-	2007-08	2009-10	15.00
81.	Genetic enhancement of high yielding blackgram varieties suitable for rainfed and rice fallows	TRRI, Aduthurai	2007-08	2009-10	20.00

82.	Development of superior hybrids in sunflower	Dept. of Oilseeds, Coimbatore	2007-08	2009-10	21.00
83.	Farmers participatory operational research – Sunflower	-do-	2008	2009	2.74
84.	Cultivation charges for evaluation of hybrids to various centres for conducting trials on sunflower	-do-	2009	2009	1.06
85.	Development of superior single cross maize hybrids with industrial utility	Dept. of Millets, Coimbatore	2007-08	2009-10	20.00
86.	Development of hybrid in coconut with high copra and oil suitable for chocolate making	CRS, Aliyarnagar & HSC&RI, Madurai	2007-08	2009-10	30.00
87.	Evaluating the performance of maize pre-release hybrids through farmer's participatory operations research	Dept. of Millets, Coimbatore	2007-08	2009-10	5.00
88.	Development of seed hardening technique and designer seed technology for pulses, millets, cotton, tomato hybrid and Bt brinjal of TNAU & demonstration	Seed Centre, Coimbatore	June 2008	May 2011	25.00
89.	Customizing nano particles and quantum dots for monitoring live and dead seeds	Dept. of SS&T, Coimbatore	June 2008	May 2011	25.00
	<b>TOTAL</b>				<b>1758.65</b>

## II. GOVERNMENT OF INDIA (GOI) SCHEMES

(Rs. in lakhs)

Sl. No.	Title of the Project	Location	Date of Start	Date of Closure	Budget
1.	Modelling urea transport for nitrogen scheduling in drip irrigation	WTC, Coimbatore	6.1.09	5.1.2012	27.83
2.	Market access and training interventions to improve net profitability of agricultural commodities in Tamil Nadu	CARDS, Coimbatore	Apr. 2008	Mar. 2009	14.55
3.	Dynamics of migration among resource poor rainfed farming families and its impact on socio-economic livelihood	-do-	Aug. 2008	July 2009	0.05
4.	Assessing the trade liberalization impact on cropping pattern change,	-do-	Apr. 2008	Mar. 2009	5.00

	technological adoption and income distribution in Tamil Nadu, India				
5.	An analysis of outreach and effectiveness of agricultural credit policy in Tamil Nadu	-do-	4.4.2008	15.8.2008	5.33
6.	Strengthening institutional agricultural credit system through collective	-do-	Nov. 2008	Oct. 2009	0.97
7.	Evaluation Rockefeller foundation research and technology	-do-	Nov. 2008	Dec. 2010	50.80
8.	Performance of agriculture in river basins of Tamil Nadu in the last three decades – A total factor productivity approach	-do-	Jan. 2009	Oct. 2009	7.78
9.	DBT – photography honey bees	ARS, Bhavanisagar	Apr. 2008	Mar. 2011	22.04
10.	National Horticultural Mission at HC&RI, Periyakulam	-do-	Apr. 2008	Mar. 2009	2.85
11.	National Horticultural Mission, Coimbatore	-do-	Apr. 2008	Mar. 2009	18.00
12.	AICSIP testing fees for conduct sorghum trials	-do-	Apr. 2008	Mar. 2009	0.40
13.	Strengthening of quality seed production and distribution	-do-	Apr. 2008	Mar. 2009	15.00
14.	Evaluating the performance of sugarcane pre release culture and the precision farming – Farmers participatory operational research project (NADP)	SRS, Cuddalore	2008-09	2009-10	5.00
15.	Development of hybrids of brinjal	VRS, Palur	1.4.2008	31.3.2011	10.00
16.	Establishment of model nursery	-do-	2008	2009	18.00
17.	NHM model nursery	HRS, Yercaud	Jan. 2009	Continuous	18.00
18.	Utilization fly ash as a source of silicon and potassium for mitigating the biotic and abiotic stress in rice, DST, New Delhi	AEC&RI, Kumulur	1.7.2008	30.6.2011	27.50
19.	Off-season production of moringa through evaluation and management practices	HC&RI, Periyakulam	9.6.2008	8.6.2011	7.00
20.	Developing of hybrids in tomato brinjal and gourds	-do-	19.5.2008	18.5.2011	10.00
21.	Molecular and immune based early detection and management of post harvest disease of mango	Plant Pathology	June 08	May 11	9.36
22.	Bioefficacy Evaluation of UPF 807 against powdery mildew disease of grapevine and cowpea	-do-	June 08	May 09	1.06
23.	Survey, molecular characterization, epidemiology and management of aflatoxin	-do-	June 08	May 11	15.96

	producing fungi, <i>Aspergillus flavus</i> and <i>A. parasiticus</i> in groundnut and maize				
24.	Nucleic acid and serology based early diagnosis of basal stem rot disease in coconut and sustainable management using consortia of bioagents	-do-	June 08	May 11	17.76
25.	Molecular strategies for the control of Fumonisin–mycotoxin contamination in maize	-do-	June 08	May 11	18.13
26.	Studies on Isolation, Identification and Characterization of antagonistic sugarbeet rhizospheres yeast against its soil borne pathogens	-do-	Oct. 08	Sep. 11	14.92
27.	Empowerment and Capacity building of self help group women through establishment of Agro Processing Centre (APCs)	HRS, Thadiyan Kudisai	¼/2008	30/10/2010	12.89
28.	National Horticulture Mission (Directorate of Arecanut and Spices Development)	-do-	2008	2009	4.50
29.	Exploitation of Green lentil as a substitute for Indian pulses. Home Science College and Research Institute, Madurai (Centre – B)	HSCI&RI, Madurai	July 2008	March 2010	36.44
30.	Formulation and Development of Nutraceutical products from <i>Solanum Nigrum</i>	-do-	2008	2010	15.55
31.	Women empowerment through production and supply of hybrid seeds and value added products of maize for sustainable community development	ADAC&RI Trichy	2008	2010	11.47
32.	Optimization of agrobacterium tumefaciens transformation protocol for local elite cultivars of <i>jatropha curca</i>	Dept. of PMB&B	14.2.2008	31.3.2011	13.71
33.	Transgenic cassava production with genes conferring resistance to Indian cassava mosaic virus disease (Phase I)	-do-	3.4.2008	3.4.2011	28.00
34.	Molecular lagging of downy mildew disease resistance in maize and introgression into elite inbred lines	-do-	Apr. 2008	March 2011	9.54
35.	Exploration of the molecular diversity and insecticidal spectrum of the isolates of UAS Dharwad and cloning novel insecticidal genes	-do-	Apr. 2008	March 2009	6.91

36.	Engineering resistance in papaya against the papaya ring spot virus through RNAi approach	-do-	9.7.2008	8.7.2011	58.84
37.	Rice heparanase cloning, characterization and over expression for oxidative stress tolerance in rice	-do-	June 2008	June 2011	13.04
38.	Molecular marker assisted breeding and development of gall midge resistant rice varieties and hybrids suitable for Tamil Nadu	-do-	1.4.2008	31.3.2009	6.07
39.	Upliftment of rural women through dissemination of improved technologies in coconut cultivation and employment generation activities	TCRS, Yethapur	Jan. 2007	Dec. 2009	14.40
40.	Development of new TGMS lines through mutation for utilizing in two line breeding in rice	Dept. of Rice, CBE	2003	2006	8.83
41.	Technological empowerment of rural women through hybrid rice seed production	-do-	25.10.2004	24.10.2007	13.65
42.	Generation of virus resistant rice for India diversifying transgenic resistance to popular varieties, studying virus – host interactions and new marker – free transgenic against tungro diseases	-do-	2006	2009	19.35
43.	Molecular mapping of gene(s) / QTL for bruchid ( <i>Callosobruchus spp.</i> ) resistance in blackgram ( <i>Vigna mungo</i> (L). Hepper	Dept. of Pulses, CBE	Jan. 2008	Dec. 2010	15.22
44.	Development of eco-friendly colour cotton	Dept. of Cotton, CBE	2004	2007	6.12
45.	Saturational mutagenesis to uncover temperature linked male sterility expression and studies on TGMS allelism in rice	CPBG, CBE	2005	2008	29.40
46.	Induced <i>in vitro</i> and <i>in vivo</i> mutagenesis in soybean	CPBG, CBE	2005	2008	11.11
47.	Development of non-lodging little millet	Dept. of Millets, CBE	2005	2008	8.85
48.	Isolation and characterization of mutants with high resistant starch content in rice	CPBG, CBE	Dec. 2007	Mar. 2010	14.83
49.	Enhancing yield and stability of pigeonpea	Dept. of Pulses, CBE	2005	2010	19.72
50.	Implementation of plant variety and farmers rights legislation through DUS testing	Dept.of SST, CBE	2003	2007	4.23

51.	Characterization and use of EMS induced mutants of rice variety Nagina 22 for yield and drought tolerance	Dept. of Rice, CBE	2007	2012	70.66
52.	Molecular tagging of thermo-sensitive genic male sterile gene for development of new TGMS lines in rice	-do-	2007	2009	23.47
53.	Development of high throughput market assisted selection systems for improvement of drought tolerance and fibre quality related traits in cotton	CPBG, CBE	2007	2012	101.80
54.	Bee-keeping-an income generating enterprises for farm women	AC&RI, Madurai	2007	2010	11.08
55.	Optimization and stabilization of crop-livestock silvipastoral farming system for livelihood security of rural women in dryland areas of Western Zone of Tamil Nadu	Dept. of Agronomy, CBE	Jan 09	Dec 11	11.49
56.	National Invasive Weed Surveillance	-do-	April 08	Mar 10	26.35
57.	Establishment of Automatic Weather Station (AWS) in 224 blocks of Tamil Nadu	Dept. of ACRC, CBE	Mar 08	Mar 09	160.90
58.	Assessment of impacts of climate change on major irrigated and rainfed crops in India and hence food security issues with special focus on regional crops in Tamil Nadu	-do-	Apr 08	Sep 09	3.00
59.	Promotion of organic farming and organic manure production in Tami Nadu	Dept. of ENS, CBE	Mar 08	Mar 09	154.80
60.	Establishment of Agri Clinic-cum-Mini Soil Testing Laboratories in Tamil Nadu	Dept. of SS&AC, CBE	Mar 08	Mar 09	22.40
61.	Land Resource Inventory and GIS Database for Farm, Village and Block Level Planning'	-do-	Mar 08	Mar 09	132.75
62.	Mycorrhizal Symbiosis to Promote Carbon Sequestration for Sustainable Soil Fertility and Environmental safety	-do-	Apr 08	Mar 11	37.06
63.	Developing ecofriendly Microbial consortia for Pathogen removal in sewage waste water and Mitigation of pathogen entry into hydrological Cycle	Dept. of ENS, CBE	April08	Mar 11	11.56
64.	Enhancement of resistant to Panama wilt of banana mediated through co-culturing of banana plantlets with PGPR and Endophytes	Dept. of Fruit Crops, CBE	Oct. 2007	Sept. 2010	11.76

65.	Development of process for exploring the possibilities of utilization of processing waste	-do-	June 2008	May 2010	24.50
66.	Reducing raffinose family oligosaccharides through molecular breeding in chickpea	Dept. of Pulses, Coimbatore	2008	2011	34.71
67.	Molecular mapping of gene(s) / QTL for bruchid resistance in blackgram hepper	-do-	2008	2010	15.22
68.	Standardization of seed enhancement and storage technique, seed certification standards for jatropha and pungamia and standardization of seed handling techniques in jatropha	Dept. of SS&T, Coimbatore	July 2008	June 2011	18.21
<b>TOTAL</b>					<b>1597.68</b>

### III. STATE GOVERNMENT SCHEMES

(Rs. in lakhs)

Sl. No.	Title of the Project	Location	Date of Start	Date of Closure	Budget
1.	TN- IAMWARM project - Development of Battery Operated Weeder for Wet Land Paddy	AEC&RI, Kumulur	1.4.08	31.3.2009	2.00
2.	TN- IAMWARM project- Chinnar Sub Basin	-do-	1.4.08	31.3.2009	21.90
3.	IAMWARM project- Anivari Odai Sub Basin	-do-	1.4.08	31.3.2009	16.34
4.	TN- IAMWARM project - Development of SRI transplanter	-do-	1.8.08	31.7.2009	16.09
5.	TN- IAMWARM project- Rural Artisans training	-do-	1.1.2009	31.3.2009	6.38
6.	Imparting knowledge on quality seeds to high school children of Theni Dist.	ARS, Vaigaidam	Sept. 08	Oct. 08	0.20
7.	Comprehensive assessment of watershed development programmes in Tamil Nadu	CARDS, Coimbatore	June 08	May 2009	4.90
8.	Continuous evaluation of gerbera	HRS, Kodaikanal	2008-09	2010-11	5.00
9.	Evaluation of drip fertigation in intensive Maize based inter-cropping system	Dept. of Agronomy, CBE	Apr 08	Mar 09	2.97
10.	Biodiversity assessment of dry ever green forest at point calimere wild life sanctuary	FC&RI, Mettupalayam	Oct. 2008	Sept. 2009	2.81
<b>TOTAL</b>					<b>78.59</b>



#### IV. FOREIGN AGENCY SCHEMES

(Rs. in lakhs)

Sl. No.	Title of the Project	Location	Date of Start	Date of Closure	Budget
1.	Development of varieties in moringa with high oil content	Dept. of Veg. Crops, CBE	31.10.2008	31.3.2011	97.31
2.	Exploration for natural enemies for classical biocontrol of the downy snow line mealybug, <i>Rastrococcus iceryoides (Green) (Pseudococcidae)</i>	Agrl. Entomology	June 08	May 10	9.90
3.	Integrated management of thrips-borne tospoviruses in vegetable cropping systems	Plant Pathology	Oct.08	Sep.09	4.54
4.	Stress tolerant rice for poor farmers in Africa and South Asia	ADAC&RI, Trichy	2008	2009	0.65
5.	Stress tolerant rice for poor farmers in Africa and South Asia	Dept. of PMB&B, CBE	March 2008	Apr. 2009	2.36
6.	Morpho-genetic assay of landraces, breeding and mapping, populations and introgression lines for genetic enhancement of drought tolerance in rice	Dept. of Rice, CBE	2002	2006	69.47
7.	Morpho-genetic assay of landraces, germplasm	-do-	2002	2007	8.21
8.	Developing and disseminating resilient and productive rice varieties for drought-prone environments in India	-do-	2006	2008	8.21
9.	Valancia peanut breeding	Dept. of Oilseeds, CBE	2006	2008	4.40
10.	Enhancing grain legumes productivity and production and the incomes of poor farmers in drought-prone areas of sub-saharan Africa and South Asia	Dept. of Oilseeds, CBE ,ORS, Tindivanam & TRRI, Aduthurai	2007	2010	54.22
11.	Resilience of Agricultural Land & Increased food security	Dept. of ACRC, CBE	July 08	Dec 09	14.65
12.	Connecting performance under drought with genotypes through phenotype associations	Dept. of Rice, Coimbatore	2007-08	2010-11	14.89
13.	Testing of rice hybrids developed by rice	-do-	2008	2009	2.74
14.	Popularisation of extra-short duration mungbean cultivars for poverty alleviation and improved nutrition in Bihar, Rajasthan and Jharkhand, Himachal Pradesh, Haryana and Tamil Nadu, India based on Punjab Model-Year III	Dept. of Pulses, Coimbatore	2008	2009	15.75
	<b>TOTAL</b>				<b>307.30</b>

## V. PRIVATE AGENCY SCHEME

(Rs. in lakhs)

Sl. No.	Title of the Project	Location	Date of Start	Date of Closure	Budget
1.	Bio efficacy and phytotoxicity of Gramokxone 24 SL in cotton, potato and Logran 20 WG (Triasulfuran) on rice	SRS, Cuddalore	1.9.2008	31.8.2009	3.20
2.	Studies on short and long term impact of distillery effluent fertigation and one time controlled land application to paddy, sugarcane and banana on the changes in soil and water resources	AEC&RI, Kumulur	1.8.2008	31.7.2009	4.61
3.	Evaluation of bio stimulants (Endo root soluble and mycorrhiza roots on onion and tomato)	Dept. of Veg. Crops, CBE	June 2008	March 2009	2.64
4.	Dissemination of resilient and productive varieties to improve income and livelihood security of rainfed farmers of Tamil Nadu	ARS, Paramakudi	April 2008	March 2010	7.14
5.	Bioefficacy, phytotoxicity, effect on natural enemies and residues for CFL 101 (Buprofezin 25% EC) on rice and chilli	Agri. Entomology	March 08	Feb. 09	2.02
6.	Bioefficacy, Phytotoxicity and effect on natural enemies for UPI 108 against pests of cotton and cabbage	-do-	June 08	April 09	4.26
7.	Bioefficacy, phytotoxicity, effect on natural enemies for some new chemicals against pests of cotton, rice, chilli and sugarcane	-do-	June 08	April 10	8.65
8.	Identification of pigeonpea volatiles for the control of <i>Helicoverpa armigera</i>	-do-	Nov. 08	March 12	7.00
9.	Bioefficacy, Phytotoxicity and Residues of Emamectin Benzoate 5% WSG on Cotton and Okra	-do-	Oct. 08	Sep. 10	3.77
10.	Bioefficacy, Phytotoxicity and Residues of Azoxystrobin 23 SC in Grapes	-do-	Oct. 08	Sep. 10	3.77
11.	Studies on the safety of Pymetrozine 50 WG to some common insect predators and parasitoids in rice ecosystem	-do-	Nov. 08	Oct. 09	6.00
12.	Bioefficacy of Fusion gene (cry 1AB-1Ac) against <i>Spodoptera litura</i>	-do-	Dec.08	Feb.09	0.58
13.	Evaluation of Cuprous Oxide 75% WG against important diseases of tomato and chillies	Plant Pathology	Sep. 08	Aug 09	3.74
14.	IPM Technologies for managing pests and diseases in vegetables and rice in Tamil Nadu	-do-	April 08	March 11	29.96

15.	Testing the effectiveness of newer chemical molecule Cabrio Top 60% WG (Metiram 55% + Pyraclostrobin 5% WG) against anthracnose disease of chilli	-do-	Sep. 08	Aug. 10	2.68
16.	<i>In vitro</i> screening of natural compounds against major diseases of major crops	-do-	Oct. 08	Sep. 09	2.19
17.	Evaluation of CIL/F-108 against downy mildew of grapes and late blight of potato	-do-	Nov. 08	Oct. 09	3.74
18.	Eco-friendly recycling techniques of sugar and distillery industries bio-inputs for enhancing soil and crop productivity	ADAC&RI, Trichy	2008	2011	7.30
19.	Evolving eco friendly recycling techniques and assessing the impact of bioinputs of distillery industries for enhancing soil and crop productivity	-do-	2008	2011	6.52
20.	Bio-efficacy testing of Met 20 (Metominostrobin 20 SC) against major diseases of rice	-do-	2008	2009	1.96
21.	Evaluation of bio-efficacy and phytotoxicity of folicur (Tebuconazole) 25 EC w/v against purple blotch disease of onion	-do-	2008	2009	1.59
22.	Developing drought tolerant rice varieties using genetic research and participatory plant breeding approaches	Dept. of PMB&B, Coimbatore	1.4.2008	30.9.2008	3.22
23.	dissemination of resilient and productive varieties to improve income and livelihood security of rainfed rice farmers in Tamil Nadu	-do-	April 2008	March 2011	12.72
24.	Regional integrated pest management research and education for South Asia	-do-	Oct. 2008	Sept. 2009	5.75
25.	Developing drought tolerant rice varieties using genetic research and participatory plant breeding techniques	-do-	1.10.2008	31.3.2009	1.95
26.	Seed and seedling management techniques for improvement of vegetable productivity of tribal farmers under rainfed tracks of Kalrayan of Kallakurichi	Dept. of SST, CBE	2003	2006	2.75
27.	Evaluation of Bt corn maize hybrids	Dept. of Millets, CBE	2005	2006	3.25
28.	Evaluation Bt, cotton hybrids	Dept. of Cotton, CBE	2006	2007	17.60
29.	Evaluation of bioefficacy of Fosetyl Aluminium (Alliete) 80 WP against Gummosis (Foot Rot) disease in Mandarin oranges	AC&RI, Madurai	2008	2009	1.05

30.	Evaluation of bio-efficacy and toxicity of Fluopyram 200 + Tebuconazole 200-400 SC (W/V) against grape powdery mildew and Anthracnose and Botrytis in grapes	-do-	2008	2009	1.05
31.	Monitoring and Management of Pymetrozine 50 WG resistance in rice brown planthopper	-do-	2008	2010	5.98
32.	Evaluation of bioefficacy of Spinetoram 12 SC w/v (11.7% w/w) against major chilli pests and their natural enemies	-do-	2008	2009	2.40
33.	Evaluation of bioefficacy and phytotoxicity of Sectin 60 WG (Fenamidone 10 % + Mancozeb 50 %) against Gherkin downey mildew	-do-	2008	2009	1.85
34.	Testing the bio-efficacy of E2Y45 20% SC (Coragen 20 SC) against Lepidopteran pests of black gram, bengal gram, okra and cucurbits	-do-	2008	2010	4.19
35.	Efficiency of Halosulfuran methyl NC – 319 75 % WDG on weeds in sugarcane and its effect on the succeeding crops	Dept. of Agronomy, CBE	April 08	Mar 10	4.50
36.	Efficacy of post emergence tank – mix application of Kloben 25 WP + Pantera 4 EC on weed control in soybean	-do-	April 08	Mar 09	3.61
37.	Popularization of dryland technologies for enhancing the livelihood of dryland farmers of Tamil Nadu through farmers' participatory approach	-do-	Mar 08	Feb 11	24.24
38.	Study on susceptibility of <i>Echinochloa</i> spp population from different locations against Azimsulfuron 50 DF	-do-	April 08	Mar 09	0.90
39.	Evaluation of Metamifop 10 EC for Bio-efficacy, Phytotoxicity and Residues in Direct Seeded Rice	-do-	July 08	Jun 10	4.82
40.	Efficacy evaluation of pre-emergence herbicide pendimethalin 38.7% (PC 01-08) for weed control in cotton and their residual effect on the succeeding crops	-do-	Aug 08	Jul 10	4.82
41.	Efficiency evaluation of Imazethapyr 10% SL and its phytotoxicity in groundnut and soybean and on succeeding crops	-do-	Oct 08	Sep 10	7.66
42.	Field Evaluation of Prodigion 40% WSG in Grapes	Dept. of Crop Physiology, CBE	Oct 08	Sep 09	2.49

43.	Developing technologies for the utilization of solid wastes of tannery processing semi-finished leather to finished leather and their effects on soil and crops	Dept. of ENS, CBE	April 08	Mar 10	3.96
44.	Ecofriendly Recycling of Breweries Waste Water for Maximizing the Productivity of Crops and Sustainable Soil Health	-do-	Jul 08	Jun 11	7.0
45.	Studies on the Long Term Impact of Distillery Effluent Application on Soil and Crops	-do-	Sep 08	Aug 09	2.23
46.	Studies on the Eco monitoring the land application of distillery spentwash for sustainable crop production and maintenance of soil health and environmental aspects	-do-	Sep 08	Aug 11	5.94
47.	Popularising Azolla as feed supplement among women and tribal population	Dept. of ACRC, CBE	Oct 08	Mar 10	6.79
48.	Wireless sensor based forecasting for disease management and water use efficiency in banana	Dept. of Fruit Crops, CBE	July 2008	June 2009	7.34
49.	Amla scheme on in vitro and invivo mutation studies in amla	-do-	1.1.2008	31.12.2010	17.70
50.	Technical evaluation of private nurseries in Tamil Nadu for supplying inputs and planting materials to TANHOPE	-do-	June 2008	March 2009	3.36
51.	Bioefficacy testing of smart fresh on mango fruits	-do-	15.4.2008	15.10.2008	3.31
52.	Evaluation of boom flower to assess the presence of plant growth regulating compounds	-do-	Jan. 2008	Feb. 2008	0.40
53.	Biological evaluation of Mycoplex in banana	-do-	July 2008	June 2009	2.76
54.	Breeding for PRSV resistance in papaya (Carica papaya L.) through intergenetic hybridization	-do-	Dec. 2007	Nov. 2009	2.30
55.	Biological testing of sea weed base 06 EM & MA GELL TYPE in banana and tomato	-do-	Jan. 2008	Dec. 2008	2.51
56.	Popularization of small millets in hilly tribal areas and small farms in Tamil Nadu	Dept. of Millets, CBE	2007-08	2010-2011	10.00
57.	Testing of rice hybrids	-do-	2008	2009	2.74
58.	Evaluation of private hybrids in sunflower	Dept. of Oilseeds, CBE	2008	2009	0.80
59.	Evaluation of Bt cotton hybrids evaluation and monitoring	Dept. of Cotton, CBE	2007	2008	29.20

60.	Development of mechanized integrated seed coating technology for maize and pearl millet	Dept. of SS&T, CBE	June 2008	May 2010	2.87
61.	Evaluation of DISCO brand seed coating polymer of INOTEC on major agronomic crops for storability	-do-	June 2008	May 2009	1.59
<b>TOTAL</b>					<b>345.72</b>

## VI. PLAN & NON-PLAN SCHEMES

(Rs. in lakhs)

Sl. No.	Title of the Project	Location	Date of Start	Date of Closure	Budget
1.	Mass Production of Natural enemies, Demonstration and adoption of technology for the management of leaf eating caterpillar and Rhinoceros beetle on Coconut	CRS, Aliyarnagar	1.4.2007	31.3.2009	8.00
2.	Introduction and popularization of forage crops	Dept. of Forage Crops, CBE	2005	2007	6.00
3.	Bt gene cotton introduction of Bt gene for bollworm resistance in MCU 5 / MCU 12 / MCU 13 / SVPR 2	Dept. of Cotton, CBE	2006	2008	10.00
4.	Development of high yielding extra long stage	-do-	2006	2008	9.90
5.	Capacity Building of Extension Functionaries in Technical-managerial Skills for Accelerating Agricultural Development and Living Standards of Farmers	AC&RI, Madurai	2008	2009	7.50
6.	Capacity Building of Extension Functionaries in Information Communication Technology Skills for Accelerating Agricultural Development and Living Standards of Farmers	-do-	2008	2009	15.00
7.	Capacity Building of Extension Functionaries in Information Communication Technology Skills for Accelerating Agricultural Development and Living Standards of Farmers - II phase.	-do-	2008	2009	9.45
8.	Non-plan	Dept. of Fruit Crops, CBE	Continued process		27.31
<b>TOTAL</b>					<b>93.16</b>

## VII. VENTURE CAPITAL SCHEMES

(Rs. in lakhs)

Sl. No.	Title of the Project	Location	Date of Start	Date of Closure	Budget
1.	Manufacturing and Marketing of Agricultural machinery and Tools, TNAU	AEC&RI, Kumulur	1.4.2008	31.3.2011	2.00
2.	Seed Production in Agrl. crops	-do-	5.1.2009	--	1.00
3.	Production and Distribution of coconut seedlings	CRS, Aliyarnagar	1.4.2007	31.3.2010	14.70
4.	Mass production of biocontrol agents viz., <i>Trichoderma viride</i> and <i>pseudomonas fluorescens</i>	-do-	1.8.2006	30.7.2009	1.05
5.	Vermicomposting with coconut wastes	-do-	1.4.2007	31.3.2010	2.25
6.	Production of biocontrol agents viz., <i>Pseudomonas fluorescens</i> and <i>Trichoderma viride</i>	HRS, Thadiyankudisai	2008	2009	1.00
7.	Production of elite planting materials of horticultural crops	-do-	2008	2009	0.30
8.	National Horticulture Mission – Tamil Nadu Horticulture Development Agency (Small Nursery Scheme)	-do-	2008	2009	3.00
9.	Commercial production of vermicompost Azolla and elite planting materials	ARS, Thirupathisaram	8.7.2008	7.7.2011	1.50
10.	Testing of seeds for quality parameters	Dept. of SS&T, CBE	July 2008	July 2011	0.50
11.	Production of Azospirillum, Phosphobacteria and Rhizobium bio inoculants for agricultural and horticultural crops	AC&RI, Killikulam	July 2008	July 2011	0.50
12.	Production and sale of beneficial microbial products for plant disease management and mushroom production	-do-	Nov. 2008	Nov. 2011	0.50
13.	Commercial multiplication of sugarcane setts	ADAC&RI, Trichy	July 2008	July 2011	0.75
14.	Commercial multiplication of coconut seedlings	-do-	July 2008	July 2011	0.50
15.	Coconut tonic for North Western Zone of Tamil Nadu	TCRS, Yethapur	Sept. 2003	Mar. 2009	0.30
16.	Virus elimination through tissue culture techniques in cassava	-do-	June 2008	Mar. 2011	2.00
17.	Augment production of quality planting material in selected fruit crops	-do-	2003	Continued	4.84
18.	Testing of seeds for quality parameters	Dept. of SS&T, CBE	Apr. 2008	Mar. 2009	0.50
	<b>TOTAL</b>				<b>37.19</b>

## **Agenda No.4**

### **RESEARCH HIGHLIGHTS**

#### **Abstract of Research Findings**

#### **LIST OF NEW CROP VARIETIES, FARM IMPLEMENTS AND MANAGEMENT TECHNOLOGIES RELEASED DURING 2008**

##### **Varieties**

1. Rice – CO (R) 49
2. Ragi – Paiyur (Ra) 2
3. Groundnut – VRI (Gn) 7
4. Brinjal – PLR (B) 2
5. Cumbu Napier Hybrid Grass – CO (CN) 4
6. Green Manure Kolingi – MDU (Ko) 1
7. Manila Tamarind – PKM (MT) 1
8. Casuarina – MTP (CA) 1

##### **Implements**

1. Battery Operated Portable Wetland Weeder
2. Tractor Operated Fruit-Shake Harvester
3. Tractor Operated Rotary Spading Machine
4. Tractor Operated Subsoil Coir Pith Applicator

##### **Management Technologies**

1. Botanical based Silkworm Uzifly Ovipositional Deterrent
2. IPM for the Management of Serpentine Leaf Miner *Liriomyza trifolii* Burgess in Vegetables
3. Slope Stabilization Technology
4. TNAU Panchagavya Technology
5. High Density Planting in Mango



# AGRICULTURE

## I. CROP IMPROVEMENT

### A. FOR ADOPTION

#### RICE – CO (R) 49

Parentage	: C 20 / RNR 52147
Duration	: 130-135 days
Season	: Late Samba / Thaladi
Grain yield	: 6286 Kg/ha (11.2% increase over BPT 5204)
Highest yield obtained	: 9750 kg/ha
Area of adoption	: Suitable for cultivation as transplanted rice throughout Tamil Nadu except Virudhunagar, Ramnad, Sivaganga & Nilgiris Districts

#### Special features

- Moderately resistant to blast and Rice Tungro Disease (RTD)
- Moderately resistant to yellow stem borer and Green Leaf Hopper (GLH)
- Medium slender white fine rice similar to BPT 5204
- Intermediate amylose content, intermediate gelatinization temperature and high linear elongation ratio on cooking
- Superior cooking quality
- Suitable for late samba / thaladi seasons

#### RAGI – Paiyur (Ra) 2

Parentage	: Hybrid derivative of VL 145 / Selection 10
Duration	: 115 days
Season	: Rainfed – Adipattam
Yield	: 2527 kg/ha (14.6% increase over GPU 28 and 6.6% increase over Paiyur 1)
Highest yield obtained	: 3150 kg/ha
Area of adoption	: Dharmapuri, Krishnagiri, Salem and Namakkal districts

#### Special features

- Medium tall, erect and non-lodging plant type
- Resistant to leaf blast & moderately resistant to neck and finger blast
- Nutritionally rich grain (7.2% protein)
- Highly suitable for value addition

#### GROUNDNUT – VRI (Gn) 7

Parentage	: Cross derivative of TMV 1 / JL 24
Duration	: 120-125 days
Season	: Rainfed
Yield	: 1865 kg/ha (19.0% increase over TMV 1 and 14.7% increase over TMV 10)

Highest yield obtained : 2517 kg/ha  
Area of adoption : Rainfed tracts of Namakkal, Salem, Erode, Dharmapuri and Perambalur districts

Special features

- Semi spreading type
- Suited for rainfed conditions
- Moderately resistant to rust and late leaf spot diseases
- Shelling: 72%; Oil content: 48%
- Seed dormancy upto 45 days – non sprouting during harvest

**CUMBU NAPIER HYBRID GRASS – CO (CN) 4**

Parentage : Fodder cumbu CO 8 / Napier grass FD 461  
Duration : First cut on 75-80 days after planting and subsequent cuttings at 45 days interval  
Season : Throughout the year  
Green fodder yield : 380-400 t/ha/yr (32.9% increase over CO 3)  
Highest yield obtained : 400 t/ha/yr  
Area of adoption : Throughout Tamil Nadu

Special features

- Profuse tillering (25-30 / clump) and non lodging
- Ultra soft juicy stem (3.4% Brix)
- More leaf stem ratio (0.71)
- Free from pest and disease
- Superior ratooning ability (7 cutting / year)

**GREEN MANURE KOLINGI – MDU (Ko) 1**

Parentage : Pureline selection from Thaniparai local of western ghats area  
Duration : Green manure 65-70 days; Seed crop 120-150 days  
Season : Summer  
Biomass yield : Biomass: 9004 kg/ha (70.4% increase over Local type)  
Seed: 400-500 kg/ha  
Highest yield obtained : 9974 kg/ha  
Area of adoption : All districts of Tamil Nadu

Special features

- Self sown crop
- Suited for rainfed condition
- High green mass production
- 2.42% nitrogen content in leaves
- Plumpy yellow seeds
- Quick and uniform germination (83%)

## B. FOR ON FARM TESTING

### RICE

#### Cultures in ART

#### Hybrids

**TNRH 145** (TNAU CMS 4A / CB 145 R): This early duration rice hybrid is suitable for May – June sowing under transplanted condition. This rice hybrid has recorded a mean grain yield of 5612 kg / ha, which is 12.4, 33.0 and 18.4 percentage increase over CORH 3, ADT 43 and ADT 45 respectively coupled with resistance to BPH. This hybrid is suitable for all districts Tamil Nadu except Virudhunagar, Ramnad, Sivaganga and Nilgiris.

**TNRH 135** (TNAU 2 A / CB 135 R): The hybrid, TNRH 135 has an average grain yield of 5479 kg/ha. The hybrid matures in 100 to 120 days and it has recorded 5.8% increased yield over CORH 3, 15.8% over ADT 43 and 19.3 % over ADT (R) 45. It is having medium slender grain with high LER and low BER and intermediate GT. This hybrid is having resistance to stem borer and moderate tolerance to gall midge, leaf folder, blast, BLB and Brown spot.

#### Short duration culture

**AS 06034** (IET 19571): This culture has 100 - 110 days duration, which recorded an average grain yield of 6194 kg/ha, which is 8.0, 12.5, 29.3 per cent higher yield over ADT 36, ADT (R) 45 and ADT 43 respectively. This culture has recorded high head rice recovery (60.9%), more LER (1.86) and more volume expansion (5.8 ml) after cooking.

#### Mid early duration cultures (110-124 days)

**AS 06016** (ADT 39 / ASD 16): This culture matures in 110 - 115 days and has an average grain yield of 5780 kg/ha, which is 15 per cent higher yield than ASD 16. It is found to be moderately resistant to stem borer. It has good LET (2.2), more volume expansion (6.8 ml) and soft GC.

**CB 01508** (ADT 42/CB 97039): This culture is a mid early duration culture possessing resistance to leaf folder, GLH, WBPH and moderately resistant to stem borer, blast and RTD. This culture recorded an average grain yield of 5205 kg/ha which is 17.2% and 16.9% increase over ADT 42 and ASD 16 respectively.

#### Medium duration (125-140 days)

**AD 01246** (ADT 38 / IET 13570): This is a medium duration rice culture suitable for September sowing under transplanted condition. This culture has recorded an average grain yield of 6426 kg/ha, which is 13.5 percent increase over ADT (R) 46 with moderate resistance to blast, RTD. Under field conditions, this culture is resistant to stem borer, WBPH and moderately resistant to GLH and gall midge. This culture is possessing high milling (68.9%) with 57.9% of head rice recovery and suitable for cultivation in all districts of Tamil Nadu, except Virudhunagar, Ramnad, Sivaganga and Nilgiris.

**CB 01001** (CO 43 / ADT 38): It has recorded an average grain yield of 5800 kg / ha, which is 4.3, 7.2 and 24.3 percentage increase over ADT (R) 46, I.W. Ponni and BPT 5204 respectively. This culture is moderately resistant to stem borer, sheath rot, blast and RTD. It has 72% hulling, 51% head rice recovery, good volume expansion (61 ml) and intermediate amylase content (20%) and GT.

**TR 03025** (ADT 43/ Jeeraga Samba): This culture matures in 125 – 140 days and has recorded a mean grain yield of 6029 kg/ha with 16.2, 19.6 and 48.7 % increased yield over ADT (R) 46, I.W. Ponni and BPT 5204 respectively. It is moderately resistant to leaf folder and blast. It possesses good LER (1.78), less BER (1.36), soft gel consistency and intermediate GT.

### **Long duration**

**AD 01034** (ADT 44 /PTB 15): A long duration culture with average grain yield of 5472 kg/ha. This culture recorded 9.3 and 15.0 percent increase over CR 1009 and ADT 44 respectively. This culture is moderately resistant to BPH and WBPH and having 62.1% head rice recovery with intermediate GC and GT. Suitable for cultivation in Cuddalore, Trichy, Perambalur, Karur, Pudukottai, Thanjavur, Thiruvavur and Nagapattinam districts. The culture possesses 62.1% of head rice recovery with linear expansion ratio of 1.85 and intermediate GC and GT.

### **Salt tolerant**

**TR 03008** (TS 29 / ASD 16): This culture matures in 125 – 140 days. It recorded a mean grain yield of 2948 kg/ha with eight percent increased yield over the check variety, TRY 1. It possesses medium slender grain type. It is moderately resistant to stem borer, leaf folder and blast with field level resistance to mites.

### **SPECIAL ART/OFT**

**GD 04001** (VL 89-1167/VL 90-1695): It matures in 125 days duration and has recorded an average grain yield of 5700 kg/ha, which is 15.5 % higher yield over Bharathy. The rice is white with bold grain type. It is resistant to blast and BLB diseases

**TR 20003** is a short duration culture which matures in 115 days and recorded a mean grain yield of 5277 kg/ha, which is 11.7% increase over the check variety, TRY 2. It is moderately resistant to rice tungro, blast and brown spot diseases.

## **MILLETS**

### **SORGHUM**

#### **Cultures in ART**

#### **Varieties**

**TNS 598** (APK 1/TNS291) is a high yielding culture matures in 100 days with average grain yield of 4567 kg/ha, which is 33.4 % increase over Co (S) 28. This culture is dual purpose with stover yield of 12.64 t/ha having resistance to downy mildew and shoot fly.

**TNS 599** (APK 1/TNS 291): This culture matures in 100 days having the grain yield of 3935 kg/ha which is 14.9 percent increase over CO (S) 28. This culture is high yielding, dual purpose with stover yield of 9.95 t/ha having resistance to downy mildew and shoot fly.

**TNS 603** (BSR 1/VMS 98001): This is a high yielding dual purpose culture with duration of 100 days. The average grain yield is 4151 kg/ha which is 21.3 percent over CO (S) 28. This culture is having resistance to downy mildew, shoot fly and moderately resistant to grain mould. The stover yield is 11.13 t/ha.

## **Hybrids**

**TNSH 482** (ICSA 51/TNS 30): This is high yielding hybrid with duration of 100 days with average grain yield of 6048 kg/ha which is 30.7 percent increase over COH 4. The grain colour is pearly white. The stover yield is 12.3 t/ha.

**TNSH 483** (MS 70 A/TNS 30): This hybrid is having high grain and stover yield (5688 kg/ha) with early maturity (100 days). The grain colour is pearly white which is 23.0 percent increase over COH 4. The stover yield is 10.5 t/ha.

## **PEARLMILLET**

### **Cultures in ART**

#### **Hybrids**

**TNBH 0503** (ICMA 91666 / PT 6017): This hybrid matures in 88 days with average grain yield of 4100 kg/ha which is 15 percent increase over check. This hybrid is resistant to downy mildew and rust. Seeds are bold in size.

**TNBH 0541** ((ICMA 91666 / PT 029): This hybrid is high yielding (3956 kg/ha) in 85 days. The hybrid is resistant to downy mildew and rust. The grains are bold in size.

## **MAIZE**

### **Cultures in ART**

**UMH 05044**: The single cross hybrid UMH 05044 matures in 105 days and recorded 6200 kg / ha of grain yield. This hybrid is suitable for rainfed tracts of Perambalur, Trichy, Villupuram, Namakkal, Dindigul, Virudhunagar, Tirunelveli and Tuticorin districts.

## **RAGI**

### **Cultures in ART**

**TNAU 1005** (Co 10 x TNAU 946): This is a short drought resistant culture matures in 102 days and produces grain yield of 2590 kg/ha, which is 22.3 per cent increase over Co (Ra) 14, 25.0 percent over Paiyur 1 and also 29.7 percent increase over GPU 28. This culture is tolerant to neck and finger blast.

## **VARAGU**

### **Cultures in ART**

**TNAU 51:** This is a high yielding short duration culture selected from the local variety of Perambalur having duration of 120 days. It recorded a mean grain yield of 3320 kg/ha, which is 330 % increase over Co 3. It is tolerant to drought and resistant to blast disease.

## **KUDIRAIVALI**

### **Cultures in ART**

**TNAU 43:** It is a short duration pure line selection from EF 79 and matures in 102 days with resistance to head smut disease. It is a high yielding drought tolerant culture with an average grain yield of 3216 kg/ha which is 38 percent increase over CO 1.

## **WHEAT**

**HW 5207** (HW 3029/V769): This is high yielding wheat culture with duration of 90-105 days. The average grain yield is 5170 jg/ha. This culture is resistant to all three rust and *sclerotium* foot rot diseases.

**HW 1095** (Induced Mutant of NP 200 at 20 kr): This is a high yielding wheat culture matures in 100 days with grain yield of 4770 kg/ha. This culture is resistant to all three rust and *sclerotium* foot rot diseases.

## **PULSES**

### **REDGRAM**

#### **Cultures in ART**

**CRG 990014** (CO 6 X ICPL 87119): This is a long duration culture (180 days) with average grain yield of 1875 kg/ha, which is 16.2% increase over Co 6 (1612 kg) and 13.7% increase over Vamban 2.(1583 kg) This culture is resistant to sterility mosaic disease.

**CRG 990015** (CO 6 x ICPL 8863): This is also a long duration culture maturing in 180 days with mean grain yield of 1800 kg/ha, which is 11.6% increase over Co 6 and 13.7% increase over Vamban 2. This culture is resistant to sterility mosaic disease.

### **BLACKGRAM**

#### **Cultures in ART**

**VBG 95** (COBG 27 x Vamban 3): This culture matures in 65 days. This culture has recorded the highest mean yield of 799 kg/ha and 5.4% yield increase

over the high yielding check VBN (Bg) 4 (756 kg/ha), 24.5 % than CO 5 (603 kg/ha) and VBG 62 (743 kg/ha) and 13.1 % higher than ADT 5 (694 kg/ha).

**VBG 04-001:** This culture is a derivative of (*Vigna mungo* var.*silvestris* x *Vigna radiata* var.*silvestris*) and has recorded the highest grain yield of 758 (kg/ha) and found superior to ADT 5 (663 kg/ha) and CO 5 (568 kg/ha) with an yield advantage of 14.33 and 33.45%, respectively.

**VBG 04-008** (*Vigna mungo* x *V. mungo* var *silverstis*): This is a short duration culture of 65 days maturity with a mean grain yield of 721 kg/ha. This culture is resistant to yellow mosaic virus disease.

**KKB 20055** (LU 209 x VBN 1): This is a short duration culture (65 days) with a mean grain yield of 715 kg/ha. This culture is resistant to yellow mosaic virus disease.

**CBG 647** (TMV 1 x *V. glabrescence*): This is a short duration culture (65 days) with a mean grain yield of 941 kg/ha, which is 31.2 and 22.2 per cent over ADT 5 and CO 5 respectively. This culture is resistant to yellow mosaic virus disease.

**VBG 04-003** (KU 341/VBN 2): This culture is having the duration of 65 days and recorded an average grain yield of 719 kg/ha. This culture is resistant to yellow mosaic virus disease

**VBG 04-014** (*Vigna mungo* / *Vigna mungo* var. *Silvestris*): It has recorded an average grain yield of 946 kg/ha in 65 days. This culture is resistant to Yellow Mosaic Virus

**CBG 653** (DU 2/VB 20): This culture matures in 65 days and recorded an average grain yield of 612 kg/ha with resistance to yellow mosaic virus disease.

## **GREENGRAM**

### **Cultures in ART**

**VGG 04001** (K1 x Vellore local): This is a high yielding culture with a duration of 65-70 days and recorded a mean grain yield of 682 kg/ha. This culture is suitable for Kharif and rabi seasons.

**CGG 924** (CO5 x VBG 37): This is a high yielding culture with a maturing period of 65-70 days and recorded an average grain yield of 727 kg/ha. This culture is moderately resistant to Mungbean Yellow Mosaic Virus.

**VGG 04-024** (VRM (Gg) 1 x *V. mungo* var *silvestris*): This is a high yielding culture having a duration of 65-70 days with mean grain yield of 860 kg/ha. This culture is resistant to Mungbean Yellow Mosaic Virus

**CGG 936** (Pusa Bold x CO 6): This is a high yielding culture having a duration of 65-70 days with mean grain yield of 801 kg/ha, which is 20 % increase over Co 6. This culture is resistant to Moonbeam Yellow Mosaic Virus

**VGG 04-002** (VBN 1/IPM 99-04): The culture has recorded an average grain yield of 649 kg/ha in 65 days with resistant to Mungbean Yellow Mosaic Virus

**VGG 04-003** (VBN 1/Pusa bold): This culture has recorded an average grain yield of 685 kg/ha in 65 days with resistant to Mungbean Yellow Mosaic Virus.

**CGG 934** (CO 6/ML 267): This culture matures in 65 days and recorded an average grain yield of 649 kg/ha with resistant to Mungbean Yellow Mosaic Virus

### **Cultures in OFT**

#### **Blackgram (Rice fallow)**

**VBG 04-014** ( 65 days): This culture is a cross derivative of *Vigna mungo* x *Vigna mungo* var. *silvestris*. It has recorded the average grain yield of 885 kg/ha under rice fallow condition with resistant to Yellow Mosaic Virus.

**VBG 06-011** (65 days): This culture is a cross derivative of *Vigna mungo* x *Vigna mungo* var. *silvestris*. It has recorded the average grain yield of 840 kg/ha under rice fallow condition with resistant to Yellow Mosaic Virus.

#### **Green gram (Rice fallow)**

**VGG04-002** (65 days): This culture is a cross derivative of VBN1 x IPM99-04. It has recorded the average grain yield of 1000 kg/ha under rice fallow condition with resistant to Yellow Mosaic Virus

**VGG04-003** (65 days): This culture is a cross derivative of VBN1 x Pusa bold. It has recorded the average grain yield of 1890 kg/ha under rice fallow condition with resistant to Yellow Mosaic Virus

#### **MOCHAI**

**DBI 003-07** (Selection from CO6 A): This is a high yielding culture having duration of 170 days. This culture has recorded green pod yield of 6000 kg/ha. The mean seed yield is 1300 kg/ha.

**DPI 003-04:** This culture is a selection from DL 25641. It has recorded the average grain yield of 820 kg/ha.

## **OILSEEDS**

### **GROUNDNUT**

#### **Cultures in ART**

**VG 0402** (Selection from AK 1310): It is bold seeded high yielding culture maturing in 110 days. The average dry pod yield is .2066 kg/ha. The shelling outturn is 65 per cent with 48 per cent oil. This culture is having kernel weight of 65.0 g and is suitable for rabi / summer season under high import conditions. The kernels are tan in colour.

**VG 0407** (Selection from JSP 39): It is high yielding bold seeded culture maturing in 125 days. The average dry pod yield is f2100 kg/ha with shelling percentage of 65. The oil content of the culture is 47.5 percent.



## **SUNFLOWER**

### **Culture in ART**

**CSFH 5060:** This hybrid has been developed by utilizing our own converted CMS line with mono head restorer line. It matures in 90-95 days. It has recorded a seed yield of 2710 kg/ha. as against 2185 kg/ha by Sunbred 275 with a yield increase of 24.0 per cent. The volume weight this hybrid is 43.3g/100 ml and oil content is 40.7%. The seeds are bolder with the 100 seed weight of 6.8 g and black in colour. It is suitable for cultivation under both rainfed and irrigated conditions in Dindigul, Erode, Perambalur, Karur and Trichy districts.

## **CASTOR**

### **Cultures in ART**

**YRCH 0509:** This is a high yielding hybrid maturing in 165 days with mean seed yield of 2225 kg of seeds per ha. This hybrid is moderately tolerant to Botrytis. This hybrid out yielded the TMVCH 1 by 27.0 percent. The seeds are bold with 100 seed weight of 8.8 g and oil content of 51.2 percent. It is suitable for cultivation for both rainfed and irrigated conditions in Salem, Namakkal, Erode and Dharmapuri districts.

## **COTTON**

### **Hybrids in ART**

#### **Intra *hirsutum* hybrids**

**TCHH 2322:** The intra *hirsutum* hybrid, TCHH 2322 recorded a mean seed cotton yield of 2166 kg/ha in 36 trials (OFT/Station trials) which was on par with check Bunny (2072 kg/ha). With regard to fibre quality parameters, TCHH 2322 has recorded 33.2mm of staple length and 23.2g/tex of bundle strength. This hybrid matures in 165 days and is suitable for winter irrigated tracts on Tamil Nadu. This hybrid will be tested in five locations each in Dharmapuri, Salem, Namakkal and Perambalur districts.

**TSHH 0442:** This hybrid has recorded an average seed cotton yield of 2313 kg/ha in 13 locations, which is 31.7% increase over the check Bunny (1756 kg/ha). It possesses long staple fibres measuring 28 mm, which matches with CIRCOT norms namely, S/ L ratio of 0.8. It will be tested in ART in 10 districts at 50 locations under summer irrigated conditions.

### **Varieties**

**TSH 2005:** This is a cotton culture from Srivilliputhur and it has recorded an average seed cotton yield of 773 kg/ha which is 12.4% and 2.1% increase over the check variety, SVPR 2 (688 kg/ha) and KC 3 (757 kg/ha).TSH 2005 is moderately resistant to leaf hopper and possesses superior medium staple fibres with fibre strength of 22.0 g / tex and matches with the CIRCOT norms namely, S/L ratio of 0.82.This culture will be tested at 20 locations in the districts of Tirunelveli, Tuticorin, Virudhunagar and Madurai under winter rain fed situation.

**TAH 235:** The Aruppukottai culture, TAH 235 recorded mean seed cotton yield of 758 kg/ha at three locations, which is 15.3% increased yield over SVPR 2 (657 kg/ha). It is suitable for the rain fed situations in the southern districts, namely, Tirunelveli, Tuticorin and Virudhunagar. It has recorded a 2.5% span length of 27.4 mm and 22.6 g/tex of bundle strength.

### Hybrids in OFT

#### Intra *hirsutum* hybrid

**TCHH 2251:** The hybrid TCHH 2251 registered an average kapas yield of 2075 kg/ha in 36 trials (OFT/Station trials) which was on par with the check Bunny (2072 kg/ha). This hybrid matures in 165 days and will be tested in OFT. This hybrid is having a span length of 32.9 mm and bundle strength of 23.1g/tex It is suitable for the winter irrigated tracts.

#### Inter specific hybrid

**TCHB 4510:** The interspecific hybrid, TCHB 4510 had recorded 1833 kg/ha of kapas in 17 trials (OFT/Station trials) which is 67 % increase over DCH 32 (1095 kg/ha) and 5.5% over TCHB 213 (1737 kg/ha). This hybrid recorded a 2.5% span length of 37.5mm and strength of 26.6g/tex. This hybrid matures in 180-190 days and suited for the winter irrigated tracts.

## FORAGE CROPS

### Culture in OFT

#### Guinea grass

**TNGG 062** (Clonal selection from Mumbasa): It is a perennial, high and profuse tillering (30-40clumps) grass and can be grown throughout the year. This culture is capable of yielding green fodder of 360 t/ha/year, which is 33 percent increased fodder yield over CO 2. This is a shade loving quick generation grass with dark green broad leaves which is highly palatable and preferred by sheep, goat and cattle.

## BREEDER SEED PRODUCTION

The details on breeder seed production and distribution in different crops during 2007-08 (production during 2006-07 and supply during 2007-08)

Crop/ Variety	STATE		GOI		PRIVATE		TOTAL	
	Indent	Supply	Indent	Supply	Indent	Supply	Indent	Supply
PADDY	16618	21194	3400	3030	71745	89965	91763	114189
MILLETS	940	816	-	-	201	472	1141	1288
PULSES	9729	12095	270	270	808	2081	10807	14446
OILSEEDS	43014	43697	5290	3805	-	1330	48304	48832
COTTON	418	417	-	-	205	286	623	703
FORAGE CROPS	-	-	175	55	-	-	175	55
VEGETABLES	-	90	43	-	76	225	119	315
<b>TOTAL</b>	<b>70719</b>	<b>78309</b>	<b>9178</b>	<b>7160</b>	<b>73035</b>	<b>94359</b>	<b>15293 2</b>	<b>17982 8</b>

## **II. CROP MANAGEMENT**

### **A. FOR ADOPTION**

#### **RICE**

**1. Biofertilizer for rice**

Application of 75 % N & P + Azophosmet @ 2 kg/ha is recommended for rice

#### **MILLETS**

**1. Fertilizer dose for hybrid maize (CO H(M) 5)**

Application of 150:75:75 kg N, P<sub>2</sub>O<sub>5</sub> & K<sub>2</sub>O /ha (N & K split application) along with zinc sulphate @ 37.5 kg/ha is recommended

**2. Weeder for maize**

Twin wheel hoe weeder is recommended for manual weeding

**3. Drip fertigation in maize**

NPK at 150 % recommended dose (P as basal, N & K in splits) is recommended

#### **PULSES**

**1. Mechanical weeding for pulses**

Spacing of 60 x 10 cm with mechanical weeding (Diesel Engine Operated Power Weeder) for higher grain yield of blackgram and green gram in red and black soils

**2. Value addition of pulses**

Health mix products of blackgram viz., biscuits, sweet ball and sweet bars for better health

**3. Foliar spray for pulses**

- Foliar spray of CCC @ 200 ppm at pre flowering stage for higher yield in greengram and blackgram
- Hormone based nutrient mix spray @ 200 ml/ ha during flower initiation stage for blackgram and green gram

## OILSEEDS

### 1. Redefined fertilizer schedule for Groundnut and Sunflower (Variety)

Groundnut: 25: 50: 75 NPK kg /ha

Sunflower: 60: 30: 30 NPK kg /ha

### 2. Drip fertigation for sunflower based cropping system

Drip irrigation at 100 % PE with fertigation at 125 % RDF (75 : 40 : 40 kg NPK / ha) for irrigated sunflower based cropping system

### 3. Integrated weed management in groundnut

Broad leaved weeds dominance : PE Pendimethalin 0.75 kg / ha + POE Imazethapyr 50 g / ha on 20 DAS

Grass and Broad leaved weeds dominance : PE Pendimethalin 0.75 kg / ha + HW and earthing up + lay by application of Pendimethalin 0.75 kg /ha on 40 DAS

### 4. Integrated weed management in castor & sesame

Castor: PE pendimethalin @ 1.0 kg / ha + Peg rotary weeder on 40 DAS

Sesame: Peg rotary weeder weeding on 20DAS+HW and earthing up on 40DAS

## COTTON

### 1. Biofertilizer for cotton

Azospinosmet @ 500 ml ( $10^{12}$  cells per ml) diluted to 100 liters per hectare through biofertigation along with 75% RDF as water soluble fertilizer is recommended

### 2. Fertilizer dose for Bt hybrid and ELS

Bt hybrid

Application of 120: 60 : 60 kg NPK /ha for higher yield and net returns

ELS

Application of 150 : 75 : 75 kg NPK /ha for ELS cotton with foliar nutrition (polyfeed + multi K) is recommended

### 3. Herbicide application

Pre emergence application of Pendimethalin @ 1.0 kg /ha followed by power weeding on 40 DAS is recommended

## SUGARCANE

### 1. New clone for release

Promising new clone for release is 20 c 141

### 2. Revised fertilizer schedule for western tracts of Tamil Nadu

Major nutrients: Application of 275: 62.5: 200 kg N, P<sub>2</sub>O<sub>5</sub> & K<sub>2</sub>O / ha  
Micronutrients: Soil application of CuSO<sub>4</sub> @ 5 kg/ha in addition to 100 kg FeSO<sub>4</sub> & 37.5 kg ZnSO<sub>4</sub> per hectare. Alternatively foliar spray of 0.2% CuSO<sub>4</sub> along with 1.0 % FeSO<sub>4</sub> and 0.5% ZnSO<sub>4</sub> twice during early growth phase.

### 3. Weeding in sugarcane

Hand weeding twice on 4<sup>th</sup> and 7<sup>th</sup> week of ratooning or application of Metriburine @ 1 kg a.i/ha + one hand weeding on 45 days after ratooning.

## PALM

### 1. Fertilizer for coconut nursery

Split application of NPK @ 40 : 20 : 40 kg ha<sup>-1</sup> at 6<sup>th</sup> and 9<sup>th</sup> months after sowing seednuts produces high quality seedlings and growing of sunhemp between the seedlings to reduce the weed growth is recommended.

### 2. Organic manure substitution for coconut

Application of 100% N through composted coirpith + P and K as chemical fertilizers (or) 50% N through composted coir pith + balance NPK as chemical fertilizers is recommended.

3. Composting technology for utilization of Oilpalm waste has been developed

## NON CROPS

### 1. Slope Stabilization Technology

#### Details of Technology

- Slope Stabilization Technology includes the combination of the following components on the engineered slopes of less than 23° angle at mine spoil area mainly to arrest the soil erosion.
- Tree Pit size: 1.0 x 1.0 x 1.0 m
- Tree Spacing: Top bench: 3.0 x 3.0 m; Middle bench: 5.0 x 5.0 m; Bottom bench: 8.0 x 8.0 m

- Input mixture: TNAU Pit mixture (Mine Spoil+Red Earth+Farm Yard Manure+Fly Ash+ [Press Mud+Distillery Spent Wash+Town Compost] @ 1:1:1:1:1) can be used for filling the pits.
- Trees: Top slope: *Leucaena leucocephala*, *Cassia siamea*; Middle slope: *Ailanthus excelsa*, *Dalbergia sissoo*; Bottom slope: *Muntingia glabra*, *Melia azaderach*
- Shrubs: Common to all slopes  
*Agave sisalana*: Spacing 3 x 0.45 m; *Bougainvillae spectabilis*: spacing 3 x1.5 m
- Grasses: Common to all slopes  
*Bracharia mutica* : Spacing : 0.3 x 0.3 m; *Cynodon dactylon* : Spacing: 0.3x0.3 m:  
*Vetiveria zizanioides* : Spacing : 0.3 x 0.3 m
- Creepers / Soil binders: *Calapogonium mucunoides*, *Mucuna coronaria*, *Ipomea biloba*, *Tidonia viscosa* as direct seeding on slopes

### Benefits

- Slope stabilization technology is highly suited to protect the slope structure from soil erosion.
- This technology package will aid in better adoption by mining industries.
- The mining industry at Neyveli is planning to extend the slope stabilization technology on the peripheral area of the remaining dumped spoil at each mine in the coming years, which in turn ensures eco health and stability to the mined area.
- The mining industries easily get environmental clearance for further activities of mining from Ministry of Environment and Forest and aesthetic value of mined area has been possible to brought on the dumped area.

### Economics

- Total expenditure incurred for adopting this technology in one hectare area at NLC mine slope was around Rs.42.00 lakhs.
- This technology on environment rehabilitation involved more cost rather than additional return.
- However, the aesthetic value of the degraded system is improved for which the real value and benefit cost cannot be assessed / compared.

## 2. TNAU Panchagavya Technology

### Details of Technology

- For preparing 20 litres of Panchakavya, the following inputs are required;
 

Cowdung	: 5. 0 Kg
Cow urine	: 3 lits.
Cow's milk	: 2 lits.
Cow's curd	: 2 lits
Cow's ghee	: 1 lit.
Sugarcane juice	: 3 lits.
Tender coconut water	: 3 lits.
Ripened banana	: 1 kg

- For preparing panchagavya, ghee is mixed with cow dung and kept for 3 days. After, all the materials were added to a wide mouthed mud pot and kept open under shade.
- The contents were stirred twice a day for about 20 minutes, both in the morning and evening to facilitate aerobic microbial activity.
- In addition, before spraying, the filtrate is being mixed with *Pseudomonas* @ 5 ml / L having a population of  $10^9$  cells/ml and a bio stimulant such as humic acid @ 1 ml are added.
- Fifteen days after the preparation, from the stock solution 3% concentration is prepared and sprayed @ 500 litres ha<sup>-1</sup> using hand-operated sprayer with high pore size nozzle.

### Benefits

- Panchagavya acts as organic manure, biostimulant and gives resistance against pest and diseases
- It contains all macronutrients, micronutrients and growth hormones (IAA and GA) required for crop growth
- Panchagavya contains the beneficial microbes such as yeast and *Lactobacillus* which produces antibiotics which are effective against pathogenic bacteria and fungi besides its growth promoting effect.
- Cow's urine contains uric acid which acts as manure and hormones.
- Tender coconut water is a cheaper substitute for kinetin which increases the chlorophyll content.
- Seed treatment with panchagavya enhances germination of seeds and vigour index of seedlings

### Economics

- The cost of production of a litre of panchagavya is around Rs.35 to 40/- and it can be brought down substantially if the farmers use their own cows' products. Hence, it is cost effective over other commercial growth formulations.
  - The panchagavya is diluted to 3% and sprayed on crops to get the best results and for covering one hectare of area, 500 litres of solution is required.
1. Psychrophilic methanogenic consortia has been developed for biomethanation of coffee processing wastewater
  2. Microbial consortia for degrading coffee pulp waste has been developed
  3. Application of paperboard sludge vermicompost 3.5 t ha<sup>-1</sup> +100 per cent NPK under treated effluent for *Celosia*
  4. GIS product for crop selection in Cauvery Delta Zone under different water availability situation and GIS tool on Block level soil resource information system for Tamil Nadu have been developed

## **B. FOR ON FARM TESTING**

### **RICE**

#### **1. Integrated weed management in wet seeded rice with modified drum seeder**

##### **Treatments**

- T<sub>1</sub> : Hand weeding twice on 25 and 40 DAS  
T<sub>2</sub> : PE Pretilachlor 0.45 kg/ha on 3 DAS + power operated rotary weeder on 40 DAS  
T<sub>3</sub> : Power operated rotary weeder on 10, 25 and 40 DAS

Location : Aduthurai, Thanjavur, Paiyur, Coimbatore, Madurai, Ambasamudrum  
Co-ordinator : Professor and Head, Dept. of Agronomy, Coimbatore

#### **2. Post emergence application of Azimsulfuron 50 DF in irrigated direct seeded rice**

##### **Treatments**

- T<sub>1</sub> : Hand weeding twice on 25 and 40 DAS  
T<sub>2</sub> : PE Pretilachlor by Azimsulfuron at 35 g /ha on 20 DAS + HW on 40 DAS  
T<sub>3</sub> : PE Butachlor (irrigated ) / Pendimethalin (rainfed) + + HW on 40 DAS

Location : CSRC, Ramnad (RF), ARS, Paramakkudi (RF), Dept. of Agronomy, Madurai (Irri), ARS, Bhavanisagar (Irri), ARS, Ambasamudrum (Irri)  
Co-ordinator : Professor and Head, Dept. of Agronomy, Coimbatore

#### **3. Management of negative K balance in wetland rice soils of Anaimalai block**

##### **Treatments**

- T<sub>1</sub> : Farmers' practice  
T<sub>2</sub> : Rec. dose of fertilizer (150 :50 : 50 kg NPK /ha)  
T<sub>3</sub> : Enhanced K dose as per SSNM (150 : 50 : 80 kg NPK/ha)  
T<sub>4</sub> : STCR recommendation

Location : Anaimalai block ( 5 locations)  
Co-ordinator : Professor and Head, Dept. Soil Science and Agrl. Chemistry, Coimbatore



## OILSEEDS

### 1. Enhancing seed rate to optimize plant population in medium bold groundnut varieties

#### Treatments

- T<sub>1</sub> : Seed rate @ 175 kg /ha + seed treatment with Mancozeb (2 g/kg) + soil application of Trichoderma viride (2.5 kg / ha)  
T<sub>2</sub> : Seed rate @ 135 kg /ha + seed treatment with Mancozeb (2 g/ kg) + soil application of Trichoderma viride (2.5 kg / ha)  
T<sub>3</sub> : Seed rate @ 135 kg /ha alone

- Season : Rabi 2008 - 09  
Varieties : VRI 2, Co 3  
Spacing : 30 x 10 cm (33 plants/m<sup>2</sup>)  
Observations to be recorded : Initial plant stand / m<sup>2</sup>, Final plant stand / m<sup>2</sup>, Yield parameters, Yield, Stem rot incidence (%), Economics  
Location : CRS, Aliyar nagar ;ARS, Bhavanisagar,ORS, Tindivanam ; RRS, Vridhachalam  
Co-ordinator : Director (CSCMS) and Director of Research

## SUGARCANE

### 1. Foliar spray of sugarcane booster

#### Treatments

- T<sub>1</sub> : Foliar spray of sugarcane booster at 45, 60 & 75 DAP (5, 7.5 & 10.0 kg/ha)  
T<sub>2</sub> : Control

- Location : Salem Co-operative Sugar Mills, Mohanur  
Dharani Sugars, Polur  
Rajshree Sugars, Mundiampakkam  
EID Parry India Ltd., Nellikuppam  
Co-ordinator : Dr.H.Vijayaraghavan, Prof & Head, Crop Physiology, Coimbatore will supply the sugarcane booster

## COTTON

### 1. Auger hole seeding and transplantation in cotton under rainfed conditions in Southern Tamil Nadu

#### Treatments

Direct sowing in pits with fortified coirpith, Control (Farmers' Practice)

- Varieties : KC 3, Bunny Bt cotton  
Spacing : 90 x 45 cm (Bunny Bt), 60 x 30 cm (KC 3 / SVPR 2)  
Location : ARS, Kovilpatti, ARS, Aruppukkottai, CRS, Perambalur

## 2. Evaluation of Tropicultor in rainfed cotton

Package : Summer ploughing  
Land preparation  
Broadbed furrow with seed cum fertilizer sowing  
Mechanical weeding and earthing

Locations : ARS, Kovilpatti and RRS, Aruppukkottai

## PALM

### 1. Drip fertigation for coconut

Locations : Aliyarnagar and Palar basin  
Source of funding : IMWARM  
Action : Director, WTC, Coimbatore

### 2. Drought management in coconut

#### Treatments

T<sub>1</sub> : Control  
T<sub>2</sub> : Drought management package

- Rain water harvesting with compartmental bunding
- Application of mulch (raw coir pith / coconut fronds)
- Burrial of coconut husk around basins
- Additional application of Muriate of Potash @ 1.5 kg / palm/ year

Location : CRS, Veppankulam

### 3. Precision farming in oilpalm

Activities : Organic enrichment for root foraging area (3 meters radius)  
Installation of microsprinkler  
INM through fertigation

Area : 100 hectares – New area (2008-09)  
Districts : Thanjavur, Tiruvarur, Nagapattinam, Cuddalore & Villupuram  
Funding : ISOPOM-OPDP, Govt. of TamilNadu  
Action : TRRI, Aduthurai

### III. CROP PROTECTION

#### A. FOR ADOPTION

#### RICE

#### 1. Evaluation of fine-tuned Integrated Pest and Disease Management (IPDM) module in hybrid rice (CORH 3)

##### Treatments

- T<sub>1</sub>: PGPR consortia + release of *Trichogramma japonicum* / *T. chilonis* + Azadirachtin 1 % (2ml/l) + LCC based N application  
 T<sub>2</sub>: Existing IPDM module as per Crop Production Guide  
 T<sub>3</sub>: Farmers practice - Insecticides (Monocrotophos 0.05% / chlorpyrifos 0.05% malathion 0.05% ) and fungicide (Mancozeb 0.2%)

The fine tuned IPDM module recorded reduced stem borer (2.87% deadheart and 5.48 % white ear) , leaffolder (3.65 %) blast (13.5 PDI) , brown spot (24.69 PDI) and sheathrot (14.39 PDI) incidence coupled with enhanced natural enemy activity (spiders and mirids ) , grain yield ( 6057 kg/ha) with a net gain of Rs.6786/ha.) compared to existing IPDM module and farmers' practice .

##### Effect of IPDM modules on pest and disease management

Treatment	SB (%)		LF (%)	Blast (PDI)	Brown Spot (PDI)	Sh. rot (PDI)	NE (No. / hill)		Yield (kg/ha.)	Net gain (Rs/ha)
	DH	WE					Spider	Mirid		
T <sub>1</sub> - Fine-tuned module	2.87	5.48	3.65	13.5	24.69	14.39	2.71	3.31	6057	6786
T <sub>2</sub> - Existing module	5.40	6.33	5.42	17.5	29.53	18.94	2.55	2.74	5705	2122
T <sub>3</sub> - Farmers' practice	8.46	8.55	8.61	31.9	38.85	26.30	0.99	1.89	5259	-

**Recommendation:** Fine tuned IPDM module is recommended for the management of major pest and diseases of hybrid rice.

#### 2. Rice leaf folder and stem borer management using *Beauveria* and *Pseudomonas* Pf1.

Spray application of *Beauveria* + Pf1 foliar spray at (5+5 g/lit) recorded reduced stem borer (3.54%) and leaffolder incidence (5.08 %) with a highest grain yield of 3970 kg/ha with a net gain of Rs 3365 compared to 16.24 and 9.8 % of stem borer and leaffolder incidence respectively in untreated check.

Treatments	SB (%)	LF (%)	Grain yield (t/ha)	Added cost (Rs/ha)	Added Return (Rs/ha)	Net gain (Rs/ha)
<i>Beauveria</i> ST @ 10 g/kg	9.74	5.40	3.72	37	2240	2203
<i>Beauveria</i> + Pf1 ST @ (5+5) g/l	5.49	5.32	3.87	37	3290	3253
<i>Beauveria</i> + Pf 1 foliar spray (5+5)g/l	3.54	5.08	3.97	625	3990	3365
<i>Beauveria</i> @ 10 g/l foliar spray	3.54	5.30	3.85	625	3150	2525
Profenophos 50 EC @ 500 ml/acre	1.35	4.50	4.09	1250	4830	3580
Control	16.24	9.80	3.40			

(Mean of four locations Aduthurai, Trichy, Coimbatore & Killikulam)

**Recommendation:** *Beauveria* and Pf1 foliar spray is recommended for the management of rice leafhopper.

### 3. Management of false smut of rice with new chemical copper hydroxide (Kocide 2000 54 DF)

Two sprayings of Kocide 2000 54 DF @ 2.5g/l (one at boot leaf stage and another at milky stage) is very much effective in reducing the false smut incidence of rice (12.37%) and recorded the higher yield of 4484 kg/ha when compared to 24.19% disease incidence with a grain yield of 3591kg/ha in untreated control.

#### Kocide against false smut

Treatments	Infected Panicles (%)	Grain Yiled (Kg/ha)	Net gain (Rs/ha)
Kocide 2.5g/l	12.37	4484	4108
COC@2.5g/l	16.13	4057	2146
Control	24.19	3591	-

\*Mean of four locations

**Recommendation:** Two sprays of Kocide 2000 54 DF @ 2.5g/l (one at boot leaf stage and another at milky stage) is recommended for the management of false smut.

### 4. Evaluation of newer fungicide (Tricyclazole + Mancozeb combination product) for the management of blast, brown spot and grain discolouration in rice

The combination product of Tricyclazole + Mancozeb (TMP) (0.25 %) recorded the least incidence of blast (24.2 PDI), brown spot (24.9 PDI), sheath rot (13.1 PDI) and grain discolouration (29.3 PDI) as against the maximum severity of blast (45.0 PDI), brown spot (52.8 PDI), sheath rot (32.7 PDI) and grain discolouration (48.0 PDI) in untreated control. With respect to the grain yield the newer molecule TMP at 0.25 % recorded the highest grain yield of 4767 kg/ha as against 3834 kg/ha in untreated control. The combination product of TMP can be recommended as alternate chemical for the management of blast, brown spot, sheath rot and grain discoloration.

#### Bio-efficacy of Tricyclazole + Mancozeb combination product (TMP) against major diseases of rice\*

Treatment	Blast (PDI)	Brown spot (PDI)	Grain discolouration (PDI)	Sheath rot (PDI)	Grain yield (kg/ha)	Net gain (Rs/ha)
T <sub>1</sub> - TMP 2.5 g / lit	24.2	24.9	29.3	13.1	4767	4348
T <sub>2</sub> - Tricyclazole 1.0 g / lit	29.2	33.8	36.6	24.2	4465	2786
T <sub>3</sub> - Carbendazim + Thiram (1:1) 2.0 g/lit	30.0	34.7	32.0	23.9	4420	2916
T <sub>4</sub> - Control	45.0	52.8	48.0	32.7	3834	-

\* Mean of four locations

**Recommendation:** The combination product of TMP can be recommended as alternate chemical for the management of blast, brown spot, sheath rot and grain discoloration.

### 5. Evaluation of newer fungicide Zineb + Hexaconazole (combination product) for the management of rice sheath blight

A combination product of Zineb + Hexaconazole (0.20 %) was found effective in minimizing the sheath blight incidence (21.4 PDI) as compared to untreated control which recorded the highest disease incidence (48.6 PDI). Besides, the combination product of Z + H also reduced the incidence of brown spot (28.6 PDI) and grain discoloration (30.8 PDI).

With regard to grain yield, the newer molecule Z + H (0.25 %) was found significantly superior in recording the highest grain yield (4771 kg/ha) as against the untreated control which registered the lowest grain yield of 3777 kg/ha.

#### Efficacy of Zineb + Hexaconazole combination product (Z + H) against sheath blight of rice

Treatment	Sheath blight (PDI)	Brown spot (PDI)	Grain discoloration (PDI)	Grain yield (kg/ha)	Net Gain (Rs/ha)
T <sub>1</sub> - Z + H @ 2.0 g / lit	21.4	28.6	30.8	4771	4964
T <sub>2</sub> - Carbendazim @ 0.5 g / lit	22.8	38.6	39.3	4688	4766
T <sub>3</sub> - Control	48.6	48.4	44.3	3777	-

\* Mean of four locations

**Recommendation:** Combination product of Zineb + Hexaconazole (0.20 %) is recommended for the management of sheath blight disease.

### 6. Bio-intensive nematode management strategy for rice under SRI

Application of Super *Pseudomonas* as seed treatment @ 10 g/kg of seed decreased the population of rice root nematode, *Hirschmanniella oryzae* and root-knot nematode, *Meloidogyne graminicola* by 67 – 73% and increased grain yield by 10.5% under SRI conditions with a net gain value of Rs. 7191 /ha.

#### Effect of Super *Pseudomonas* on rice nematodes

Treatments	<i>M. graminicola</i>			<i>H. oryzae</i>		Grain Yield (kg/ha)
	Soil populn. / 250 cc	% decrease over control	Gall index	Soil populn. / 250 cc	% decrease over control	
Super <i>Pseudomonas</i> ST @ 10 g/kg	38.0 <sup>b</sup>	72.6	1.4 <sup>a</sup>	113 <sup>ab</sup>	63.6	6144.0 <sup>b</sup>
Super <i>Pseudomonas</i> ST @ 10 g/kg + soil application @ 2.5 kg/ha	29.5 <sup>a</sup>	78.7	1.2 <sup>a</sup>	87 <sup>a</sup>	72.0	6373.0 <sup>a</sup>
Carbofuran 3G @ 1 kg a.i/ha	31.0 <sup>a</sup>	77.6	1.4 <sup>a</sup>	107 <sup>a</sup>	65.5	6158.5 <sup>b</sup>
Control	139.0 <sup>c</sup>		3.4 <sup>b</sup>	311 <sup>c</sup>		5560.0 <sup>c</sup>
CD (P=0.05)	3.9		0.72	22.8		155.1

(Mean of three On farm trials)

**Effect of Super *Pseudomonas* application on rice nematode control efficiency, yield and economics**

Treatments	Nematode control efficiency (%)	Grain Yield (kg/ha)	Added cost (Rs/ha)	Added return (Rs/ha)	Net gain (Rs/ha)
Super <i>Pseudomonas</i> ST @ 10 g/kg	68.1	6144	100	4088	7191
Super <i>Pseudomonas</i> ST @ 10 g/kg + soil application @ 2.5 kg/ha	75.3	6373	300	5691	5988
Carbofuran 3G @ 1 kg a.i/ha	71.5	6158	2100	4186	2086

(Mean of three on farm trials)

## PULSES

### 1. Management of powdery mildew disease using plant oils in Greengram

Foliar application of Eucalyptus oil 30 EC (0.2%) twice at initial stage of disease appearance and 15 days later effectively reduced the powdery mildew incidence (2.07 grade) and increased the yield (711.4kg/ha) with the B:C ratio of 1: 1.64, as against the maximum disease incidence of 4.87 grade with minimum seed yield of 432kg/ha in greengram. Though chemical treatment is effective, in lieu of eco-friendly approach, foliar application of Eucalyptus oil 30 EC is recommended.

#### Bio-efficacy of plant oils for the management of powdery mildew in Greengram

Sl. No.	Treatment	Powdery mildew (0-5 Grade)	Per cent reduction over control	Yield (kg/ha)	Net Gain (Rs/ha)
1	Pungam oil 30 EC (0.2%)	3.91	18.30	556	3300
2	Eucalyptus oil 30 EC (0.2%)	2.07	59.6	711	7175
3	Eucalyptus leaf extract (10%)	2.35	34.4	667	5875
4	Carbendazim (0.1%)	1.52	70.6	755	6675
5	Control ( water)	4.87	-	432	-

(Pooled analysis of five seasons data - *Kharif*, 2005 to *Kharif*, 2007)

**Recommendation:** Foliar application of Eucalyptus oil 30 EC (0.2%) twice at initial stage of disease appearance and 15 days later is recommended for the management of powdery mildew in greengram.

## OILSEEDS

### 1. New microbial consortia of PGPR and *Beauveria* for pest and disease management in Groundnut

#### Treatments

T <sub>1</sub>	P.f 1 + P.f (TDK 1) ST (10 g/kg) + SA (2.5 kg/ha-30,45 DAS)
T <sub>2</sub>	<i>Beauveria</i> (0.5%) foliar application (30 & 70 DAS)
T <sub>3</sub>	T <sub>1</sub> + T <sub>2</sub>
T <sub>4</sub>	Chemical control (Need based application of Neem oil 2% (30 DAS) and Quinalphos 25 EC @ 2 ml/lit (70 DAS)
T <sub>5</sub>	Untreated control

Need based chemical control with neem oil 2% (30 DAS) and Quinalphos 25 EC @ 2 ml/lit (70 DAS) recorded lower incidence of leaf miner (3.6%), *Spodoptera* (4.2%), rust (3.5) and late leaf spot (4.1). However it was comparable with microbial consortia of PGPR and *Beauveria* (T<sub>3</sub>) in terms of pest incidence.

#### New microbial consortia for pest and disease management

Treatments	Defoliation ( %)		Root rot (%)	LLS (%)	Rust (%)	Yield (kg/ha)	Net Gain (Rs/ha)
	Leaf miner	<i>Spodoptera litura</i>					
T <sub>1</sub>	23.2	9.2	10.00	7.5	7.9	1280	1800
T <sub>2</sub>	17.6	6.8	10.67	7.6	7.6	1300	2500
T <sub>3</sub>	19.6	8.2	9.33	7.1	7.2	1380	4600
T <sub>4</sub>	3.6	4.2	11.00	3.5	4.1	1450	4000
T <sub>5</sub>	18.8	13.6	12.00	8.5	8.5	1250	-

(Pooled mean of three trials Vriddhachalam and Tindivanam centres)

**Recommendation:** New microbial consortia as ST and SA on 30 & 45 DAS and foliar spray of *Beauveria* on 30 & 70 DAS is recommended for the management of pest and diseases of groundnut in lieu of ecofriendly approach.

### 2. Integrated Management of groundnut defoliators

IPM module recorded the minimum defoliation (4.4 & 21.6%) and recorded higher yield of 1430 kg pods/ha with more number of natural enemies with a CBR of 3.6 compared to 1475 and 1245 kg pod yield /ha in recommended and farmers practice, respectively.

Treatments	Defoliation (%)		Natural Enemies/Plant		Yield (kg/ha)	Net gain (Rs/ha)
	Leaf miner	<i>Spodoptera litura</i>	Coccinellid	Syrphids		
					Farmers practice	26.4
IPM module	21.6	4.4	3.4	3.4	1430	10575
Recommended practice	26.4	6.2	2.8	2.8	1475	6840
Control	30.2	9.0	4.2	4.2	1047	--

(Pooled mean of Vriddhachalam and Tindivanam centres)

### IPM module

- Seed treatment with *T. viride* @ 4 g/kg of seed
- Trap cropping with castor
- Pheromone trap @ 12/ha
- Bird perches (Bamboo stacks) @ 50/ha
- NSKE 5% (Twice)

**Recommendation:** IPM module is recommended for the management of defoliators.

### 3. New microbial consortia of PGPR and *Beauveria* for pest and disease management in sesame

#### Treatments

- T<sub>1</sub> P.f 1 + P.f (TDK 1) ST (10 g/kg) + SA (2.5 kg/ha-30,45 DAS)  
T<sub>2</sub> *Beauveria* (0.5%) foliar application (30 & 70 DAS)  
T<sub>3</sub> T<sub>1</sub> + T<sub>2</sub>  
T<sub>4</sub> Chemical control (Need based application of Neem oil 2% (30 DAS) and Quinalphos 25 EC @ 2 ml/lit (70 DAS)  
T<sub>5</sub> Untreated control

*Pf* - TDK1 as seed treatment (10 g/kg), SA (2.5 kg/ha 30, 45 DAS) and foliar application of *Beauveria* (0.5%) on 20 and 45 DAS recorded more yield (675 kg/ha) and CBR (1.61) with reduced incidence of root rot (3.74%) and shoot webber (4.10%).

### New microbial consortia of PGPR and *Beauveria* for pest and disease management

T. No	Phyllody (%)	Root rot (%)	<i>Alternaria</i> (G)	Powdery mildew (G)	Shoot webber (%)	Yield (Kg/ha)	Net gain (Rs/ha)
T 1	4.19	1.05	3.00	1.00	6.66	655	3960
T 2	4.86	1.39	2.00	1.33	6.89	555	2260
T 3	3.74	0.22	1.67	0.67	4.10	675	4360
T 4	6.27	1.56	3.00	2.00	3.33	520	1260
T 5	6.30	1.89	4.00	2.33	10.34	457	--

(Pooled mean of Vriddhachalam, Aliyarnagar and Tindivanam centres)

**Recommendation:** New microbial consortia of PGPR and *Beauveria* are recommended for pest and disease management in sesame.

### 4. Eco-friendly management of pod bug in sesame

- T<sub>1</sub> Removal of crop residues +NSKE 5% + Light trap @ 1no./ heap + Malathion 5 % dust @ 500 g/heap  
T<sub>2</sub> Removal of crop residues + Neem oil @10 ml /lit + Light trap @ 1no./ heap+ Malathion 5 % dust @ 750 g/heap  
T<sub>3</sub> Removal of crop residues + NSKE 5% +Light trap @ 1no./ heap + Carbaryl 10% dust @ 500 g/heap  
T<sub>4</sub> Removal of crop residues + Neem oil @10 ml /lit +Light trap @ 1no./ heap+ Carbaryl 10% dust @ 750 g/heap  
T<sub>5</sub> Removal of crop residues + NSKE 5% +Light trap @ 1no./ heap+ Wooden structure for heaping + Neem leaf powder@ 1kg/heap  
T<sub>6</sub> Untreated control



Removal of crop residues + foliar application of NSKE 5% at 1 day before harvest + light trap @ 1no./ heap + Carbaryl 10% D @ 500 g/heap ( T<sub>3</sub>) has recorded the lowest population of pod bug, maximum seed yield of 551 kg/ ha with the net gain of Rs. 2700 / ha.

### Eco-friendly management of pod bug

Treatments	PreTC in field (No./Pt)	Post Treatment Count in threshing floor (No. / heap)			Yield (Kg/ha)	Net gain (Rs/ha)
		1 DAT	3 DAT	7 DAT		
T <sub>1</sub>	8.80	4.20	4.30	8.35	493	1740
T <sub>2</sub>	9.25	3.40	3.20	7.95	519	1960
T <sub>3</sub>	9.05	2.35	2.35	5.75	551	2700
T <sub>4</sub>	9.20	3.80	4.20	8.55	518	1940
T <sub>5</sub>	8.80	5.00	5.10	10.10	481	800
T <sub>6</sub>	9.10	48.85	61.15	79.00	361	--

(Pooled mean of Coimbatore and Vriddhachalam centres)

**Recommendation:** Removal of crop residues + foliar application of NSKE 5% at 1 day before harvest+ light trap @ 1no./ heap + Carbaryl 10% D @ 500 g/heap is recommended for the management of podbug.

### 5. Designer seed for pest and disease management in Sunflower

Sunflower designer seed module I comprising of polymer 3 g/kg + Carbendazim 2 g/kg + imidacloprid 5 g/kg + Azospirillum 120 g/kg of seed recorded reduced incidence of thrips, leaf hoppers, whiteflies, necrosis, Alternaria leaf spot and rust with a higher yield of 2640 kg/ha and CBR of 3.96 compared to 1445 Kg/ha in untreated check.

### Designer seed for pest and disease management

T	Pest Incidence (No. / plant)			Disease Incidence			Yield (Kg/ha)	Net Gain (Rs/ha)
	Thrips	Whiteflies	Leaf hoppers	Alternaria (PDI)	Necrosis (%)	Rust (PDI)		
T <sub>1</sub>	0.50	0.20	0.50	13.2	6.8	2.2	2640	12150
T <sub>2</sub>	3.30	0.76	3.10	8.6	9.34	0.6	2065	6600
T <sub>3</sub>	4.50	1.70	5.20	15.8	21.5	4.2	1445	-

(Pooled mean of Coimbatore and Vriddhachalam centres)

- T<sub>1</sub> Polymer 3g+Carbendazim 2g+ imidacloprid 5g+Azospirillum 120g/Kg of seed.
- T<sub>2</sub> Polymer 3g+Pseudomonas 40g+Trichoderma 20g + Azospirillum 120g/Kg of seed.
- T<sub>3</sub> Untreated check

**Recommendation:** Sunflower designer seed module I comprising of polymer 3g/kg + Carbendazim 2g/kg + imidacloprid 5g/kg +Azospirillum 120g/kg is recommended for the management of pests and diseases .

## PALMS

### 1. Management of lethal leaf blight of coconut

Root feeding of Carbendazim 2% @ 100 ml / palm at quarterly intervals reduced the lethal leaf blight disease severity (14.6 %) and increased the nut yield (103 nuts / palm / year) with a net gain of Rs.85 per tree per year.

#### Management of coconut leaf blight disease

Treatments	Reduction in disease intensity	Mean nut yield/palm/year	Net gain (Rs.) / palm/year
T <sub>1</sub> - RF – Tridemorph 2% @ 100 ml/palm	12.3	98	63
T <sub>2</sub> - RF – Carbendazim 2% @ 100 ml/palm	14.6	103	85
T <sub>3</sub> - RF – Hexaconazole 2% @ 100 ml/palm	11.4	92	42
T <sub>4</sub> - Control	-	76	-
CD(P=0.05)	3.6	7.7	

(RF – Root feeding: (Pooled mean of four locations))

**Recommendation:** Root feeding with Carbendazim 2% thrice at quarterly intervals was effective in reducing the leaf blight intensity and increased the nut yield.

## NON CROPS

### (Sericulture, Apiculture, Nematology and Toxicology)

### 1. Botanical based silkworm uzifly ovipositional deterrent

#### Details of Technology

- Seed extract of the medicinal herb *psoralea* (petroleum extract) @ 1000 ppm (1 ml / 1 litre water) acts as ovipositional deterrent for the silkworm uzifly
- Increases the larval, cocoon and shell weight and shell ratio
- *Psoralea* treatment reduced larval mortality by 64%
- Uzifly pierced cocoon reduced by 55% and cocoon yield level increased by 24%
- Five ml of botanical formulation dissolved in 5 litres of water for spraying – 100 dfls of silkworm larvae

#### Benefits

- Botanical based ovipositional deterrent
- Safer to silkworm
- Possess Juvenile Hormone, activity helps in increasing cocoon productivity and economic parameters

## Economics

Treatments	Yield / 100 dfls (kg)	Addnl. cost incurred / 100 dfls	Addnl. benefits / 100 dfls	Benefit Cost
Psoralea seed extract treated	43.0	Rs.155	Rs.1725	11.25
Untreated control	32.80	-	-	-
Per cent difference over control	23.72	-	-	-

### 2. Development of IPM strategies for sugarcane woolly aphid

The IPM module comprising of intercropping of groundnut and border cropping of cowpea, release of *Dipha aphidivora* @ 1000 larvae/ha at initial stage of infestation and second release 15 days later and six releases of *Trichogramma* from 4<sup>th</sup> month onwards @ 2.5 cc /release at an interval of 15 days has recorded the minimum number of SWA (3.8/6.25 cm<sup>2</sup>), maximum cane yield (74.7 t/ha) with the B:C ratio of 1:2.6 as against 59.4 tonnes of cane yield in farmers practice.

#### Integrated management of sugarcane woolly aphid

Treatment	Pre-treatment count		Post treatment count (180 DAT)		Natural enemies / clump at 210 DAT		Yield (t/ha)	Net Gain (Rs/ha)
	SWA/ 6.25 cm <sup>2</sup>	Dipha / Clump	SWA/ 6.25 cm <sup>2</sup>	Dipha / Clump	Coccinellids	Syrphids		
T <sub>1</sub>	57.2	0.0	3.8 a	4.3 a	5.4a	6.2a	74.7a	12600
T <sub>2</sub>	58.6	0.0	61.3 b	0.9 b	2.5b	2.4b	59.4b	--

T<sub>1</sub> - IPM module; T<sub>2</sub> - Farmers practice

**Recommendation :** The IPM module comprising of intercropping of groundnut and border cropping of cowpea, release of *Dipha aphidivora* @ 1000 larvae/ha at initial stage of infestation and second release 15 days later and six releases of *Trichogramma* from 4<sup>th</sup> month onwards @ 2.5 cc /release at an interval of 15 days is recommended for the management of sugarcane woolly aphids.

### 3. Single brood comb stabilization technique for stabilizing newly captured stingless bee colonies

In single brood comb stabilization technique for stabilizing newly captured stingless bee colonies, retention was 100 per cent as against 55 per cent in the conventional technique.

Sl. No.	Parameters	Conventional Technique			New Technique		
		BSR	CBE	KKM	BSR	CBE	KKM
1.	No.of colonies captured	3	2	2	3	2	2
2.	No.of colonies stabilized	2	1	1	3	2	2
3.	No.of colonies deserted	1	1	1	0	0	0
4.	Per cent Success	66	50	50	100	100	100
5.	Commencement of pollen foraging (DAH)	1	1	1	1	1	1
6.	New comb construction (DAH)	7	6	7	7	6	7

**Recommendation:** Single brood comb stabilization technique is recommended for stabilizing newly captured stingless bee colonies.

#### 4. Bio-efficacy of imidacloprid against tobacco aphid *Myzus persicae*

Imidacloprid 250 ml /ha caused 99.57% reduction in aphid population over untreated control with the maximum leaf yield of 1625 Kg/ ha with the B:C ratio of 1:3.75, as against 2.8 in the farmers' practice. Residues of imidacloprid at the recommended dose of 250ml/ ha and double the recommended dosage were not detectable when analyzed one week after spray.

#### Bio-efficacy of imidacloprid against tobacco aphid *Myzus persicae*

(Pooled mean of trials conducted at two locations)

Treatments	Number of aphids/ 3 leaves/plant				Reduction over control (%)		Yield (Kg/ha)	Net Gain (Rs/ha)
	I Spray		II Spray		I Spray	II Spray		
	PTC	PoTC	PTC	PoTC				
Imidacloprid 250 mlha <sup>-1</sup>	186	8.50	6.0	0.75	95.53	99.57	1625	4612
Farmers practice	189	72.00	75.0	33.00	62.16	81.06	1350	2090
Untreated control	205	190.25	338	174.25	-	-	880	-

- PTC - Pre treatment count; PoTC - Post treatment count

**Recommendation:** Imidacloprid @ 250 ml /ha is recommended for the management of tobacco aphids.

#### 5. Foliar nutrition for higher silk yield

In mulberry, foliar application of 1 % urea on 25<sup>th</sup> day of pruning resulted in higher leaf yield (0.987 kg/plant), increased cocoon weight (1.49 g) with an additional income of Rs. 3, 640 as against 0.623 kg leaf yield and 1.21 g cocoon weight in unsprayed crop.

#### Foliar nutrition for higher silk yield

Treatments	Plant height (cm)	100 leaf weight (g)	Leaf yield (kg)	Larval weight (g)	Cocoon weight (g)	Shell ratio (%)	Additional yield (kg)	Additional income (Rs.)
Urea spray 1%	168.3	3.21	0.987	3.74	1.49	19.45	0.364	3,640
Unsprayed	148.7	2.66	0.623	3.01	1.21	17.80	---	---

(Pooled analysis of results of Coimbatore, Erode and Salem)

#### Economics

Partial budgeting of foliar nutrient supplementation  
 Added cost : Rs. 1,025  
 Added return : Rs. 3,640  
 Net gain : Rs. 2,615  
 Incremental Cost Benefit ratio (ICB) : 1 : 3.55

**Recommendation:** On 25<sup>th</sup> day of pruning, mulberry can be sprayed with 1 % urea for higher mulberry and cocoon yield.

## B. FOR ON FARM TESTING

### RICE

#### 1. Effect of Castor Oil Soaps on rice leaffolder and stemborer

Home-made castor oil based soft soaps have the potential to check soft-bodied insects such as early instar caterpillars and eggs by interfering with insect cuticle and cell respiration. Two of the castor oil-based soaps developed at AC & RI, Killikulam have exhibited significant effect on leaffolder and stemborer in field experiments.

#### Effect of Castor Oil-based Soaps on rice leaffolder, stem borer and yield

Treatments	Dose	Leaffolder damage (%)	White ear (%)	Yield (kg/ha)	BC ratio
Castor oil soap - 1	1.0 %	4.5 (12.2)	5.04 (12.83)	5292.35	2.8:1
Castor oil soap - 2	1.0 %	4.3 (11.9)	4.59 (12.24)	5409.73	4.7:1
Castor oil soap - 3	1.0 %	4.9(12.4)	4.85 (12.63)	5281.88	2.7:1
Castor oil soap - 4	1.0 %	4.8 (12.6)	3.58 (10.68)	5336.10	3.2:1
Rosin Fish Oil Soap	2.5 %	4.8(12.5)	4.80 (12.32)	5268.05	2.8:1
Chlorpyriphos 20 EC	0.1 %	5.5 (13.4)	5.07 (12.79)	5230.55	2.8:1
Control		7.3 (15.6)	7.03 (15.23)	4884.71	2.5:1
CD (P=0.05)		1.72	1.82	393.98	

#### Proposed treatments

- Castor Oil Soap - 1 @ 1.0 %
- Castor Oil Soap - 2 @ 1.0 %
- Castor Oil Soap - 4 @ 1.0 %
- Neem Oil @ 3 %
- Profenophos 50 EC 0.04 %
- Untreated check

#### Experimental details

- Design: RBD
- Replication: 4
- Plot size: 20 m<sup>2</sup>
- First spray at 45 DAT; Subsequently need-based.

#### Observations to be made

- Leaffolder damage (%)
- Dead hearts (%)
- White ear (%)
- Natural enemies
- Grain yield and Benefit-cost ratio  
(Centres: Killikulam, Aduthurai, Coimbatore, Madurai, Trichy, Ambasamudram)

## MILLETS

### 1. Validation of pest management technologies against major pests of sorghum

Two years data revealed that the treatment *viz.*, seed hardening with  $\text{KH}_2\text{PO}_4$  + seed treatment with chlorpyrifos + *Pseudomonas* + Azophos recorded the lowest damage of shoot fly (Nil), stem borer on 30<sup>th</sup> and 45<sup>th</sup> DAE (2.78 & 4.81% dead heart, respectively), stem tunneling (28.94%), peduncle tunneling (26.93%) and midge damage (4.48%) with highest yield of 4,536 kg/ha as against the maximum shoot fly, stem borer and midge damage with the lowest yield of 3,218 kg/ha in untreated control.

Treatment	Dead hearts (%)		Midge damage (%)	Grain yield (Kg/ha)	Net Gain (Rs/ha)
	Shoot fly (21 DAE)	Stem borer (45 DAE)			
Seed treatment with chlorpyrifos	1.16	10.46	6.10	3,497	1656
Seed hardening + Seed treatment with <i>Pseudomonas</i> + Chlorpyrifos.	0.00	6.23	5.93	4,274	4724
Seed hardening + Seed treatment with <i>Pseudomonas</i> + Azophos + Chlorpyrifos.	0.00	4.81	4.48	4,536	5752
Untreated control.	9.05	26.35	9.33	3,218	--

(Centers: Pooled mean of two years trials conducted at ARS, Kovilpatti)

#### Treatments

- T<sub>1</sub> Seed hardening with  $\text{KH}_2\text{PO}_4$  (2%) for 6 hrs. + ST with chlorpyrifos (4 ml/kg seed) + *Pseudomonas* (10 g/ kg) + Azophos (10 g/ kg)
- T<sub>2</sub> Seed hardening with  $\text{KH}_2\text{PO}_4$  (2%) for 6 hrs. + ST with imidacloprid (5 g/kg seed) + *Pseudomonas* (10 g/ kg) + Azophos (10 g/ kg)
- T<sub>3</sub> Farmers practice (Spraying of methyl-0-demeton on 15 DAE + endosulfan on 45 DAE + dusting of carbaryl on 50% flowering and 15 days later)
- T<sub>4</sub> Untreated control

Replications: Five

Observations to be recorded:

1. Germination count
2. Shoot fly damage on 7, 14 and 21 DAE.
3. Stem borer damage on 30<sup>th</sup> and 45<sup>th</sup> DAE
4. Midge damage (per cent damaged spike lets)
5. Yield and C:B ratio

Action: ARS, Kovilpatti, RRS, Aruppukkottai, RRS, Paiyur

\* Professor (Entomology) at Kovilpatti may visit the OFT that will be conducted at various locations.

## 2. Developing IPM module for the management of major pests and diseases in pearl millet

Field trails were conducted at Coimbatore and Bhavanisagar to develop IPM module for the management of major pests and diseases in pearl millet. The results revealed that seed treatment with imidacloprid @ 10g/kg of seeds + Seed treatment with metalaxyl @ 6g/kg of seeds + Removal of downy mildew infected plants up to 45 days after sowing + Spraying of mancozeb @ 1,000g/ha + Spraying of NSKE 5 per cent @ 50 per cent flowering significantly recorded the lowest incidence of downy mildew (1.3%) and shoot fly infestation (2.1 %) as against 12.6 and 17.5 per cent in the control plots respectively.

Treatments	Dead heart (%)	Downy mildew (%)	Rust (G)	Grain mould (%)	Grain Yield (kg/ha)	Net gain (Rs/ha)
ST with metalaxyl @ 6g/kg + Removal of DM infected plants + Spraying of mancozeb @ 1kg/ha	14.8	3.45	3.2	5.55	1,702	472
ST with metalaxyl @ 6g/kg + ST with imidacloprid @ 10g/kg + Removal of DM infected plants + Spraying of mancozeb @ 1kg/ha + Spraying of NSKE @ 50% flowering	2.15	1.3	4.6	3.7	2,041	1568
Control	17.5	12.65	4.2	23.15	1,469	-

(Pooled results of trials conducted at TNAU, Coimbatore and ARS, Bhavanisagar)

### Treatments

- T<sub>1</sub> Seed treatment with metalaxyl @ 6g/kg + Seed treatment with imidacloprid @ 5 g/kg + Removal of DM infected plants + Spraying of mancozeb @ 1kg/ha + Spraying of NSKE @ 50% flowering
- T<sub>2</sub> Seed treatment with metalaxyl @ 6g/kg + Seed treatment with imidacloprid @ 10g/kg + Removal of DM infected plants + Spraying of mancozeb @ 1kg/ha + Spraying of NSKE @ 50% flowering
- T<sub>3</sub> Untreated Control

Replications : Seven

Observations to be recorded

1. Per cent downy mildew incidence at 30 and 60 DAS
2. Per cent shoot fly infestation
3. Rust intensity as per cent leaf area infected
4. Per cent ergot and grain mould
5. Yield and C:B ratio

Centers: TNAU, Coimbatore, ARS, Bhavanisagar, RRS, Aruppukkottai.

## PULSES

### 1. Microbial consortia for the management of podborer complex in pigeonpea

ST with Pf1 (10g) + SA (2.5 kg/ha) at 30 DAS + foliar application of endosulfan 0.07% at 50% flowering recorded minimum pod damage (23.4%) with the maximum seed yield of 1416.67 kg/ha, which was found to be on par with foliar application of endosulfan 0.07% at 50% flowering. The OFT is recommended for one more year for want of confirmatory results from both the centres.

#### Management of podborer complex in pigeonpea

Treatments	Pod damage (%)	Yield (Kg/ha)
T <sub>1</sub> - ST with <i>Beauveria</i> 10g + soil application (2.5 kg/ha) at 30 DAS	30.5	916.67
T <sub>2</sub> - ST with Pf1 (10g) + SA (2.5 kg/ha) at 30 DAS	46.5	1041.67
T <sub>3</sub> - ST with consortia (Pf + <i>Beauveria</i> ) + soil application at 30 DAS	38.1	1291.67
T <sub>4</sub> - Endosulfan spray 0.07% at 50% flowering	21.2	1416.67
T <sub>5</sub> - T <sub>2</sub> + Endosulfan spray	23.4	1416.67
T <sub>6</sub> - T <sub>1</sub> + Foliar application	41.0	1333.33
T <sub>7</sub> - Control	67.1	750.00

#### Treatments

- T<sub>1</sub> ST with *Beauveria* 10g + soil application (2.5 kg/ha) at 30 DAS
- T<sub>2</sub> ST with Pf1 (10g) + SA (2.5 kg/ha) at 30 DAS
- T<sub>3</sub> ST with consortia (Pf + *Beauveria*) + soil application (Pf + *Beauveria*) at 30 DAS
- T<sub>4</sub> - T<sub>3</sub> Foliar application (Pf + *Beauveria*)
- T<sub>5</sub> Endosulfan spray 0.07% at 50% flowering
- T<sub>6</sub> Untreated control

Replications: Four

Observations to be recorded

- Per cent damage of major pests and diseases
- Yield and C:B ratio

Centres : Coimbatore and Vamban

The bioagent formulation will be supplied by Dr.T.Raguchander

### 2. Bioinoculants for the management of podborer in Blackgram

For the management of podborer in Blackgram, seed treatment with *Beauveria bassiana* @ 10 g/kg + foliar application of *B. bassiana* @ 10 g /litre during flowering recorded 3.7 per cent damage as against 8.7 per cent damage in untreated control.



Treatment details	Pod borer damage (%)	Yield (Kg/ha)
ST- <i>Beauveria bassiana</i> (10g / kg)	5.5	665
FS - <i>B. bassiana</i> + Pf 1(5+5 g / lit)	5.0	838
ST- <i>B. bassiana</i> (10g / kg)+ FS - <i>B. bassiana</i> at 30 DAS (10 g/lit)	3.7	931
ST- <i>B. bassiana</i> +Pf 1(5+5 g/kg) + FS- <i>B.bassiana</i> + Pf 1(5+5 g/lit)	4.25	905
ST - (10g / kg) + FS - (10g/lit) on 30 DAS - Super Pseudomonas	4.50	895
ST - Imidacloprid (5g/kg)	5.9	590
Untreated control	8.70	465

### 3. Bio inoculants for the management of pests and diseases of Blackgram

#### Treatments

- T<sub>1</sub> ST- *B. bassiana* (10g / kg)+ FS - *B. bassiana* at 30 DAS (10 g/lit)
- T<sub>2</sub> ST-*B. bassiana* + Pf 1(5+5 g / kg) + FS- *B. bassiana* + Pf 1(5+5 g/ lit)
- T<sub>3</sub> ST - (10g / kg) + FS - (10g/lit) on 30 DAS - Super Pseudomonas
- T<sub>4</sub> ST (2g/kg) + FS (1g/lit) on 30 DAS - Carbendazim
- T<sub>5</sub> Untreated control

Replications: Four

Observations to be recorded

- Per cent damage of major pests and diseases
- Yield and C:B ratio

Centres : Coimbatore, Vamban, Arupukottai and Kovilpatti

The bioagent formulation will be supplied by Dr.T.Raguchander

### 3. Host Plant Resistance

Pigeonpea culture LRG 41 was found promising against pod borer complex. This culture will be tested for large scale demonstration in farmers holding's along with the checks (Co 6 and VBN2).

Action:

- Dr.C. Durairaj, Professor (Entomology), TNAU, Coimbatore.
- Dr. N.Chitra, Assistant Professor (Entomology),NPRC, Vamban.  
(The seeds will be arranged by Dr. C. Durairaj, Professor of Entomology for conducting the trials).

## SUGARCANE

### 1. Field Evaluation of *Dipha* against sugarcane woolly aphid

Field demonstration on the release of *Dipha aphidivora* larvae @ 1000 /ha thrice at an interval of 15 days found to contain the woolly aphid population compared to release of 1000 pupae/ha. Hence it has been proposed for large scale testing/network experiment.

#### Efficacy of *Dipha* against sugarcane woolly aphid in Co 86032

Dose of larvae/ pupae/ ha	No. of releases	Reduction of woolly aphid infestation (%) (DAR)				Yield (t/ha)
		30	60	90	120	
1000 larvae at 15 days interval.	1	22.4 <sub>b</sub>	38.6 <sub>b</sub>	62.4 <sub>c</sub>	75.8 <sub>d</sub>	76.3
	2	25.9 <sub>a</sub>	45.8 <sub>a</sub>	68.9 <sub>b</sub>	82.3 <sub>b</sub>	
	<b>3</b>	<b>26.2<sub>a</sub></b>	<b>46.2<sub>a</sub></b>	<b>73.8<sub>a</sub></b>	<b>88.2<sub>a</sub></b>	
1000 pupae at 15 days interval.	1	21.9 <sub>b</sub>	40.0 <sub>b</sub>	62.8 <sub>c</sub>	77.9 <sub>c</sub>	75.8
	2	25.7 <sub>a</sub>	46.1 <sub>a</sub>	68.7 <sub>b</sub>	81.9 <sub>b</sub>	
	<b>3</b>	<b>25.9<sub>a</sub></b>	<b>46.3<sub>a</sub></b>	<b>74.0<sub>a</sub></b>	<b>88.6<sub>a</sub></b>	

Treatments : Release of *Dipha* @ 1000 larvae / ha twice at 15 days interval

Observations to be recorded: Incidence of SWA (30,45, 60,75, 90, 105 and 120 days after release) will be recorded

Centres: Coimbatore, Cuddalore, Melalathur and Sirugamani

Field evaluation of *Micromus* sp. against sugarcane woolly aphid

T<sub>1</sub>- Release of 1500 *Micromus* grubs/ ha

T<sub>2</sub> - Release of 2000 *Micromus* grubs/ha

T<sub>3</sub> - Release of 2500 *Micromus* grubs/ha

T<sub>4</sub> - Release of 3000 *Micromus* grubs/ha

T<sub>5</sub> - Release of *Dipha* @ 1000 larvae/ha

Methodology: Three releases at 15 days interval

Observations to be recorded

- Incidence of SWA (30,45, 60,75, 90, 105 and 120 days after release) will be recorded

Centres: Coimbatore, Cuddalore, Melalathur and Sirugamani

### 2. Field evaluation of promising resistant/ moderately resistant clones against red rot

Clones: C 20136, G 05004, G 05005, G 05018, G 05020, G 05047, G 05019, G 05105, G 05807, C 20247, C 22044 and Si 2004-70

Standard Checks: Co C 671 and Co 86032

Methodology: Standard Evaluation Procedure (Nodal & Plug methods) will be followed

Centres: Cuddalore , Melalathur & Sirugamani

# COTTON

## 1. Management of cotton stem weevil

Treatment	Stem Weevil			
	Plant infestation (%)		Plant Mortality (%)	
	SVPR	KPT	SVPR	KPT
T <sub>1</sub> - Seed treatment with chlorpyrifos @10 ml/ kg	44.17 (41.65)	42.63 (40.76)	9.31 (17.76)	3.40 (10.65)
T <sub>2</sub> - Seed treatment with chlorpyrifos @10 ml/ kg + Drenching collar region with chlorpyrifos @ 2.5 ml /l at 15 and 30 DAS and earthing up	41.17 (39.91)	19.93 (26.43)	8.07 (16.49)	1.50 (6.71)
T <sub>3</sub> - Seed treatment with imidacloprid @10 ml/ kg + Drenching collar region with chlorpyrifos @ 2.5 ml /l at 15 and 30 DAS and earthing up	42.20 (40.51)	25.98 (30.58)	8.64 (17.09)	1.60 (7.11)
T <sub>4</sub> - Seed treatment with <i>Beauveria</i> @ 10 g / kg + soil application @ 2.5 kg / ha on 20 DAS and earthing up	42.70 (40.80)	39.43 (38.89)	9.60 (18.04)	3.60 (10.86)
T <sub>5</sub> - Seed treatment with <i>Beauveria</i> + Pf 1 each 10 g + soil application each at 2.5 kg / ha on 20 DAS and earthing up	42.62 (40.75)	37.70 (37.88)	9.33 (17.78)	3.00 (9.84)
T <sub>6</sub> - Untreated check	49.79 (44.88)	65.78 (54.26)	10.85 (19.23)	8.50 (16.66)
CD	(0.60)	(2.81)	(0.84)	(2.51)

(Figures in parenthesis are arcsine transformed values)

Field trials conducted at Srivilliputhur and Kovilpatti indicated that seed treatment with chlorpyrifos @10 ml/ kg + Drenching collar region with chlorpyrifos @ 2.5 ml /l at 15 and 30 DAS and earthing up was found to be effective in reducing the stem weevil infestation. Histopathological studies indicated that *Beauveria* is found to be infective to eggs and grubs indicating the endophytic nature. Hence the following treatments are proposed for OFT.

### Treatments

- T<sub>1</sub> Seed treatment with chlorpyrifos @10 ml/ kg + Drenching collar region with chlorpyrifos @ 2.5 ml /l at 15 and 30 DAS and earthing up
- T<sub>2</sub> Seed treatment with chlorpyrifos @10 ml/ kg + *Beauveria* @ 10 g / kg + Drenching collar region with chlorpyrifos @ 2.5 ml /l at 15 and 30 DAS + soil application of *Beauveria* @ 2.5 kg / ha on 20 DAS and earthing up
- T<sub>3</sub> Seed treatment with imidacloprid @10 ml/ kg + Drenching collar region with chlorpyrifos @ 2.5 ml /l at 15 and 30 DAS and earthing up
- T<sub>4</sub> Seed treatment with imidacloprid @10 ml/ kg + *Beauveria* @ 10 g / kg + Drenching collar region with chlorpyrifos @ 2.5 ml /l at 15 and 30 DAS + soil application of *Beauveria* @ 2.5 kg / ha on 20 DAS and earthing up
- T<sub>5</sub> Seed treatment with *Beauveria* + Pf 1 each 10 g + soil application each at 2.5 kg / ha on 15 DAS and earthing
- T<sub>6</sub> Untreated check

### Observations to be recorded

- Per cent infestation
- No. of galls / plant
- Yield
- C: B ratio

Centres : Coimbatore , Srivilliputtur, Aruppukottai , Kovilpatti

## 2. Management of cotton mealybug

Results of on farm trial indicated that methyl parathion and chlorpyrifos were found to be effective in reducing the mealybug incidence.

Treatments	Dose (ml or gm /lit)	Pre-treatment count (No / 5 cm of stem)	No. of mealy bugs at 7 <sup>th</sup> DAT ( No / 5 cm of stem)	
		Mean	Mean	Transformed values
Acephate	2	8.85	8.55	(2.92) d
Fish oil Rosin Soap	25	8.55	7.98	(2.82) c
Kerosene	20	8.40	3.15	(1.77) b
Methyl parathion	2	8.45	0.38	(0.58) a
Chlorpyrifos	5	8.93	0.33	(0.54) a
Untreated check	-	7.90	9.83	(3.13) d
Mean			5.03	(1.96)
CD				(0.24)

Hence the following treatments are proposed for on farm testing

Treatments

S.No.	Treatments	Dose (ml or gm /lit)
1	Acephate	2 g /lit
2	Chlorpyrifos	2.5 ml /lit
3	Chlorpyrifos	5 ml /lit
4	Methyl parathion	2 ml /lit
5	Profenophos	2.ml /lit
6.	FORS	40g/lit
7	Untreated check	--

Time of application: Once immediately after appearance & second after a fortnight

Treatments proposed:

- Per cent plants infestation
- Damage by grading (1,5 & 10 DAS)
- Natural eneies
- Yield

Centres : Coimbatore , Srivilliputtur, Aruppukottai

Spray schedule: Spray at first appearance of disease or 90 DAS followed by 15 days interval twice.

Observations to be recorded:

- Disease incidence as PDI based on the 0-4 scale grade
- Yield
- C: B ratio

## OILSEEDS

**1. Biological control of *A. flavus* infection and aflatoxin contamination in groundnut under field conditions (Kharif 2007)**  
(Vriddhachalam cv. VRI-2 ) (Bhavanisagar cv. Co-3)

Seed treatment (10 g/Kg) and soil application (2.5 Kg/ha) with *Burkholderia gladioli* had minimum contamination of 0.6 µg/Kg and 5.8 µg/Kg with a pod yield of 1822 -3150 Kg/ha compared to 9.1 to 31.5 and 71.4 – 92.4 µg/Kg with a pod yield of 1822- 3015 and 1255 – 2975 Kg/ha in carbendazim and untreated check respectively at both Vriddhachalm and Bhavanisagar.

Treatments	AFB1 in kernels (µg/Kg)		Yield (Kg/ha)	
	VRI	BSR	VRI	BSR
ST with <i>B. gladioli</i> (10g/kg)	3.8	4.2	1732 b	3128 ab
SA (30,45 and 60 DAS) (2.5 kg/ha)	5.6	8.7	1815 a	3223 a
ST+SA with <i>B. gladioli</i>	0.6	5.8	1822 a	3150 ab
Seed treatment with Carbendazim (2g/Kg)	31.5	9.1	1697 c	3015 ab
Untreated control	71.4	92.4	1255 d	2975 ab

**Biological control of *A. flavus* infection and aflatoxin contamination in groundnut**

Treatments

1. ST with *B. gladioli* (10g/kg)
2. SA with *B. gladioli* (30,45 and 60 DAS) (2.5 kg/ha)
3. ST + SA with *B. gladioli*
4. ST with Carbendazim (2g/Kg)
5. Untreated control

Plots size 5×3 m<sup>2</sup>

Spacing 30 × 10 cm

Replication 4

Observations to be recorded

- Plant biomass
- 100 seed weight
- Oil content
- *flavus* infection
- Aflatoxin B1 content in kernels
- Pod yield

(Action: Vriddhachalam, Aliyarnagar, Tindivanam, Bhavanisagar)

**2. Effect of PGPR and *Beauveria* mixtures on leaf miner and collar rot of groundnut**

Among the various combinations of entomopathogenic fungi, *Beauveria* and plant growth promoting rhizobacteria (PGPR) used as seed treatment and foliar spray, *Beauveria* + *Pseudomonas* TDK1 + Pf1 treatment recorded low disease incidence of 0.10 per cent compared to 30.50 per cent in untreated check. Similarly,

mixture of *Beauveria* and *Pseudomonas* strains treated plots recorded lower incidence of 0.66 % of leafminer compared to 17.00 % in untreated plots. The above new consortia treatment recorded the highest yield of 2375 and 2675 kg/ha from trial I (rainfed) and II (irrigated), respectively which is significantly different from all other treatments including chemical treatment. Lowest yield of 1033 and 1200 kg/ha was recorded from trial I and II, respectively in the untreated control plots. In general, all the treatments were effective in increasing the pod yield of groundnut compared to the chemical and untreated control from trial I and II.

#### Treatments

T<sub>1</sub> - *Beauveria* + TDK 1 (Seed treatment + foliar spray)

T<sub>2</sub>- TDK 1 + Pf1 (Seed treatment + foliar spray)

T<sub>3</sub> - *Beauveria* + TDK 1 + Pf1 (Seed treatment + foliar spray)

T<sub>4</sub>- Chemical (Insecticide and Fungicide) (Seed treatment + foliar spray)

T<sub>5</sub>- Control

Observation to be recorded

1. Leafminer incidence
2. Collar rot incidence
3. Natural enemies
4. Yield

(Action: Vriddhachalam, Aliyarnagar, Tindivanam, Bhavanisagar)

#### Efficacy of PGPR and *Beauveria* mixtures on collar rot and leaf miner incidence of groundnut

Treatments	Collar rot incidence (%)	Leaf Miner incidence (%)	Rainfed condition (Trial I)		Irrigated condition (Trial II)	
			Yield (kg/ha)	BC Ratio	Yield (kg/ha)	BC Ratio
T1 - <i>Beauveria</i>	13.00 <sup>f</sup>	3.66 <sup>c</sup>	1583 <sup>g</sup>	1 : 3.2	1875 <sup>f</sup>	1 : 3.9
T2 - TDK 1	3.33 <sup>d</sup>	5.26 <sup>d</sup>	1916 <sup>e</sup>	1 : 5.1	2100 <sup>e</sup>	1 : 5.2
T3 - Pf1	4.75 <sup>e</sup>	6.16 <sup>d</sup>	1791 <sup>f</sup>	1 : 4.4	2075 <sup>e</sup>	1 : 5.1
T4 - <i>Beauveria</i> + TDK 1	1.20 <sup>bc</sup>	2.00 <sup>b</sup>	2083 <sup>c</sup>	1 : 6.1	2400 <sup>c</sup>	1 : 6.9
T5 - <i>Beauveria</i> + Pf1	2.25 <sup>c</sup>	2.50 <sup>bc</sup>	2000 <sup>d</sup>	1 : 5.6	2325 <sup>d</sup>	1 : 6.5
T6 - TDK 1 + Pf1	0.90 <sup>ab</sup>	5.00 <sup>d</sup>	2166 <sup>b</sup>	1 : 6.6	2,454 <sup>b</sup>	1 : 7.3
T7 - <i>Beauveria</i> + TDK 1 + Pf1	0.10 <sup>a</sup>	0.66 <sup>a</sup>	2375 <sup>a</sup>	1 : 7.8	2675 <sup>a</sup>	1 : 8.6
T8 - Chemical	5.20 <sup>e</sup>	3.33 <sup>c</sup>	1875 <sup>e</sup>	1 : 4.5	2390 <sup>c</sup>	1 : 5.8
T9 - Control	30.50 <sup>g</sup>	17.00 <sup>e</sup>	1033 <sup>h</sup>	-	1200 <sup>g</sup>	-

Values are mean of three replications

Means followed by a common letter are not significantly different at 5% level by DMRT

**NON CROPS**  
(Sericulture, Apiculture, Nematology and Toxicology)

**1. IPM packages for silkworm pest and diseases management**  
(Technical Service Centres of Coimbatore and Gopichettipalayam)

Sl. No.	Particulars	Larval mortality (%)	Yield / 100 dfls (kg)
1	IPM for Uzi fly	5.94	64.00
	Control 1	11.26	42.17
2	Grasserie management	4.30	68.23
	Control 2	8.86	61.20
3	Flacherie Management	0.24	76.80
	Control 3	16.90	58.00

IPM for Uzi fly, Grasserie and Flacherie in silkworm helped in reducing the larval mortality and increased the cocoon yield.

Treatments:

1. TNAU IPM package for Uzi fly, grasserie and flacherie (Acephor, TNAU Seridust, Chloromphenicol and *Nesolynx* hyper parasite)
2. Farmer's practice

Locations: Ten trials in Technical Service Centres of Annur and Gopichettipalayam

Observations to be recorded:

- Pest and disease incidence
- Silkworm economic parameters
- C:B ratio

# HORTICULTURE

## I. CROP IMPROVEMENT

### A. FOR ADOPTION

#### BRINJAL – PLR (B) 2

Parentage	:	Single plant selection from Sevanthampatti village of Trichy Dist.
Duration	:	145 days
Season	:	April-May, June-July & Dec.-Jan.
Yield	:	38 t/ha (15.4% increase over PLR 1)
Highest yield obtained	:	42 t/ha
Area of adoption	:	Suitable for Cuddalore, Villupuram, Tiruvannamalai, Vellore, Kancheepuram and Perambalur districts

#### Special features

- Fruits are oval in shape, dark purple with pink tinge and glossy
- Excellent cooking quality
- Suitable for all types of culinary preparations
- Consumer preference because of better taste, flavour, texture & colour
- Moderately resistant to brinjal shoot and fruit borer
- Suitable for all seasons

#### MANILA TAMARIND – PKM (MT) 1

Parentage	:	Open pollinated seedling selection from Soolakkarai at Virudhunagar district
Duration	:	Perennial
Season	:	June – September
Yield	:	79 kg/tree/year (30.0% increase over Local type)
Highest yield obtained	:	125 kg/tree/year (11.85 t/ha)
Area of adoption	:	Throughout Tamil Nadu especially in the rainfed tracts of Southern districts

#### Special features

- Tolerates sewage water stagnation and grows well in sandy, saline and alkaline soils
- Regular bearer – bears in clusters (2-3)
- Spirally twisted fruits with clear constrictions, pale yellow pods, white attractive aril
- Skin of fruits at maturity turns yellow and seeds turn black



## B. FOR ON FARM TESTING

### Banana

A banana hybrid H 212 was developed by using Pisang Lilin as male parent and Karpooravalli as female parent. The bunch weight is around 13 kg. Individual fruit weight is 76 g. Number of hands and number of fingers in a bunch is 11 and 160 respectively. The TSS content is 26%. Duration is 362 days. This hybrid is tolerant to nematodes, and akin to Ney Poovan.

The hybrid NPH – 02-01 resembles Pachanadan. It is evolved by crossing H - 201 and Anaikomban. The bunch weight is 19 kg. Individual finger weight is 77.60 g and number of fingers in a bunch is 213. The TSS content is 16.8%. It is resistant to *Fusarium* wilt and nematode (*Pratylenchus* spp.). H-531 is a cross between Poovan and Pisang Lilin. This hybrid is akin to Poovan. It recorded a bunch weight of 13.5 kg with 9 hands and 126 fingers in a bunch. Individual fruit weight is 98g. TSS content is 22.50 ° Brix. It is resistant to nematode and *Fusarium* wilt.

### Papaya

A new genotype CP-50 (Wild papaya x C0.6), field tolerant to PRSV, with castor leaf type was identified from papaya germplasm. The yield/tree/year is 52.8 kg. The number of fruits/tree is 26 and individual fruit weight is 2.03 kg. The TSS content is 13°brix. Papain yield/fruit is 20 g wet latex.

### Pear

The culture Pc-5 recorded the highest fruit yield of 13.8 kg/tree/year which was 22.5 per cent higher than the local type (10.7 kg/tree/year). The fruits are sweet and soft with very good market acceptability. Pc-5 was an early season culture and the fruits are ready for harvest during the peak summer (April – May). Regular varieties arrive market during July-Sep.

### Tomato hybrid

The identified tomato hybrid COLCNRH.1 is resistant to leaf curl and root knot nematode with good yield potential. The fruits are oblong shape with an average fruit weight of 65.6g. It recorded a yield potential of 75 t/ha. The hybrid recorded the ascorbic acid content of 31.2 mg/100 g, TSS content of 5.81°brix and lycopene content of 6.48 mg/100g. Four number of pesticide sprays can be reduced in this hybrid as it is resistant to TLCV apart from resistance to root knot nematode.

### Tomato hybrid

The tomato hybrid COLCNRH.2 has recorded a yield of 80 t/ha with resistance to leaf curl virus having (2.33 TLCV diseases). The hybrid is also resistant to root knot nematode with a gall index of 2.46 (resistant). The average weight of the fruit is 61.8 g with an ascorbic acid content of 33.9 mg/100 g, TSS (5.9°brix) and lycopene content of 5.92 mg/100g. Approximately 2.5 lt of pesticide / ha can be saved in which four pesticide sprays can be reduced.

**Chilli hybrid**

The chilli hybrid CCH 1 is resistant to anthracnose disease with an average green chilli yield of 20 t/ha. The fruits are long, smooth and dark green with a mean fruit number of 149.3 per plant. The percent disease incidence recorded in this hybrid for fruit rot was 2.46. This hybrid is suitable for green chilli.

**Brinjal hybrid**

The brinjal hybrid CBH 2 is tolerant to shoot and fruit borer with an incidence percent of 11.12. The average weight of the fruit is 45 – 60g. The fruits are dark purple with shiny skin and a yield potential of 60 t/ha without the application of pesticide. The seeds of the hybrid have been sent for ART / MLT.

**Turmeric**

The performance of the identified promising culture CL 101 was studied in four locations viz., Tamil Nadu Agricultural University, Coimbatore, Agricultural Research Station, Bhavanisagar, and in farmer's field at Boluvampatti and Alandurai. The mean yield was 49.3 t/ha with the curcumin content of 3.5 percent. The curing percentage was 16.10 per cent.

**Pepper**

The identified promising culture in pepper PN 57 registered the yield of 9.4 kg and 2.8 kg of green and dry berry yield followed by PN 33 which recorded the yield of 7.6 kg and 2.2 kg of green and dry berry at Horticultural Research Station, Yercaud. These two accessions have been forwarded to the coordinated varietal trial for further evaluation.

**Nutmeg**

Among the 22 accessions evaluated the performance of Selection 4 from Castle Rock, Kanyakumari district was found to be best. The number of fruits per tree is 720.24 with the single fruit weight of 74.15 gm and with the nut and mace recovery percentage of 11.8 per cent and 1.5 percent respectively.

**Cashew**

Among the eight hybrids of cashew evaluated at Regional Research Station, Vridhachalam from 1989 to 2006 the hybrid H13 was found to be promising with high yield 2700 kg/ha (11.8% over VRI 3) and plus characters namely bold nut, typical cluster bearing character and easy peeling testa.

**Ocimum**

In ocimum, sixteen accessions were collected and evaluated for herbage yield and oil content at HC&RI, Periyakulam. Among the accessions evaluated OS. 3 exhibited high biomass yield /ha (17.38t/ha) with an oil content content of 72.10 kg/ha (5.6% increase over the check).

**Chrysanthemum**

The accession Acc.103 which was found superior with high flower yield (33.3t/ha compared to 30t/ha in CO.1 and 32t/ha in CO.2) and larger flowers with bright yellow colour is under MLT in 111 locations and reports were received from 76 locations. This accession has been found ideal for cultivation in all the locations. Planting materials are being multiplied further.

## II. CROP MANAGEMENT

### A. FOR ADOPTION

#### 1. HIGH DENSITY PLANTING IN MANGO

##### Details of Technology

- Mango trees are normally planted by farmers at a spacing of 10 x 10m accommodating 100 trees per hectare. Under this system, due to less number of trees the productivity per unit area is low. In the normal spacing the tree canopy takes 8 years to cover the area. Hence high density planting system is suggested for higher productivity efficient utilization of land and other natural resources. The results of 14 years of research in mango is presented below.
- Double hedge row system (10x5x5 cm) can accommodate 222 plants/ha compared to 100 trees/ha in conventional system of planting (10m x 10m) the increased population is around 122%.

Double hedge row planting

```

*--- 5 m--- *-----10 m ---- *--- 5 m --
*                               --*          -*
5 m                               5 m
*--- 5 m --- *-----10 m ---- *--- 5 m --
*                               -- *          -*
5 m                               5 m
*--- 5 m --- *-----10 m ---- *--- 5 m --
*                               -- *          -*
  
```

Spacing: 10x5x5 m  
Number of plants: 122/ha

##### Benefits

- More plants can be accommodated (122% increase in population over the square system of planting) per unit area
- More yield can be obtained (9.45 t/ha) compared to square system (5.05 t/ha)

##### Economics

- The increased yield in double hedge row system is (88%) over conventional system.

The yield in double hedge row system is 9.45 t/ha with a cost benefit ratio of 5.82 compared to conventional system (5.05 t/ha with a cost benefit of 5.05).

### III. CROP PROTECTION

#### A. FOR ADOPTION

##### 1. IPM for the management of serpentine leaf miner *liriomyza trifolii* burgess in vegetables

###### Details of Technology

- Removal of alternate host plants of fabaceae, solanaceae and cucurbitaceae
- Planting one row of sorghum / maize at every 10 m of tomato / brinjal
- Install yellow sticky trap @ 1-2 traps / cent
- Spray NSKE 5% (50g/lit) or azadirachtin (0.3%) @ 3.0 ml/lit alternated with chlorpyrifos 20 EC @ 2.5 ml/lit or triazophos 40 EC @ 1.0 ml/lit
- Conservation and augmentation of the larval parasitoid, *Chrysonotomyia rexia*

###### Benefits

- 20 to 40% less damage
- Minimum use of insecticides
- Conservation of natural enemies
- Low cost of production
- Environmental protection

###### Economics

- Cost Benefit Ratio (CBR) = 1 : 2.9

##### 2. Management of Tea Mosquito Bug, *Helopeltis antonii* on Cashew

Profenophos 0.05% was effective for the management of Tea Mosquito Bug with a net gain of Rs.17, 440 / ha.

Treatment	Cost of spraying	Yield (kg/ha)	Add. Yield	Cost of addl. Yield	Net gain (Rs/ha)	BCR
Standard spray	3560	1320	600	24000	20,440	5.7
Chlorpyrifos 0.05%	2960	1160	440	17600	14,640	4.9
Triazophos 0.1%	6160	1080	360	14400	8,240	1.3
L- Cyhalothrin 0.003%	2560	1040	320	12800	10,240	4.6
Profenophos 0.05%	3360	1240	520	20800	17,440	5.2
Untreated control	--	720	--	--	--	--

**Recommendation:** Profenophos 0.05% is recommended for the management of Tea Mosquito Bug.

### 3. Management of Basal rot of onion

On farm trials were conducted in three different locations viz., Bhavanisagar, Madurai, Periyakulam in Randomized Block Design with four treatments and five replications to assess the efficacy *Trichoderma viride* and VAM on basal rot of onion revealed that bulb treatment with *T.viride* @ 4g/kg+ SA @2.5 kg/ha+VAM 12.5 Kg/ha effectively reduced the onion basal rot (58.27 %) with a net gain of Rs. 3710 / ha.

Treatments	Basal Rot Incidence (%)*	Disease reduction (%)	Bulb yield t/ha	Net gain (Rs/ha)
T <sub>1</sub> - T.v (BT 4g/kg)+ SA 2.5/kg/ha	23.60	53.17	6.1b	1554
T <sub>2</sub> - T.v (BT 4g/kg)+ SA 2.5/kg/ha+VAM 12.5kg/ha	21.03	58.27	7.1a	3710
T <sub>3</sub> - Carbendazim (BT 2 g/kg) +SD(0.1%)	18.17	63.94	7.7a	3690
T <sub>4</sub> - Control	50.39	-	4.5c	-

- Mean of five replications; Pooled mean of 3 locations;
- BT-Bulb treatment, SA-Soil Application ,

**Recommendation:** Bulb treatment with *T.viride* @4g/kg+ SA @2.5+VAM 12.5 Kg/ha effectively reduced the onion basal rot.

### 4. Management of Tosspovirus incidence in tomato

Imidacloprid 0.0375% on 7 days after planting (DAP); *Pseudomons fluorescens* + Buttermilk on 15 DAP; Monocrotophos on 30 DAP; *Pseudomons fluorescens* + Buttermilk on 45 and 60 DAP has recorded reduced incidence of tomato spotted wilt with the maximum yield of 40.9 tonnes/ha and with a net gain of Rs. 6,290 per ha.

Treatment	75 DAT		90 DAT		Yield (t/ha)	Net gain (Rs./ha)
	Disease incidence (%)	Thrips (No./pt)	Disease incidence (%)	Thrips (No./pt)		
T1 <i>P. fluorescens</i> 2%	5.9	7.6	5.9	6.3	32.0	3,600
T2 Imidacloprid 0.0375%	8.5	6.3	9.4	5.3	31.5	4,300
T3 Combination*	0.87	4.7	0.87	4.0	40.9	6,290
T4 Buttermilk 30 ml/l	16.4	7.3	16/4	6/3	27.7	2,300
T5 Control	19.3	12.0	23.5	10.8	23.2	-

Combination\*:Imidacloprid 0.0375% on 7 days after planting (DAP); *Pseudomons fluorescens* + Buttermilk on 15 DAP; Monocrotophos on 30 DAP; *Pseudomons fluorescens* + Buttermilk on 45 and 60 DAP.

**Recommendation:** Imidacloprid 0.0375% on 7 days after planting (DAP); *Pseudomonas fluorescens* + Buttermilk on 15 DAP; Monocrotophos on 30 DAP; *Pseudomonas fluorescens* + Buttermilk on 45 and 60 DAP is recommended for the management of Tospovirus in tomato.

## 5. Management of root-knot nematode in snakegourd

Neem Cake @ 30 g/plant as spot treatment 10 days prior to sowing reduced nematode population (48.5% in soil and 66.3% in root) and increased the yield (26.4%).

Treatment	Final nematode population (No.)		Gall Index	Yield (t/ha)	Net gain (Rs./ha)
	Soil (200 cc)	Root (5 g)			
T1 Neem cake 30 g/plant	281.6	57.7	3	141.3	14,850
T2 Mustard cake "	380.1	72.3	4	120.7	4,550
T3 Castor cake "	404.3	76.6	4	119.1	3,750
T4 Carbofuran 3G 10 g/plant	303.8	59.4	3	140.9	12,450
T5 Untreated Control	546.6	171.1	5	111.8	-
CD (P=0.05)	40.32	6.92	-	11.09	-

**Recommendation:** Neem Cake @ 30 g/plant as spot treatment 10 days prior to sowing is recommended for the management of root-knot nematode in snakegourd.

## 6. Biomangement of Nematode disease complex in medicinal coleus

Medicinal coleus cuttings dipped in 0.1% *Pseudomonas fluorescens* at planting + marigold (*Tagetes erecta*) intercrop uprooted at the time of earthing up (60-70 DAP) effectively reduced the nematode population by 66.7 %, root rot disease incidence by 45.3 % and increased the yield by 45.3 % with a net gain of Rs 22,150/ha.

Treatment	Nematode control efficiency (%)	Gall Index	Root rot disease control efficiency (%)	Root tuber yield (t/ha)	Net gain (Rs./ha)
Cuttings dipping in 0.1% <i>P. fluorescens</i> + marigold intercropping	73.4	1.7a	45.3	6.92b	22,150
Cuttings dipping in 0.1% <i>P. fluorescens</i> + marigold intercropping + <i>Pseudoplus</i> drenching	77.8	1.6a	50.4	7.07b	19,850
Chemical check (Carbofuran + Carbendazim)	55.1	2.7b	59.2	7.31a	17,650
Control		4.0c		3.78c	

(Pooled mean of two on farm trial)

**Recommendation:** Dipping of coleus cuttings in 0.1% *Pseudomonas fluorescens* at planting + marigold (*Tagetes erecta*) intercrop uprooted at the time of earthing up (60-70 DAP) is recommended for the management of nematode disease complex in medicinal coleus.

## B. FOR ON FARM TESTING

### 1. IPM for Fruit fly (*Gitona distigma*) in Annual Moringa

Modules	Treatments to be imposed
Suggestive module 1	<ul style="list-style-type: none"> <li>• Soil Application of thiamethoxam 25 WG @ 200 g a.i./ha on 150, 180 and 210 DAP</li> <li>• Placement of fermented tomato trap @ 25/ha</li> <li>• Need based foliar spray of spinosad 45 SC @ 56 g a.i./ha followed by profenofos 50 EC @ 250 g /ha</li> </ul>
TNAU module	<ul style="list-style-type: none"> <li>• Raking soil</li> <li>• lindane 1.3D @ 163 g a.i./ha</li> <li>• fermented grape juice</li> <li>• FS of dichlorvos 76 WSC @ 380 g a.i./ha followed by fenthion 100 EC @ 750 g a.i./ ha</li> </ul>
Farmers Practice	Local Adaptive methods

Observations to be recorded

1. No. of infested pods
2. No. of eggs/pod
3. No. of pupa/sq.ft. of soil under the trees (20 places)

Locations to be tested

HC&RI, Periyakulam, RRS, Paiyur, AC&RI, Killikulam, AC&RI, Madurai, TNAU, Coimbatore

### 2. Coriander Powdery Mildew

Seed treatment with *Pseudomonas fluorescens* @ 10 g /kg of seed followed by foliar spraying @ 0.2 % on 60 and 70 days after sowing was found to be effective in reducing the disease (22.00 PDI) as against control (62.57PDI) with higher yield and C:B ratio.

#### Management of Coriander Powdery Mildew (*Erysiphe polygoni*)

S.No.	Treatment	Powdery mildew (PDI)	Yield (kg/ha)	Net Gain (Rs/ha)
1.	Seed treatment with <i>P.fluorescens</i> (Pf 1 @10 g/kg) + Foliar spray ( 0.2%) on 60 and 70 DAS	22.00 (27.97)	731.66	2730
2.	Soil application of <i>Bacillus subtilis</i> 2.5 kg/ha + Foliar spray (0.2 %) on 60 and 70 DAS	25.00 (30.00)	656.88	1785
3.	Wettable sulphur spray (0.25%)	12.72 (20.88)	705.44	1671
4.	Control	62.57 (52.30)	458.33	
	CD (0.05%)	3.18		

(Pooled analysis of two seasons)

Treatments

1. ST *P.fluorescens* (TNAU Pf 1) (10g/Kg) + FS 0.2 % on 60 and 70 DAS
2. SA of *Bacillus subtilis* @ 2.5Kg/ha + FS (0.2 % ) on 60 and 70 DAS
3. Wettable sulphur spray (0.25%)
4. Control

Observation to be recorded

- Powdery mildew intensity
- Yield
- CB ratio

Centres : CBE, APK, PKM

**3. The wild isolates of *Calocybe indica* WC 2, WC 6 and WC 19 to be tested for their performance in different mushroom farms under OFT.**

Treatments

- a. Strains to be used : WC 2, WC 6, WC 19 and APK 2
- b. Method of cultivation : As per standard method (Krishnamoorthy *et al.*, 1998)
- c. Locations : 4 locations
- d. Observations to be recorded:
  - DFSR, DFCR, DFFH, No. of mushrooms harvested
  - Average Weight, Yield, Bio-efficiency, P : S Ratio
  - Incidence of Pests and Diseases

Centre: Coimbatore

**4. Testing the yield performance of *Tricholoma lobayense* in different farms Special Features of *Tricholoma lobayense***

- Pileus fleshy, convex, smooth, white to pale yellow
- Stipe solid, cylindrical, sub-bulbous base
- Easily cultivable tropical mushroom (similar to milky mushroom)
- Cropping cycle : 40-45 days
- Bioefficiency : 140-150%
- Superior to milky mushroom in flavour and appearance
- C:B Ratio - 1 : 3.2

Hence, the on-farm trials of *T. lobayense* will be conducted for testing the performance over the existing variety of milky mushroom APK 2.

Treatments

- a. Strains to be used : *Tricholoma lobayense*
- b. Method of cultivation : As per standard method (Anand, 2002)
- c. Locations : 4 locations
- d. Observations to be recorded:
  - DFSR, DFCR, DFFH, No. of mushrooms harvested
  - Average Weight, Yield, Bio-efficiency, P : S Ratio
  - Incidence of Pests and Diseases

Centre: Coimbatore



**5. Management of root-knot nematode and reniform nematode complex on tomato using commercial formulations of PGPR**

(Proposing Centre : Coimbatore) (Mean of two experiments)

Treatment	<i>Meloidogyn e sp.</i>	<i>Rotylenchulus sp</i>	Gall Index	Yield/plot (20 m <sup>2</sup> ) (kg)	CB Ratio
<i>Pseudomonas fluorescens</i> (Pfbv 22) @ 2.5 kg/ha	137.6	85.5	2.0	222.0	1 : 3.9
<i>Bacillus subtilis</i> (Bbv 57) @ 2.5 kg/ha	141.3	90.3	2.4	187.4	1 : 2.6
<i>Pseudomonas fluorescens</i> (Pfbv 22) + <i>Bacillus subtilis</i> (Bbv 57) @ 2.5 kg/ha	120.8	73.7	1.1	244.6	1 : 4.8
Carbofuran + Carbendazim	145.5	93.8	2.6	181.0	1 : 2.1
Untreated Control	265.8	250.4	4.9	124.0	

Two field experiments were conducted in hot spot area in Kattuthottam and Theethipalayam villages of Coimbatore district revealed significant reduction in the infestation of both root knot (*Meloidogyne incognita*) and reniform (*Rotylenchulus reniformis*) nematodes in tomato plants treated with the commercial formulation of Pfbv 22 and Bbv 57 @ 2.5 kg ai/ha on 15 days after transplanting. The treatment also enhanced the plant growth parameters viz. shoot height, shoot weight, root length and root weight. Significant increase in fruit yield was obtained which recorded a CB ratio of 1 : 4.8 due to the treatment.

Treatments

T<sub>1</sub> *Pseudomonas fluorescens* (Pfbv 22) + *Bacillus subtilis* (Bbv 57) @ 2.5 kg/ha

T<sub>2</sub> *Pseudomonas fluorescens* (Pf1) @ 2.5 kg/ha

T<sub>3</sub> Carbofuran (33 kg/ha) + Carbendazim (1 kg/ ha)

T<sub>4</sub> Control

No.of Replication : Five

Design : RBD

Plot Size : 20 m<sup>2</sup>

Observations to be recorded

1. Nematode population in soil and root (root-knot nematodes and reniform nematode)

2. Observations on plant growth parameters

3. Yield and net gain in Rs./ha

(Action : Coimbatore, Periyakulam, Madurai)

**6. Management of *Globodera* nematodes in potato**  
(Proposing Centre : Coimbatore)

Treatment	No.of white females/ 2.5 cm root 60 DAS	Final Population		Tuber Yield (t/ha)
		Cysts/ 100 g soil	Eggs/ Cyst	
T <sub>1</sub> <i>Pf</i> ST @ 20 g/kg	7.6	113	27	16.0
T <sub>2</sub> <i>Tc</i> ST @ 10 g/kg	8.2	122	73	15.1
T <sub>3</sub> <i>Pl</i> ST @ 10 g/kg	5.5	98	46	17.6
T <sub>4</sub> SA of <i>Pf</i> @ 2.5 kg/ha	7.2	100	54	16.6
T <sub>5</sub> SA of <i>Tv</i> @ 2.5 kg/ha	8.1	118	61	15.4
T <sub>6</sub> T <sub>1</sub> + T <sub>4</sub>	5.2	90	42	21.2
T <sub>7</sub> T <sub>2</sub> + T <sub>5</sub>	8.0	112	68	15.8
T <sub>8</sub> Mustard intercropping	7.5	105	61	16.6
T <sub>9</sub> Carbofuran 3G @ 1 kg ai/ha	5.9	93	59	19.7
T <sub>10</sub> Control	13.1	142	121	11.1
CD at P=0.05	0.30	4.1	3.5	0.80

- The results of two field experiments revealed that *Pseudomonas fluorescens* ST @ 20 g/kg + SA @ 2.5 kg/ha reduced potato cyst nematodes (60.3%) and increased yield by 60.2%

Treatments

T<sub>1</sub> *Pseudomonas fluorescens* ST @ 20 g/kg + SA @ 2.5 kg/ha

T<sub>2</sub> *Trichoderma viride* ST @ 20 g/kg + SA @ 2.5 kg/ha

T<sub>3</sub> Carbofuran @ 1 kg ai/ha

T<sub>4</sub> Control

No. of Replications : Five

Design : RBD

Observations to be recorded

- Nematode population in soil and root and cyst count
- Observations on plant growth parameters
- Yield and net gain in Rs./ha.

(Locations: 3 locations at Nilgiris)

# AGRL. ENGINEERING

## A. FOR ADOPTION

### 1. Battery operated portable wetland weeder

Coverage	:	0.2 – 0.3 ha/day
Weeding efficiency	:	95%
Cost of operation	:	Rs.625/ha
Cost of weeder	:	Rs.8000/-

#### Special Features

- Suitable for weeding in SRI field
- Easy to operate compared to cono weeder
- Operated without experiencing any drudgery

### 2. Tractor operated fruit-shake harvester

Cost of the unit	:	Rs.2600/-
Cost of operation	:	Rs.8 per 100 kg
Harvesting efficiency	:	85%
Saving in time	:	95%

#### Special Features

- Harvest fruits by shaking branches
- Tractor PTO operated
- Suitable for tamarind, lime and other such fruits

### 3. Tractor operated rotary spading machine

Field capacity	:	1.5 ha/day
Saving in cost	:	26 to 38%
Saving in time	:	96%
Cost of machine	:	Rs.1,00,000/-

#### Special Features

- For primary tillage
- For deep inter cultivation between rows under hard soils
- For use in rice fallow cotton & coconut garden

#### **4. Tractor operated subsoil coir pith applicator**

Field capacity : 0.60 ha/day  
Depth of coir pith application : 15-30 cm  
Cost of machine : Rs.20,000/-

##### Special features

- To place mulch of coir pith at a depth of 15 to 30 cm as a sub soil mulch
- Improve soil structure
- Enhance water holding capacity thus getting increased yield of rainfed crops

### **B. FOR ON FARM TESTING**

- Biomethanation of waste water based high rate reactor system recommended for treating domestic and municipal food processing industry waste water
- Electrostatic charging attachment to knap sack sprayer
- Performance evaluation of subsurface drainage cum irrigation system for water table management
- $\beta$ - Caroline rich fruit pulp based pasta products

# FORESTRY

## A. FOR ADOPTION

### CASUARINA – MTP (CA) 1

Parentage	:	Clonal selection and multiplication
Duration	:	30-36 months
Season	:	Planting during rainy season
Yield	:	100 t/ha (wood) (33.3% increase over Local type)
	:	
Highest yield obtained	:	125 t/ha (wood yield)
Area of adoption	:	Throughout Tamil Nadu particularly in coastal area and also in sandy soil, red lateritic and other well drained inland soils

#### Special features

- Fast grower with conical crown structure
- Uniform bole size - straight, clean and cylindrical
- Branches erect medium thick with a branching angle of 45 to 60°
- Tolerant to moderate saline and alkaline conditions
- Cellulose - 46%
- Highly responsive to fertilizer application (NPK 50:150:100 kg/ha)

## B. FOR ON FARM TESTING

### 1. Eucalyptus

Among 27 clones of *Eucalyptus tereticornis* which are already in on farm testing based on the recommendation of CSM, 2006 and 2007, six clones register very high performance in terms of their biodrainage efficiency. The water pumping potential of 1.5 years clones are described below.

Amount of water transpired by the best performing clones

Sl.No.	Clone Number	Amount of water transpired (lit/day)
1.	MTP-6	26.4
2.	NGL-2	23.4
3.	MTP-5	21.8
4.	SGC-1	21.7
5.	SG-1	16.8
6.	MTP-1	16.7

One of the best performing clones on confirmation of biodrainage potential, may be advocated as purpose oriented variety to the specific condition.

### 2. Casuarina

Screening yield potential of 40 clones of *Casuarina equisetifolia* revealed that two clones namely FC & RI-17 and FC & RI -38 showed very high growth potential in terms of height and DBH. Hence, these two clones may be recommended for on farm testing.

## **For information**

# **CENTRE FOR PLANT MOLECULAR BIOLOGY**

## **Dept. of Plant Molecular Biology and Biotechnology**

One BC<sub>4</sub>F<sub>1</sub> progeny of IR20 and one BC<sub>1</sub>F<sub>1</sub> progeny of IR 64 rice with three drought tolerance QTLs on chromosome 4 and 9 obtained through marker aided selection.

Three Golden rice events were hybridized with ASD16 and ADT43 to introgress phytoene synthase and phytoene desaturase genes. By backcrossing with respective recurrent parent(s), BC<sub>2</sub>F<sub>1</sub> plants were generated. The positive plants among BC<sub>2</sub>F<sub>1</sub>s were checked through PCR using transgene specific primers and confirmed with specific PCR primers.

New *cry1Aa*, *cry1Ab* and *cry1Ac* genes were cloned from indigenous isolates of Bt. Two chimeric *cry1A* genes were also constructed. Studies on expression of parental and chimeric *cry1A* genes in recombinant bacterial strains are in progress.

Among the 120 new isolates of Bt screened for toxicity against *H.armigera*, three showed 100 per cent mortality as in the case of the reference strain, HD1. Among the 112 new isolates of Bt screened by PCR, one or more of the following five *cry* genes (*cry1*, *cry2*, *cry4*, *cry9* & *cry10*) were present in 80 new isolates.

The four combinations of brinjal Co2 x EE1, MDU1 X EE1, KKM1 x EE1 and PLR1 x EE1 were used to generate BC<sub>4</sub>F<sub>1</sub> seeds. Multilocation trials on transgenic Bt Brinjal varieties are being conducted in two locations in Coimbatore and Madurai.

## **Dept. of Microbiology**

### **Azophosmet**

This is a co-culture formulation of three bio-fertilizers such as Azospirillum, Phosphobacteria and Methylobacterium . The methylobacterium fixes atmospheric nitrogen and produces plant growth promoting substance. Application of Azosphos will provide nitrogen, phosphorus and also growth promoting substances. This is more suitable for sugarcane, cotton and rice. The application of this formulation will reduce two third of bio-fertilizer cost.

### **Liquid Bio-fertilizer**

The shelf life of carrier based bio-fertilizer is relatively short i.e. about three months due to non availability of nutrients, whereas shelf life of Liquid Bio-fertilizer is one year with zero contamination levels. The liquid bio-fertilizer is highly effective in Bio-fertigation and comparatively more efficient than carrier based inoculants. This is also useful for phyllosphere spray.

Consortia of beneficial microorganisms were formulated as liquid culture. Two sprays on 15 and 45th day after planting applied to tomato, brinjal, banana and roses under precision farming in Dharmapuri and Krishnagiri districts at five locations, showed an average yield increase of 8-10% over control besides enhancing the growth and nutrient status.

### **Bio-fertigation**

The liquid Bio-fertilizer Azospirillum, Phosphobacteria, Methylobacterium and co-culture Azophosmet is more suitable for Bio-fertigation. Bio-fertigation of Bio-fertilizer such as Azospirillum, Phosphobacteria and Methylobacterium or combination of these bio-fertilizers or Azophosmet (Co-culture) prior to inorganic fertilizer is more suitable for cotton, coconut and sugarcane. We could reduce 25% of inorganic nitrogen and phosphorus fertilizer.

## **WATER TECHNOLOGY CENTRE**

### **Achievements of TN-IAMWRAM Project**

<b>Particulars</b>	<b>Area demonstrated (ha)</b>
SRI in rice	1299
Rice fallow pulses	695
<b>Production technology</b>	
Gingelly	46
Maize (Hybrid)	398
Castor (Hybrid)	75
Sunflower(Hybrid)	35
Cotton (Hybrid)	120
Groundnut	337
Garden land pulses	152
Casuarina saucer planting method	63
Aerobic rice	4
Production technology for thornless bamboo	20
Intercropping of cocoa in coconut	100
Model village and organic farming	180

### **SRI yields at different sub basins**

<b>Name of the Farmer &amp; Sub-basin</b>	<b>Paddy (Kgha-1)</b>		<b>% of increase</b>
	<b>SRI(Variety)</b>	<b>Conventional</b>	
Th. T. Renganathan, Aliyar	6475 (White Ponni)	4700	38
Th. C. Palanivel, Arjunanadhi	7350 (TRY 1)	5250	40
Th. K. Shanmugam, Manimuthar	8750 ADT 39	4750	84
Th. C. Ravi, Upper Vellar	9750 ADT 39	6560	49
Tmt. Vijayalaxmi, Varahanadhi	7636 (BPT 5204)	4688	63



### Improved production technology of hybrid castor

Sl. No	Village Name	Average yield (kg/ha)
1	Mullaivadi	2695
2	Athanoorpatti	3531
3	C.N.Palayam	3375
4	Kottavadi	2820
5	B. Karadipatti	2205

## HOME SCIENCE

Home Science College and Research Institute had its origin as the Department of Home Science, Agricultural College and Research Institute, Madurai in 1980. Its evolution into a full-fledged institute became necessary and mandatory. When ICAR began to give its special attention to the strengthening of Home Science faculties in all the Agricultural Universities, the institute became full fledged in 2002 with five departments. The Five departments are involved in productive research in their respective area. The department of Food Science and Nutrition involves in research work pertaining to development of quick cooking rice, health mixes from black gram, utilization and commercialization of minor millets for health products, commercialization of value added mango product, product development and storage studies of coconut jelly, value added products from sesame, development of value added products to alleviate micro nutrient deficiency, therapeutic products from medicinal plants such as amla candy, bael noodles and herbal tea are being undertaken. In addition the technologies developed had been disseminated through trainings under venture capital scheme.

The Department of Human Development conducts research in the physical and socio psychological issues of child rearing, parenting, guidance and counseling, an explorative study on Archiving Ethno Medicinal Knowledge and Local Health Care System (LHCS) through modern electronic gadgets, economic empowerment of rural women through promoting micro enterprises. The Family Resource Management Department carries out research in the area of pragmatic approach to improve the occupational health and safety of women employed in selected micro enterprises and empowerment and capacity building of self help group women through establishment of Agro Processing Centre (APC's). The Department of Apparel Designing and Fashion Technology carries out research on the area of computer aided designing, apparel quality, printing, dyeing and evaluation of fastness properties of natural dye from leaves on cotton fabrics. The Department of Home Science Extension concentrates on popularizing low cost technology, resource saving technology, basic education on health and hygiene and nutrition for rural folks.

This college is currently operating external agency projects funded by Department of Science and Technology, University Grant Commission, Department of Science and Industrial Research, Government of India Schemes such as NMPB, CDB and Ministry of Food Processing to a tune of Rs. 1,46,40,983/-. The findings of the research are presented in National and International seminars and conferences. This institute helps the farmers to improve the quality of life. Trainings are given to self help groups and entrepreneurs based on the needs expressed by the trainees.

## **DIRECTORATE OF AGRI BUSINESS DEVELOPMENT**

Venture Capital scheme is an innovative programme of TNAU with twin objectives of helping farmers with provision of quality agricultural inputs and generation of revenue to the University through sale of products. In the year 2007-08, totally 127 Venture Capital schemes were operated at various Colleges/ Research stations/ KVKs. From the above schemes agricultural inputs viz., breeder and TFL seeds of improved varieties of agricultural crops, Hybrid seeds of agricultural and horticultural crops, seedlings and grafts of fruit crops, biocontrol agents, biofertilizers, vermicompost, forestry seedlings etc., were produced and sold to the farmers, private and Government organizations. Besides production of agricultural inputs, trainings were also offered to the farmers and entrepreneurs on production of vermicompost, mushroom cultivation, food processing, urban horticulture etc. From the above schemes, 25 % of the total receipts i.e. Rs.1.02 crores was received towards institutional charges to the University as revenue. Remaining 75% of the receipts were utilized by the respective institutions for the developmental activities like creating lab facilities and other infrastructure development, purchase of farm equipments and machineries, etc.

A total number of 37 consultancy services were offered from TNAU during the year 2007-08, in the areas of bio-energy, environment sciences, entomology, mushroom production, soil mapping, value addition and quality improvement of agro products, establishment of biofertilizer, mushroom, food processing units, precision farming on oil palm and medicinal crops.

In TNAU, number of improved crop varieties and technologies are developed and released every year. However, many of the above are not reaching the needy groups in time. Hence, with the objectives of technology transfer and generation of revenue to the university, the process of commercialization was initiated recently and the process is in progress. In this connection, an MoU was also signed with ICRISAT, Hyderabad.

## **CENTRE FOR PLANT BREEDING AND GENETICS**

### **ADAPTIVE RESEARCH TRIALS - OILSEEDS 2008-09**

#### **DISTRIBUTION OF TRIALS**

<b>Trial Number</b>	<b>Groundnut 1/2008-09 (Bold)</b>	<b>Castor 1/2008-09</b>	<b>Sunflower 1/2008-09</b>	<b>Sunflower 2/2008-09</b>
Season	Rabi (Dec.-Jan.)	Kharif (June-July)	Kharif (June-July)	Rabi (Nov-Dec)
Culture	VG 0402, VG 0407	YRCH 0509	CSFH 5060	CSFH 5060
Checks	CO 3	TMVCH 1, GCH 4	Sunbred 275, TCSH 1	Sunbred 275, TCSH 1
Thiruvallur	2	-	-	-
Kancheepuram	2	-	-	-
Villupuram	2	-	-	-

Vellore	2	-	5	5
Thiruvannamalai	2	-	5	5
Cuddalore	2	-	-	-
Dharmapuri		30	5	5
Salem	2	-	5	5
Namakkal	2	-	5	5
Erode	2	30	5	5
Coimbatore	2	-	5	5
Thiruchirappalli	2	-	5	5
Perambalur	2	-	5	5
Karur	2	-	5	5
Pudukkottai	2	-	5	5
Tanjore	2	-	-	-
Madurai	2	-	5	5
Theni	2	-	5	5
Virudhunagar	2	-	5	5
Tuticorin		-	5	5
Dindigul		-	5	5
Sivagangai	2	-	-	-
Tirunelveli	2	-	5	5
<b>Total</b>	<b>40</b>	<b>60</b>	<b>85</b>	<b>85</b>





## ADAPTIVE RESEARCH TRIALS ON MILLETS CROPS 2008-2009

ART NO	ENTRY	CHECK																														
			Thiruvallur	Kancheepuram	Villupuram	Vellore	Tiruvannamalai	Cuddalore	Dharmapuri	Salem	Krishnagiri	Namakkal	Erode	Coimbatore	Tiruchirapalli	Perambalur	Virudhachalam	Karur	Pudukkottai	Aruppukottai	Ramanathapuram	Madurai	Theni	Dindigul	Virudhunagar	Ramanad	Sivagangai	Thoothukudi	Tirunelveli	Kanyakumari	Nilgris	Total
<b>I. SORGHUM - Varieties</b>																																
1/2008-09 June-July	TNS 598 TNS 599 TNS 603	CO (S)28, K8 and APK1	2	--	2	4	2	2	4	4	-	4	2	4	4	2	-	4	2	-	-	2	2	2	-	-	-	-	-	-	-	48
2/2008-09 Sept-Oct.	TNS 598 TNS 599 TNS 603	CO (S)28, K8 and APK1	2	-	2	4	4	2	4	4	-	4	4	4	2	2	-	4	2	-	-	2	4	4	4	2	2	4	4	-	-	70
3/2008-09 Feb. - Mar.	TNS 598 TNS 599 TNS 603	CO (S)28, K8 and APK1	2	-	2	4	4	2	4	4	-	4	4	4	2	2	-	4	2	-	-	2	4	2	4	-	-	-	-	-	-	56
<b>SORGHUM - Hybrids</b>																																
1/2008-09 June-July	TNSH 482 TNSH 483	COH 4, MSH 51	-	--	2	2	-	2	2	2	-	2	-	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18
2/2008-09 Sept-Oct.	TNSH 482 TNSH 483	COH 4, MSH 51	-	-	2	4	2	2	4	4	-	4	4	4	2	4	-	4	2	-	-	2	4	4	2	2	2	4	2	-	-	64
3/2008-09 Feb. - Mar.	TNSH 482 TNSH 483	COH 4, MSH 51	-	-	2	4	4	2	4	4	-	4	4	4	2	2	-	4	2	-	-	2	4	2	-	-	-	2	-	-	-	54
<b>II. Pearl millet</b>																																
1/2008-09 (June-July)	TNBH 0503 TNBH 0541	X 7, Private hybrid	4	-	4	2	2	4	4	4	-	2	4	4	4	4	-	4	2	2	-	2	2	4	2	-	-	-	-	-	-	60
2/2008-09 (Sept-Oct.)	TNBH 0503 TNBH 0541	X 7, Private hybrid	-	-	2	-	-	2	-	-	-	2	2	4	-	-	-	-	2	4	-	4	4	4	4	2	4	4	4	-	-	48
2/2008-09 (Jan. Feb.)	TNBH 0503 TNBH 0541	X 7, Private hybrid	2	-	2	2	2	2	2	2	-	2	2	4	2	2	-	2	2	2	-	2	2	4	2	-	-	2	-	-	-	44
<b>III. MAIZE</b>																																
1 / 2008 - 09 (Rainfed) (June - July)	UMH 05044	COH(M) 5, NK 6240 , M 900	-	2	2	2	2	-	2	2	-	4	-	4	4	4	-	2	2	2	-	2	2	4	2	2	-	2	-	-	-	48

## ADAPTIVE RESEARCH TRIALS ON MILLETS CROPS 2008-2009 ...contd.

ART NO	ENTRY	CHECK																														
			Thiruvallur	Kancheepuram	Villupuram	Vellore	Tiruvannamalai	Cuddalore	Dharmapuri	Salem	Krishnagiri	Namakkal	Erode	Coimbatore	Tiruchirapalli	Perambalur	Virudhachalam	Karur	Pudukkottai	Aruppukottai	Ramanathapuram	Madurai	Theni	Dindigul	Virudhunagar	Ramanad	Sivagangai	Thoothukudi	Tirunelveli	Kanyakumari	Nilgris	Total
<b>IV. RAGI</b>																																
1 / 2008 - 09 (Rainfed) (June - July)	TNAU 1005	CO(Ra) 14, GPU 28, Paiyur 1	-	3	4	5	5	4	10	8	10	-	5	-	-	-	-	-	3	-	-	-	-	-	-	-	3	-	-	-	-	60
2 / 2008 - 09 (Irrigated) (Nov. - Dec.)	TNAU 1005	CO(Ra) 14, GPU 28, Paiyur 1	2	3	4	3	4	4	5	8	5	-	5	-	-	-	-	-	3	-	3	-	-	3	-	3	2	3	-	-	60	
<b>V. Other Millets - Kudiraivali</b>																																
1 / 2008 - 09 (Rainfed) (June - July)	TNAU 43	CO 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	10	3	4	10	-	3	5	5	-	-	50	
<b>Varagu</b>																																
1 / 2008 - 09 (Rainfed) (June - July)	TNAU 51	CO 3	-	-	10	5	10	10	3	5	3	-	-	-	3	10	-	-	3	-	-	5	-	3	2	-	-	-	3	-	-	75
<b>Wheat</b>																																
1 / 2008 - 09 (Rainfed) (June - July)	HW 5207 <i>Triticum aestivum</i> (Bread wheat)	HW 2044 , CO W(W) 1	-	-	-	3	3	-	3	3	3	3	3	3	-	-	-	3	-	-	-	-	3	3	-	-	-	-	-	-	33	
1 / 2008 - 09 (Rainfed) (June - July)	HW 1095 <i>Triticum dicoccum</i> (Samba wheat)	NP 200	-	-	-	3	3	-	3	3	3	3	3	3	-	-	-	3	-	-	-	-	3	3	-	-	-	-	-	-	33	

**ADAPTIVE RESEARCH TRIAL PULSES (2008-09)**

Trial	Season	Entries	Checks	Villupuram	Vellore	Thiruvannamalai	Cuddalore	Dharmapuri	Krishnagiri	Salem	Namakkal	Coimbatore	Erode	Trichy	Perambalur	Karur	Pudukkottai	Madurai	Theni	Dindigul	Virudhunagar	Sivagangai	Thirunelveli	Total	
<b>Redgram</b>																									
<b>Long duration</b>	June - July	<b>CORG 99001 4</b> <b>CORG 99001 5</b>	CO 6 VBN 2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	60



**ADAPTIVE RESEARCH TRIALS - PULSES (2008-09)**

Trial	Season	Entries	Checks	Villupuram	Vellore	Thiruvannamalai	Cuddalore	Dharmapuri	Krishnagiri	Salem	Namakkal	Coimbatore	Erode	Trichy	Perambalur	Karur	Pudukkottai	Thanjavur	Nagapattinam	Thiruvarur	Madurai	Theni	Dindigul	Virudhunagar	Sivagangai	Thirunelveli	Total
<b>Black gram</b>	June-July	VBG 95, VBG 04-001, VBG 04-008, KKB 20055, COBG 647, VBG 04-003, VBG 04-014, COBG 653	<b>VBN(Bg)5 &amp; VBN(Bg)4</b>	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-	3	3	3	3	3	3	<b>60</b>
	S Sept.- Oct.	VBG 95, VBG 04-001, VBG 04-008, KKB 20055, COBG 647, VBG 04-003, VBG 04-014, COBG 653	<b>VBN(Bg)5 &amp; VBN(Bg)4</b>	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-	3	3	3	3	3	3	<b>60</b>
	Feb-March	VBG 95, VBG 04-001, VBG 04-008, KKB 20055, COBG 647, VBG 04-003, VBG 04-014, COBG 653	<b>VBN(Bg)5 &amp; VBN(Bg)4</b>	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	<b>69</b>

**ADAPTIVE RESEARCH TRIAL (2008-09)**

Trial	Season	Entries	Checks	Villupuram	Vellore	Thiruvannamalai	Cuddalore	Dharmapuri	Krishnagiri	Salem	Namakkal	Coimbatore	Erode	Trichy	Perambalur	Karur	Pudukkottai	Thanjavur	Nagapattinam	Thiruvarur	Madurai	Theni	Dindigul	Virudhunagar	Sivagangai	Thirunelveli	Total	
<b>Green gram</b>	June-July	VGG 04-001, COGG 924, VGG 04-024, COGG 936, VGG04-002, VGG 04-003, COGG 934	Gg) CO(Gg)7 & VBN (Gg)2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-	3	3	3	3	3	3	3	60
	Sept. Oct.	VGG 04-001, COGG 924, VGG 04-024, COGG 936, VGG04-002, VGG 04-003, COGG 934	CO(CO(Gg)7 & VBN2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-	3	3	3	3	3	3	60

Trial	Season	Entries	Checks	Villupuram	Vellore	Thiruvannamalai	Cuddalore	Dharmapuri	Krishnagiri	Salem	Namakkal	Coimbatore	Erode	Trichy	Perambalur	Karur	Pudukkottai	Thanjavur	Nagapattinam	Thiruvarur	Madurai	Theni	Dindigul	Virudhunagar	Sivagangai	Thirunelveli	Total	
<b>Green gram</b>	Feb.- March	VGG 04-001, COGG 924, VGG 04-024, COGG 936, VGG04-002, VGG 04-003, COGG 934	CO CO(Gg)7 & VBN(Gg)2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	69

**ADAPTIVE RESEARCH TRIALS ON COTTON - 2008-2009**

Trial	Season	Entries	Dharmapuri	Salem	Namakkal	Erode	Tiruchirappalli	Perambalur	Thanjavur	Madurai	Nagapattinam	Dindigul	Virudhunagar	Tuticorin	Tirunelveli	Total		
Cotton 1/2008-09	Winter irrigated	TCHH 2322	5	5	5			5									<b>20</b>	
		Bunny (C)																
		MCU 12 (C)																
Cotton 2/2008-09	Summer irrigated	TSHH 0442		5		5	5		5	5	5	5	5	5	5	5	<b>50</b>	
		Bunny (C)																
		SVPR 2 (C)																
Cotton 3/2008-09	Winter rainfed	TSH 2005								5			5	5	5		<b>20</b>	
		TAH 235																
		SVPR 2 (C)																
		Surabhi (C)																

## Agenda No.5

### NEW ACTIVITIES

Tamil Nadu Agricultural University (TNAU) has been constantly reorienting its activities of Agricultural Education, Research, Extension, Agricultural Human Resource Management and policy interface to meet the objectives of not only sustaining the self sufficiency in food production but also exploring the agricultural potential for export thereby improving the rural economy.

TNAU Take up research on need based problems that are brought out from various fora like Scientific Workers' Conference and Annual Crop Scientists' Meet. These research projects are funded by Government of Tamil Nadu, Government of India and various National and International donors. To facilitate the research in dryland agriculture a new Dryland Agricultural Research Station was established at Chettinad, Sivagangai district in May 2008. To cater the needs of flower growers, a new Floriculture Research Station was established at Thovalai, Kanyakumari district.

TNAU is focusing its research activities in areas *viz.*, development of genetically modified crops and crop hybrids with resistance to major pests and diseases in crops like cotton, brinjal, banana and rice. With assistance from ICAR under the special grant of Rs.50 crores, infrastructural facilities are developed in research stations as well as in teaching campuses of TNAU. Scientists have been sent abroad for specialized training in newer areas like biotechnology, nanotechnology etc.

During 2008-09, eight new crop varieties - CO (R) 49 rice, Paiyur (Ra) 2 Ragi, VRI (Gn) 7 Groundnut, PLR (B) 2 Brinjal, CO (CN) 4, Cumbu Napier Hybrid Grass, MDC (KO) 1 Green manure Kolinji, PKM (MT) 1 Manila Tamarind and MTP (CA) 1 Casuarina were released for cultivation by farmers. During this period, four new farm implements and five crop management technologies were also released for use by the farming community.

Economically viable technologies and products like Coconut tonic, Sugarcane Booster, Seri Dust, Biomineralizer, Master trap and Tomato and Brinjal Seed Extractor were developed by TNAU and identified for commercialization through private entrepreneurs.

A new *Bacillus* formulation has been developed for the management of Ganoderma wilt of coconut. In addition, a liquid formulation of *Pseudomonas* has been developed for application through drip irrigation in crops like banana and vegetables and is under large scale demonstration.

### CROP IMPROVEMENT

In rice major thrust is being given to develop fine and superfine varieties with biotic resistance having quality equal to BPT 5204. Cultures CB 05501 and CB 05215 are already in multilocation testing. Rice variety CO (R) 49 released in the year 2008 possesses fine quality as well as blast tolerant and is being promoted as a replacement for BPT 5204. Besides, CMS based hybrids meeting the above

requirements are also in the advanced station trials. TNRH 174, a new hybrid combination of medium duration was found to yield 30 per cent higher yield than CO (R) 48 but with fine grain type.

Induced mutagenesis resulted in the generation of new TGMS (Temperature sensitive Genetic Male Sterility System) genes in elite genetic background of ADT 39, CR 1009 and IR 50. The targeted mutants isolated are being stabilized for homozygosity. However, from the existing population, stable homozygous TGMS lines were identified and their potential for hybrid breeding is being explored

Using molecular markers, development of water use efficient rice cultivars suitable for rainfed and aerobic system of cultivation is pursued employing local landrace Norungun as the donor. The advanced backcross inbred line, CB 001524 has already proven its drought tolerance and high yield across locations all over India. The culture is under evaluation in MLT both in irrigated as well as rainfed situations

Hybrid breeding is given major thrust in all the crops. Three high yielding sorghum hybrids TNSH 485, TNSH 483 and TNSH 482 were identified with an average yield potential of 6700 kg/ha. These hybrids registered increased grain yield of 36% over the check COH 4 (4889 kg/ha). These hybrids are under multilocation testing during 2007-08. TNS 603 has been found to consistently yield superior to existing varieties in station coordinated trials and is in the pre release stage.

Two downy mildew resistant cumbu hybrids TNBH 0503 and TNBH 0541 are under Adaptive Research trials. The hybrid TNBH 0541 recorded a mean yield of 3750 kg/ha which is 58 and 44 per cent increase over the checks X 7 and the private hybrid NBH 07. The hybrid TNBH 0503 recorded the yield of 3437 kg/ha which is 23% and 44% increased yield over the check X 7 and private hybrid NBH 07.

Interspecific hybridization was attempted between *Vigna radiata* and six wild species namely *V. radiata var sublobata*, *V. mungo var silvestris*, *Vigna hainiana*, *V. umbellata*, *V. vexillata* and *V. trilobata* to introduce biotic resistance genes and other yield traits. The species *V. mungo var silvestris*, a wild progenitor of blackgram is found to be resistant to bruchid (storage pest) infestation. Interspecific crosses were made between *V. mungo* x *V. mungo var silvestris*, to transfer bruchid resistance genes. Molecular mapping of bruchid resistance genes has also been taken up. In blackgram the advanced cultures namely VBG 04-008, VBG 04-009 and VBG 04-014 and in greengram VGG 04-003 were developed through interspecific crosses and found to be resistant to mungbean yellow mosaic virus.

In cotton research work was carried out to develop bollworm resistant cotton varieties. The *Bt* gene isolated and cloned at TNAU was used as the main source of resistance. Besides a total of five *Bt* genes i.e one *Cry1EC* (from NBRI, Lucknow) and four genes viz., *Cry1Ac*, *Cry1Ia5*, *Cry2Ab* and *vip* (from ICGEB, New Delhi) were obtained on MoU basis. The varieties MCU 5, MCU 12, MCU 13 and SVPR 2 were used as target genotypes. Besides, the already proven varieties Coker 310 and Coker 201 were used for callus induction. Callus induction frequency was high in MS basal, 0.3 mg/l thiamin HCl, 0.1 mg/l 2,4-D and Gamborg's vitamins. Somatic embryo induction in Coker 310 genotypes was noticed in the MS + B5 vitamin + Thiamin HCl (0.1 mg/l) + 2,4-D (0.1 mg/l) + 2ip (0.1 mg/l). A method for regeneration of plantlets from somatic embryos in coker genotypes was standardized. Somatic

embryos were transformed with *Bt* gene *Cry2Ac* by *Agrobacterium* transformation method using Coker 310. Transgenic events in Coker 310 were tested by both GUS histochemical assays and Polymerase Chain Reaction (PCR) and were confirmed. Next generation, GUS positive T<sub>1</sub> plants were back crossed with MCU 5, MCU 12, MCU 13 and SVPR 2 varieties. Further backcrosses will also be continued for bollworm resistance. Research work is in progress with other *cry* genes also.

A farmer participatory approach of varietal evaluation and seed multiplication is being followed in groundnut breeding. A Virginia bunch groundnut culture ICGV 87846 recorded 1603 kg/ha while the locally grown variety recorded 869 kg/ha only in Farmers' Participatory Varietal Selection Trials under rainfed condition at Namakkal district during kharif, 2008. This culture has 70 per cent shelling with 49.5 per cent oil content. This culture is being proposed for multilocation trials during 2009'-10.

Hybrid sunflower is the main focus of research. A new sunflower hybrid CSFH 5060 was developed by utilizing converted CMS line developed by Tamilnadu Agricultural University with mono head restorer line. It matures in 90-95 days and records a seed yield of 2710 kg/ha as compared to 2185 kg/ha by Sunbred 275. The yield increase is 24.0 per cent. The volume weight of this hybrid is 43.3g/100 ml and oil content is 40.7%. The seeds are bolder with the 100 seed weight of 6.8g. This hybrid is in Adaptive Research Trial during 2008-09.

A shade tolerant polyploidy Guinea Grass culture FD 2235 registered a mean green fodder yield of 423 t/ha/year which is 75.6 per cent increase over the check CO 2 and on par with Cumbu Napier Hybrid grass. It has the unique features of high and profuse tillering habit (30-40 tillers per clump) and dark green and broad (4-5 cm) leaves. It is having higher digestibility and proposed for release during 2009.

## **SEED CENTRE**

In Seed Centre, a total of 11 Research Sub-Projects are being handled at present, including 5 network projects on various aspects of seed production, seed testing and seed quality enhancement aspects.

A total quantity of 1,79,828 kgs of breeder seeds were produced and supplied against the indent of 1,52,932 kgs during 2007-08 and a quantity of 1,54,185 kgs of breeder seeds were supplied upto December 2008. In addition, a quantity of 7,55,142 kgs of foundation and TFL seeds were also produced and supplied during 2007-08 and it is programmed to produce about 7,55,200 kgs of foundation and TFL seeds during the year 2008-09.

## **CROP MANAGEMENT**

- **Yield Maximization** - For rainfed groundnut yield maximization technology viz., optimization of plant population, INM, supplemental nutrition with micronutrients and harvesting technologies are initiated through farmers' participatory approach.
- **Altering crop geometry** - Studies are initiated to alter the crop geometry of important dryland crops to facilitate mechanization of various field operations in dryland.

- **Organic farming** - Development of organic farming package of practices for major cropping systems is initiated.
- **Studies on root rhizosphere** - Research is initiated to study the factors governing root-rhizosphere-water-nutrient management interactions under various systems of rice establishment.
- **Restructuring of sunflower fertilizer** - Study on restructuring fertilizer recommendation for sunflower is initiated.
- **Land resource inventory and GIS database for farm, village and block level planning** - A detailed inventory of land resources and GIS data base has been initiated for sustainable soil health and productivity at farm, village and block level.
- **Mycorrhizal symbiosis to promote carbon sequestration for sustainable soil fertility and environmental safety** - Research has been initiated to determine the verifiable carbon distribution in soil, plant and rhizosphere microbes in maize-mycorrhizal system.
- **Commercialization of coconut tonic** - For the nation-wide commercialization of TNAU-Coconut tonic, the technical consultancy programme has been initiated with ABI-ICRISAT and Business incubator – TNAU under the aegis of Agri-Science Park, ICRISAT supported by the DST, Government of India.
- **Development of sugarcane booster** - TNAU – Sugarcane Booster developed by the Department of Crop Physiology has improved the sugar recovery by 1% and in TamilNadu six sugarcane factories have taken up on farm trials.
- **Development of banana booster** - TNAU – Banana Booster has been formulated to improve the banana yield and it is being field test verified.
- **Hormone consortia** - To boost the yield of cotton, maize and groundnut nutrient growth hormone consortia were developed individually and field trials are being conducted.
- **Establishment of aerosol observatory and Environmental observatory** - In collaboration with Indian Space Research Organization (ISRO) Aerosol Observatory was established at ICH, Ooty for assessing aerosol radiative forcing over India. In collaboration with Indian Space Research Organization (ISRO) Environmental Observatory was established at Ooty to monitor the trace gas in Nilgris Biosphere.
- **Development of fertilizer product from poultry wastes** - Research has been initiated to develop a nutrient rich organic fertilizer product from poultry wastes.
- **Training for Farmers / SHG** - Under NADP trainings are being given to farmers and SHGs belonging to nine districts on organic farming, organic manure and bio-input preparation and municipal solid waste management.
- **Establishment of Automatic Weather Stations** - Activities have been initiated for establishing Automatic Weather Stations (AWS) in 224 blocks of Tamil Nadu in collaboration with the Department of Agriculture in all the blocks of nine focused districts viz., Coimbatore, Dharmapuri, Dindigul, Krishnagiri, Namakkal, Perambalur(Ariyalur), Ramanathapuram, Salem, and Villupuram districts and at the rate of 5 blocks each in nineteen other districts



AWS will be installed with a main aim of more precise block level weather forecasting and giving suitable advisory based on weather forecast. In this regard, training on weather based agro advisories for Department of Agricultural staff is being given.

- **International Collaboration** - Collaboration with Texas A&M University on Soil & Water Assessment Tool (SWAT) (Hydrological) Modeling.
  - Collaboration with University of Reading on Erosion Productivity Impact Calculator (EPIC) modeling
  - MOU signed between Bioforsk, Norway and TNAU
  - MOU signed between Chicago Climate Exchange and TNAU on developing carbon emission reduction units.
- **Yield Forecasting** - Activities are initiated to run the World Food Studies (WOFOST) crop simulation model for yield forecasting.

## **CROP PROTECTION**

- Mass production techniques of *Bacillus* and Super *Pseudomonas*
- Development of new biopesticide formulation against rice pests and diseases
- Bioefficacy testing of fungicides against major diseases of crops
- Development of diagnostic kit for detection of aflatoxin and its management
- Fine tuning of IPM for major insect pests of crops
- Bioefficacy of new insecticide molecules against various pests of crops
- Patent for gadgets for stored product pest management (Two in one automatic device for pulse beetle)
- Biochemical basis of resistance in rice, pulses and cotton
- Cataloguing of insect pests of crops
- Nematode management using biopesticides in rice, fruit crops
- Identification of the nematicidal activity seed extract of *Sweetenia mahogany* against root knot nematode
- Development of botanical formulation using *Psoralea* spp against diseases of silkworm IPM for leaf webber
- Development of management practices for pests and diseases of Mulberry
- Mass production of "Seri Dust", a new formulation

## **HORTICULTURE**

In Horticulture, in order to fill the research gaps the following new research initiatives have been taken up with financial support from different agencies.

- Western Australia scheme for conducting research on moringa
- Collaborative research on onion and garlic to address the research issues
- Collaborative research on cocoa with Cadbury India
- Scheme on value chain on flowers sponsored by NAIP for research on cut flowers and loose flowers
- Scheme on value chain in mango sponsored by NAIP to study the marketing channel
- Schemes for research on medicinal plants like Gloriosa, feverfew etc. sponsored by NMPB

- A new Floriculture Research Station at Thovalai in Kanyakumari district was established to cater to the need of the farmers of the region
- 12 Model nurseries have been strengthened in different centres of TNAU for production of quality planting material under National Horticulture Mission

Resistance breeding to overcome the problem of Papaya Ring Spot Virus is taken up by the Faculty of Horticulture by crossing cultivated varieties of papaya with wild species *Carica candamarcensis* is taken up and further studies are in progress.

In cassava CMD is a serious problem. Screening of varieties and meristem tip culture of resistant plants of H 226, MVD 1 are taken up and PCR was done and tested for virus resistance. These plants are hardened and grown in the field and found to be virus free. Further multiplication is in progress at Yethapur, Paiyur and in Salem district for supply to farmers.

## **BIO-TECHNOLOGY**

### ***GM Products in the pipeline***

#### ***Bt Brinjal***

One of the major constraints in brinjal is the damage caused by the fruit and shoot borer (FSB) of brinjal. Conventional methods of pest management are less effective as the insect thrives inside the fruit. FSB resistant brinjal plants have been developed through genetic transformation in four regional specific brinjal lines by exploiting well proven Bt technology in collaboration with Mahyco Hybrid Seeds Pvt. Ltd., Four genotypes (Co2, MDU1, PLR1 and KKM1) were chosen for transformation keeping regional preference in mind. The advanced breeding materials are in field trials.

#### ***Sheath blight resistant rice***

A rice line (ASD16) expressing rice chitinase generated in the transformation laboratory has been evaluated for disease resistance under transgenic greenhouse conditions over generations. Based on its performance, the line has been advanced to multi location research trials (MLRT).

#### ***Golden rice***

Elite locally adapted genotypes namely ADT43 and ASD16 are being converted into golden rice lines with a view to improving pro-vitamin A content of rice grains. The pro-vitamin A biosynthetic pathway genes (phytoene synthase and phytoene desaturase) were introgressed from an elite golden rice event of Syngenta into the target genotypes through molecular marker assisted back-cross breeding.

#### ***Marker Assisted Selection***

#### ***Drought Tolerant Rice Culture Proposed for Release during 2008***

Promising drought tolerant rice cultures *viz.*, CPMB ACM 04 004, CPMB ACM 04 006 and PM 01 011, PM 03 002 and RM 04 001 were developed through marker aided selection (MAS) and farmers participatory plant breeding approach in the Department of Plant Molecular Biology and Biotechnology, CPMB with the help of

Dept. of Plant Breeding and Genetics, AC&RI, Madurai, ARS, Paramakudi and CSRC, Ramnad.

### ***Development of molecular markers linked to leaf folder resistance***

Phenotyping and genotyping of the mapping population resulted in the detection of QTLs for leaf folder resistance on the linkage groups *viz.*, 7 (RM5499, RM432 and RM11), 9 (RM257, RM242 and RM3909) and 10 (RM271 and RM244).

### ***Mapping QTLs for yellow stem borer resistance in rice***

Microsatellite markers associated with yellow stem borer resistance at vegetative and reproductive stages were identified by deploying single marker analysis (SMA). Twenty RILs were selected out of 72 based on the SSR markers associated with both YSB resistance and yield components. Of which two RILs *viz.*, YSB RIL # 143 and YSB RIL # 479 were found to be the best recording average grain yield of 6.5 t/ha with moderate resistant to YSB among them based on the distribution of alleles for resistance too YSB and yield components

### ***Mapping gene(s) associated with brown planthopper resistance in rice***

IR 50 and Ratu Heenati were identified as susceptible and resistant parents respectively to develop a mapping population to map the QTLs associated with BPH resistance. To identify the QTLs and validate the markers already identified the F<sub>5</sub> progenitors were advanced to F<sub>6</sub> generation by following SDS method.

### ***Development of more potent indigenous Bt genes***

Indigenous Bt strains of about 500 numbers were isolated in TNAU from samples of diverse regions of Tamil Nadu. Potent isolates of native Bt were selected by insect bioassay against lepidopteran pests of rice, brinjal and cotton. Indigenous Bt genes were cloned from potent isolates of Bt and plasmid constructs were made to express codon optimized synthetic *cry2A* genes in rice and brinjal plants. In addition, a chimeric *cry2A* gene has been made using DNA sequences of two indigenous *cry2A* genes of *B. thuringiensis*. The chimeric Cry2A protein isolated from recombinant bacterium showed about 20-fold higher toxicity to *H. armigera* (cotton bollworm) than the Cry2Ab protein which is currently used in the Bt-hybrids of private companies. For extending the benefit of indigenous Bt gene developed in TNAU to the farming community of India, TNAU has been invited recently to join hands with other leading public and private sectors in the country for a project funded by the New Millennium Indian Technology Leadership Initiative (NMITLI) of CSIR, GOI.

## **NANOTECHNOLOGY**

An advanced laboratory for nanotechnological research in agriculture is being established with the financial assistance from the ICAR (Rs.50 crore projects). Eight research projects in nanotechnology applications in agriculture *viz.*, synthesis of nanofertilizer, nanoencapsulations of herbicides for weed management in dryland agriculture, non destructive method of viability testing of seeds, bio-nanosensor for disease detection, nanomembrane for enhancing the shelf life of processed food, enhancement of the bioavailability of phytochemicals in health foods, neem based nanopesticides, biosynthesis of nanoscale zero valent ion are being in operation.

- ***Nano herbicides for weed management*** - In controlled release of nano herbicides for weed management in rainfed agriculture, synthesis of nano particles and screening of herbicides suitable for polymer coating are initiated. Setting up of nano technology lab is in progress.
- ***Nanofertilizer formulations for promoting balanced crop nutrition and sustainable soil productivity*** - A new research initiative for synthesizing zeolite-based nano-fertilizer formulations is under progress for balanced nutrition of maize and sustainable soil productivity.
- ***Environmental Nanotechnology*** - Research on biosynthesis of zero-valent iron for the remediation of polluted soil and groundwater habitat.
- ***Nanotechnology based non destructive viability test*** – Research on nano technology based non destructive, real time method to deduct live and dead seeds in a seed lot

## **BIOFUEL**

Under the promotion of Biofuels programme in Tamil Nadu, the scheme on Introduction of Jatropha cultivation in Tamil Nadu will be continued for the third year in succession during 2009'-10. To cover 20,000 ha under cultivation of Jatropha an outlay of Rs.498 lakhs has already been provided. Similarly, four numbers of training programme on Jatropha cultivation at a cost of Rs.4.00 lakhs will also be organized during the year 2009'-10.

## **POST GRADUATE RESEARCH**

Tamil Nadu Agricultural University (TNAU) a leader in agricultural education in South Asia, in partnership with Cornell University, USA, an Ivy League University and the global leader for agricultural research and education will be offering students in India and USA a dual master's degree program that integrates Cornell's Master of Professional Studies (MPS) and TNAU's Master of Technology (M.Tech) this year 2008-09. The course will be the first dual degree offering by any Land Grant University of US origin in partnership with a State Agriculture University in India. The proposed program will fill significant unmet needs for life science professionals who can effectively combine science, technology and management knowledge and skills together to benefit an industry characterized by high levels of global integration. The initial courses are i) Food processing and marketing and ii) Biotechnology and Business Management with further courses tailored to address other disciplines such as Agril. Extension and rural development. The students will be getting complete support from Tata Trust (Rs. 12 lakhs per student) to meet the entire tuition fees of Cornell University, Air travel accommodation in years.

PG students will be taking up research in National Parks, Singapore on urban ecology and greening. Under this program post graduate students in any of the M.Sc. degree programmes in TNAU and are expected to after completion of first year of their M.Sc. programme will be undertaking their research in Singapore. National Parks will provide the selected students with travel support to Singapore and back, accommodation and monthly internship allowance of SGD (Singapore dollar) 850.

Ms. Naalamle Amissah, Ph.D. scholar from Cornell University, USA has undergone three months training on recent advances in Spices and orchids in TNAU during 2008. The students from foreign universities such as University of Kassel,

Germany, University of East Anglia, UK and Copenhagen University, Denmark are permitted to take up thesis research in organic farming, waste management, water technology in TNAU during 2008-09 academic year.

Four doctoral students of TNAU have been awarded graduate student exchange program (GSEP) fellowship by the Canadian Bureau of International Education on behalf of foreign affairs and international trade of Canada to carryout a part of their thesis research in University of Saskatchewan, Canada. The students are working un the research areas viz.,

- Development of nanoscale zero valent iron particles based permeable reactive barriers (PRBs) for wastewater treatment
- Developing of packaging materials from oil palm empty fruit bunch fibers
- Development of suitable photocatalytic reactor for the treatment of industrial wastewater to zero liquid effluent discharge
- Exploring abiotic stress tolerance in crop plants carrying Rob5 gene

One Ph.D. student in agronomy has been awarded Israeli Government scholarship for the year 2008-09 to take up research in Hebrew University of Jerusalem, Israel. One PG student in forestry from TNAU has won the prestigious Erasmus Mundus scholarship offered by the European commission to pursue dual masters program in sustainable tropical forestry in University of Copenhagen, Denmark with fellowship. One PG student in plant breeding is undertaking collaborative research on chickpea genetic engineering in ICRISAT, Hyderabad.

The students are permitted to carryout thesis research in partnership with R&D institutes viz., Jain Hi Tech Agricultural Institute, Jalgaon, Barwale Foundation, Hyderabad, Mahyco Research Foundation, Hyderabad, Metahelix, Bangalore and John Deere, Pune.

## **VENTURE CAPITAL SCHEME**

Venture Capital schemes is an innovative programme of TNAU with twin objectives of helping farmers with provision of quality agricultural inputs and generation of revenue to the University through sale of products. In the year 2007-08, totally 136 Venture Capital schemes were operated at various Colleges/ Research stations/ KVKs. Out of the total seed money released (Rs.168.54 lakhs), Rs.134.0 lakhs is received back upto 2007-08. From the Venture Capital Schemes agricultural inputs viz., quality seeds of improved varieties and hybrids of agricultural and horticultural crops, seedlings and grafts of fruit crops, biocontrol agents, biofertilizers, vermicompost, fodder crops, forestry seedlings etc., were produced and supplied to the farmers, private and Government organizations. Besides production of agricultural inputs, trainings were also offered to the farmers and entrepreneurs on production of vermicompost, mushroom cultivation, food processing, urban horticulture etc. From the above schemes, Rs.94.00 lakhs as institutional charges was received for the year 2007-08. Remaining 75% of the receipts was utilized by the respective institutions for the developmental activities like improvement of lab facilities and other infrastructure development, purchase of farm equipments and machineries.

## **PLAN SCHEME 2008-'09**

During 2008-09, from the net grant of Rs.4317.16 lakhs provided by Government of Tamil Nadu an expenditure Rs.3416.32 lakhs has been made under plan schemes and with this grant 116 plan schemes including 9 temporary non-plan and one part II plan scheme are operated. The details of part II plan scheme is as follows:

One Part II Plan Scheme named "Mass production of natural enemies, demonstration and adoption of technology for the management of leaf eating caterpillar and rhinoceros beetle on coconut" is operated during 2007- 08 & 2008-09 under this scheme, Surveillance on the infestation of coconut leaf eating caterpillar ***Opisina arenosella*** and coconut rhinoceros Beetle ***Oryctes rhinoceros*** was carried out in Erode district, Dindugal district, Dharmapuri district and Villupuram district from April 2008 January 2009 and the hot spot areas were identified. The level of infestation of coconut black headed caterpillar and rhinoceros beetle was found to be significantly in higher proportion ranging from 5 to 94.55% and 3 to 25% respectively in all the five districts surveyed. So far, 34,75,000 numbers of Braconids and 1,37,500 numbers of Bethylids parasitoids were mass produced and released in the IPM demonstration plots. In all the BHC – IPM demonstration plots, there was a drastic reduction in black caterpillar population after imposing the chemical treatment followed by releases of biological agents Braconids and Bethylids for six times consecutively at 21 days intervals of time. Consequently there was a population build up of Braconids and Bethylids at appreciable level was noticed in all the experimental plots.

## **TN-IAMWARM PROJECT**

The Tamil Nadu Irrigated Agriculture Modernization of Water Resources Management (TN-IAMWARM) project was continued to be implemented in 16 river sub-basins during the year 2008-09 with an outlay of Rs. 2006.14 lakhs apart from the 9 river sub-basins in the year 2007-08 by implementing SRI, improved production technology in rice fallow pulses, garden land pulses, maize, groundnut, sunflower, cotton, gingelly, onion and cumbu, precision farming in sugarcane, banana, tapioca, vegetables and flowers and seed production in rice, coconut, vegetables and pulses.

## **NATIONAL AGRICULTURAL DEVELOPMENT PROGRAMME (NADP)**

The National Agricultural Development Programme (NADP) was continued and implemented by TNAU in 2008-09 along with the line departments with an outlay of Rs.620.61 lakhs, for implementing the schemes on precision farming, establishment of agri clinics cum mini soil testing laboratories, agricultural mechanization, dry land development and maximizing crop productivity, promotion of organic farming and organic manure production, strengthening of quality seed production and distribution and augmenting pulses production through DAP spray.

## **NATIONAL AGRICULTURAL INNOVATIVE PROJECT (NAIP)**

Under the ICAR's National Agricultural Innovation Project (NAIP), two research projects with TNAU as the leading partner with an outlay of Rs.507.69 lakhs and seven research projects with TNAU as co-partners with a funding of Rs.450.49 lakhs have been taken up. The following are the list of the NAIP project being implemented:

TNAU as *lead centre*

1. A value chain on industrial agroforestry in Tamil Nadu
2. Value chain on flowers for domestic & export markets

TNAU as *cooperating centre*

1. Development of e-courses for B.Sc (Ag.) degree programme
2. Value chain on biomass based decentralized power generation for agro enterprises
3. Soil organic carbon dynamics vis-à-vis anticipatory climatic changes and crop adaptation strategies
4. Development of e-courses for B.Sc.(Hort.) degree program
5. Risk assessment and insurance products for agriculture
6. Visioning policy analysis and gender (V-page)
7. Developmnet of value chain for wild bee honey

### **DOMESTIC AND EXPORT MARKET INTELLIGENCE CELL (DEMIC)**

The Domestic and Export Market Intelligence Cell functioning in Tamil Nadu Agricultural University had released 19 price forecasts for major crops namely; Onion, Groundnut, Chillies, Black gram, Vegetables, Sunflower, Maize, Rice, Adipattam (Maize, Gingelly, Groundnut) Cotton, Karthigaipattam (Chena, Cumbu, Sunflower, Coriander). One month before sowing of each major crop a forecast on prices that are likely to be received during harvest of that crop is released. Due to this the farmers are able to take decisions on whether to sow that crop or not and also the extent of area. Similarly, during harvest of all major crops recommendations are made to sell the produce immediately or to store the same for sometime to fetch a better price. Thus, farmers are helped in getting better prices for each crop. The forecasts were disseminated to the farmers through Tamil and English Dailies, All India Radio, Television, Krishi Vigyan Kendras, Dept. of Agricultural Marketing and Agri-Business and Regulated Markets.

### **INTELLECTUAL PROPERTY RIGHTS (IPR) CELL**

IPR cell was established in 2008 at the Directorate of Centre for Agricultural and Rural Development Studies (CARDS), TNAU, Coimbatore. The cell is imparting many awareness training and out-reach programmes to scientists, farmers, students and other stakeholders all over the state. The main role of IPR cell is to facilitate an individual patent filed by TNAU scientists in patent office with legal counsel from International Patent Attorney through IPR cell. Hitherto, six patents obtained, ten patent applications filed, eighteen training programmes conducted and initiated the proposal for registration of extant crop varieties of TNAU are the achievement of the cell.

### **DYNAMIC MARKET INFORMATION THROUGH MOBILE AND INTERNET**

Dynamic market price information for 130 perishable commodities are made available to the farming community on daily basis for getting better price for their commodities. The same market information was also sent through mobile phones and internet to the farmers in a pilot scale. Separate Department of Market Extension has also been established at Directorate of Extension Education, TNAU for market extension research and offering market extension training to the department officials.

**List of MoUs signed between TNAU and other academic institutions and private companies from April 2008 to February 2009**

<b>Sl. No.</b>	<b>Name of the institutions / companies / firms with which MoU signed</b>	<b>Name of the project / study / scheme etc.</b>	<b>PI incharge of the project</b>	<b>Duration (with date of comments)</b>
1.	Rasi Seeds, Attur	Rasi development of fortified seed coating and pelleting technology for cotton	Dr.A.S.Ponnuswamy, Special Officer (Seeds) Coimbatore	1 year (1.11.2008 to 30.10.2009)
2.	National Oilseeds and Vegetables Oils Department Board (Novod), Ministry of Agriculture, Gurgaon, Haryana	Standardization of seed enhancement and storage technique, seed certification standards for jatropha and pungamia and standardization of seed handling techniques in jatropha	Dr.P.Srimathi, Prof. & Head, Dept. of SS&T Coimbatore	3 years (1.7.2008 to 30.6.2011)
3.	Pioneer Seeds, Hyderabad	Development of mechanized integrated seed coating technology for maize and pearl millet	Dr.P.R.Renganayaki, Assoc. Prof. (SST) Coimbatore	2years 1.6.2008 to 31.5.2010)
4.	Incotec, Ahamedabad	Evaluation of DISCO brand seed coating polymer of INOTEC on major agronomic crops for storability	Dr.A.S.Ponnuswamy, Special Officer (Seeds) Coimbatore	1 year (1.6.2008 to 31.5.2009)
5.	Ratan Tata trust Mumbai	Popularization of dryland technologies for enhancing the livelihood of dryland farmers of Tamil Nadu through farmers' participatory approach	Dr.K.Ponnusamy Professor (Agronomy) Coimbatore	3 years (Mar 08- Feb 11)
6.	The Presidency Kid Leather Pvt. Ltd Chennai	Developing technologies for the utilization of solid wastes of tannery processing semi-finished leather to finished leather and their effects on soil and crops	Dr.P.Doraisamy Professor (ENS) Coimbatore	1 year (Sep 08- Aug 09)
7.	United Breweries Ltd Palakkad	Ecofriendly Recycling of Breweries Waste Water for Maximizing the Productivity of Crops and Sustainable Soil Health	Dr.G.Rajannan Professor (ENS) Coimbatore	3 years (Sep 08- Aug 11)
8.	Sakhti sugars Limited, Erode	Studies on the Long Term Impact of Distillery Effluent Application on Soil and Crops	Dr.G.Rajannan Professor (ENS) Coimbatore	2 years (Oct 08- Mar 10)
9.	Bannari Amman Sugars Ltd. Periapuliyur Bhavani Taluk	Studies on the Eco monitoring the land application of distillery spentwash for sustainable crop production and maintenance of soil health and environmental aspects	Dr.P.Thangavel Professor (ENS) Coimbatore	2 years (April 08- Mar 10)
10.	Ratan Tata Trust	Popularizing Azolla as feed supplement among women and tribal population	Dr.K.Lakhsmanan Associate Prof. (ENS) Coimbatore	2 years (Oct 08 - Mar 10)



11.	Terre des Hommes Bangalore	Resilience of Agricultural Land & Increased food security	Dr.V.Geethalakshmi Professor (ACRC) Coimbatore	1 year (July 08 - Dec 09)
12.	Monsanto India, Mumbai	Evaluation of corn hybrids (roundup ready corn event-Nk 603) crop safety and safety and bio efficacy of roundup herbicide.	Dr.C.Chinnusami Professor (Agronomy) Coimbatore	1 year (Jan 09 – Dec 09)
13.	Grow Green Technologies Australia	Evaluation of effectiveness of organic fertilizers (Profert and Soil Reviva) on crops, soil and environmental quality	Dr.S.Mahimairaja Professor (ENS), Coimbatore	2 years (Feb 09 – Jan 11)
14.	Sir Ratan Tata Trust, Mumbai	IPM Technologies for managing pests and diseases in vegetables and rice in Tamil Nadu	Dr. R. Samiyappan Director, CPPS, Coimbatore	3 years (April 2008 – March 2011)
15.	International Centre of Insect Physiology and Ecology (ICIPE), Nairobi, Kenya	Exploration for natural enemies for classical biocontrol of the downy snow line mealybug, <i>Rastrococcus iceryoides</i> (Green) ( <i>Pseudococcidae</i> )	Dr. S. Suresh Professor (Entomology) Coimbatore	2 years (16.06.2008– May 2010)
16.	State Bank Institute of Rural Development (SBIRD), Hyderabad	Collaborative research and training programme in agricultural finance	Dr.M.Chandrasekaran as PI of the project & Dr.K.Mani as CO-PI	From 7.1.2009 for three years
17.	AVT Ltd., Sathyamangalam, Salem Spices (P) Ltd., Salem, Elkhil Agrotech (P) Ltd., Ooty & Vanguard Exports (P) Ltd., CBE	Value chain on flowers for domestic and export markets	Dr.M.Jawaharlal, Prof. & Head, Dept. of Floriculture and Landscaping, Coimbatore	4 years (1.9.08 to 30.6.12)
18.	Cadbury India Ltd., Mumbai	TNAU Cadbury research project for sustainable cocoa production in Tamil Nadu	Dr.K.Rajamani Prof. & Head, Dept. of Spices & Plantation Crops, Coimbatore	5 years (June 2008 to June 2013)
19.	KCP-HETC-GLOBAL, Hyderabad	Technical knowhow of high rate reactor design and drawing for the installation of the unit to treat sewage water	Dr.S.Kamaraj, Professor, Dept. of Bio-energy, Coimbatore	--
20.	TIFAC CORE, JSS College of Pharmacy, Ooty	Research and development in medicinal plants and undertake student PG and Ph.D. research programmes in medicine plants	Prof. & Head, HRS, Ooty	2 years
21.	International Rice Research Institute (IRRI), Manila, Philipines	Connecting performance under draught with genotypes through phenotype association	Director, CPBG, Coimbatore	3 years
22.	Petroleum Conservation Research Association (PCRA), Ministry of Petroleum & Natural Gas, Govt. of India	Commercialization of energy efficiency tractor operated spading machine	Dean, AEC&RI, (Prof. & Head, Dept. of Farm Machinery), Coimbatore	18 months
23.	Central Rice Research Institute, (ICAR), Cuttack Orissa, India and 4 consortium members	Soil organic carbon dynamics vis-à-vis anticipatory climatic changes and crop adaptation strategies	Dept. of Agrl. Microbiology, AC&RI, Madurai	

24.	Cypress semiconductor technology India Pvt. Ltd., Bangalore	Wireless sensor based forecasting for disease management and water use efficiency in banana	Prof. & Head, Dept. of Fruit Crops, Coimbatore	1 year
25.	Science and Engineering Res. Council, Dept. of Sci. & Tech., New Delhi	Molecular mapping of <i>alternaria</i> resistance gene(s) in sunflower	Director, CPBG, TNAU, Coimbatore	3 years
26.	Dept. of Science & Technology, Science and Engineering Res. Council, New Delhi	Up-Scaling of Vermiculite Based Treatment System (VBTS) technologies available at laboratory	Director, SCMS, TNAU, Coimbatore	3 years
27.	Joint Director, Department of Biotechnology, New Delhi	Breeding & Biotechnological approaches for the improvement of Jatropha Genetic resources	Dean, FC&RI, Mettupalayam	3 years
28.	ICAR, New Delhi & Consortium Partners Industrial Agro Forestry in Tamil Nadu	Development of jatropha hybrids for higher seed and oil yield and to jointly patent the new varieties and technologies and commercialization on payment of 2% royalty	Dean, FC&RI, Mettupalayam	5 years
29.	National Parks, Singapore	Students research attachment programme, university personnel exchange and visit, cooperative research, urban horticulture, post-graduate level research and training, conducting seminars and workshops through separate negotiation and mutually agreed cooperation agreements and exchange of scientific publications, journals and reference materials and conditions for student research attachment programme	Dean (SPGS), Coimbatore	5 years
30.	University of South Australia, Adelaide, Australia.	Faculty and student exchange programme, exchange of information, joint education and training, joint research and publication and other activities.	The Dean (SPGS), TNAU, Coimbatore.	12 months
31.	University of Saskatchewan	To get samples of the materials viz. 7B-1 male-sterile tomato line, progeny of such tomato line and associated know how, information and data from the University of Saskatchewan	Dean, Horticulture, TNAU, Coimbatore	10 years
32.	President of India, Department of Biotechnology, Ministry of Science and Technology, Government of India, New Delhi.(DBT)	Self-employment and entrepreneurship development among farm women and tribals by imparting training on production of vermicompost and mycorrhizal biofertilizers	Dean (FC&RI), TNAU, Mettupalayam.	3 years

33.	Emami Biotech Ltd., Madurai	--	Dr.M.Paramathma, Professor & Nodal Officer, Coimbatore	4 years (19.6.2008 to 18.6.2012)
34.	Sri Shakthi Institute of Engineering and Technology (SIET), Coimbatore.	(1) Organizing international and national level seminars on renewable energy applications, status and future, (2) Mobilizing financial support for strengthening the research and development programmes on Energy management / Conservation and Sustainable Resource Development and (3) Sharing the facilities and experiences of both the organizations for the benefit of the faculty and the trainees to conduct educational programmes in B.Tech. (Energy and Environment Engineering and B.Tech.(Food Process Engineering) offered by TNAU	The Dean, AEC&RI, (Dept. of Bio-Energy), TNAU, Coimbatore.	3 years
35.	Department of Biotechnology, GOI, New Delhi (DBT)	Reducing Raffinose family oligosaccharides through Molecular breeding in chickpea ( <i>Cicer arietinum</i> L.)	Prof. and Head, Dept. of Pulses TNAU, Coimbatore.	3 years
36.	Dept. of Biotechnology, Ministry of Science and Technology, Government of India, New Delhi.	Engineering resistance in papaya ring spot virus through RNAI approach	Prof. and Head, Department of Biotechnology, TNAU, Coimbatore.	3 years
37.	M/s. Bharat Petroleum Corporation Limited (BPCL), (A Govt. of India Enterprise), Noida.	To undertake bio-diesel production from micro algae i.e. development and designing of the pilot plant studies for bio-diesel production from micro algae and processing, chemical analysis and techno economic feasibility of micro algal based bio-diesel.	Dean, AEC&RI, TNAU, Coimbatore (Dept. of Bio-energy)	3 years
38.	Department of Biotechnology, GOI, New Delhi	Empowerment of rural farm women through knowledge transfer on maize hybrid seed production techniques and seed entrepreneurship at community level	Professor and Head, Dept. of Plant Breeding & Genetics, AC&RI, Killikulam, Vallanadu.	3 years
39.	Dept. of Biotechnology, Ministry of Science and Tech.,Govt. of India, New Delhi.	Agro based entrepreneurship for the empowerment of farm women in Madurai district	Professor and Head, RRS, Aruppukottai	3 years (2007- 2009)

40.	University of Turin, Italy	To undergo training by the scientists of TNAU on advanced techniques on biological control, biological control of post harvest diseases and induced systemic resistance at the University of Turin and deepen collaboration by joint research project, exchange of staff and researchers, exchange of information, admission to library etc.	Director (CPPS), TNAU, Coimbatore	3 years
41.	University of Turin, Italy	Mycotoxin research – pursuing research at the University of Turin, Italy.	Director (CPPS), (Dept. of Plant Pathology), TNAU, CBE (Dr.R.Velazhagan, Professor)	2 years (2007-2009)
42.	Planning Commission, Govt. of India, New Delhi.	Performance of Agriculture in River Basins of Tamil Nadu in the Last Three Decades-A Total Factor Productivity Approach	Dr.C.R.Ranganathan, Professor of PS&IT and Dr.A.Vidhvavathi, Asst. Prof. of Agri. Econ., TNAU, Coimbatore.	
43.	Washington State University, Office of Grant and Res. Development, 423 Neill Hall, Pullman, WA	Integrated Management of thrips borne tospoviruses in vegetable cropping system funded by IPM	Professor and Head, Department of Plant Pathology, TNAU, Coimbatore	1 year - (Oct ' 08 to Sep '09)
44.	Evolva Biotech Private Limited, 203-206, Tara Tycoon Building, Tarnaka, Secundrabad	<i>In vitro</i> Screening of natural compounds against major diseases of major crops	Director (CPPS) (Department of Plant Pathology), TNAU, Coimbatore.	1 year
45.	Department of Biotechnology, Government of India, New Delhi-110 003.	Optimization of <i>Agrobacterium tumefaciens</i> transformation protocol for local elite cultivars of <i>Jatropha curcas</i>	Director (CPMB) (Dept. of Plant Molecular Biology), TNAU, Coimbatore.	3 years
46.	State Bank Institute of Rural Development (SBIRD), Hyderabad,	For mutual benefits and for enhancing training capabilities and to undertake research jointly involving faculty/Post Graduate students.	Director, CARDS, TNAU, Coimbatore	3 years
47.	Department of Biotechnology, Government of India, New Delhi-110 003.	Rice heparanase: Cloning, Characterization and over expression for oxidative stress tolerance in rice	Director (SCMS) (Dept. of Agronomy), TNAU, Coimbatore.	3 years
48.	Department of Biotechnology, GOI, New Delhi	Cytological Screening and Molecular characterization of Thermo sensitive genic male sterile lines for developing inter- sub-specific two line hybrids in rice	Director, CPBG, TNAU, Coimbatore	3 years
49.	Directorate of Onion and Garlic Research (ICAR), Rajgurunagar, Pune constituent of the ICAR, Dr.Rajendra Prasad Road, New Delhi-14.	Onion and Garlic Research to promote location specific technology for enhancing productivity.	Dean, Horticulture, TNAU, Coimbatore	

50.	Monsanto India Limited, Mumbai.	Evaluation of bio-efficacy and Residue of glyphosate in transgenic corn.	Professor and Head, Dept. of Agronomy, TNAU, Coimbatore	
51.	Mission Biofuels, Mumbai with TNAU	Development of Jatropha hybrids for higher seed and oil yield	Dr.K.T.Parthiban Professor, FC&RI, Mettupalayam	5 years can be extended if required
52.	District Collectorate, Tiruchirappalli.	Developing Comprehensive District Agricultural Plan	Dr. S. Jeyaraman, Dean, ADAC & RI, Trichy.	6 months Jan 2009 – June 2009
53.	M/s.Kothari Sugars and Chemicals Ltd., Kattur, Trichy District.	Eco friendly recycling techniques of natural and sugar industry bio inputs for enhancing soil and crop productivity	Dr. P. Pandiyarajan Professor and Head Dept. of Crop Management, ADAC&RI, Trichy	Three years 2008 - 2011
54.	Trichy Distilleries and Chemicals Limited, Tiruchirappalli-4	Evolving eco friendly recycling techniques and assessing the impact of bio inputs of distillery industries for enhancing soil and crop productivity	-do-	3 years (2008-2009 to 2010-2011)
55.	M/s. Indofil Chemicals Company, Mumbai.	Bio-efficacy testing of Met 20 (Metominostrobin 20 SC) against major diseases and phytotoxicity on rice.	Dr. D. Dinakaran, Professor (Plant Path.), Dept. of Crop Protection, ADAC&RI, Trichy	One year from September 2008 to August 2009.
56.	M/s. Bayer Crop Science Ltd, Coimbatore – 34.	Evaluation of bio-efficacy and phytotoxicity of Folicur (Tebuconazole) 250 EC W/v against purple blotch disease of onion.	-do-	12 months (August 2008 to July 2009).
57.	Indian Institute of Crop Processing Technology (IICPT), Tanjore	Standardization of selected ethnic fermented foods and beverages by rationalization of indigenous knowledge	Dr.S.Kanchana, Assoc.Professor, Dept of Food Science & Nutrition, H.Sc.& RI, Madurai	January 2009 Project yet to be commenced
58.	Coconut Development Board (Ministry of Agriculture, Govt. of India) Cochin	Product Development and Storage Studies of Coconut Jelly	Dr.S.Amutha, Professor, Dept of Food Science & Nutrition, H.Sc.& RI, Madurai	21.09.2006 to September 2008
59.	Ministry of Science and Technology, National Mission on Bamboo Applications, New Delhi.	Estimating the therapeutic and nutraceutical uses of bamboo	Dr. S. Parvathi, Professor and Head, Department of Human Development, Home Science College & Research Institute, Madurai.	March 2007 to January 2009

42<sup>nd</sup>  
**RESEARCH COUNCIL  
MEETING**

2<sup>nd</sup> March, 2009



**AGENDA NOTES**

**DIRECTORATE OF RESEARCH  
TAMILNADU AGRICULTURAL UNIVERSITY  
COIMBATORE – 641 003**

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