

**TAMIL NADU
AGRICULTURAL UNIVERSITY**

TWENTYSECOND ANNUAL REPORT

April 1, 1992 to March 31, 1993

BOARD OF MANAGEMENT

Chairman

Vice-Chancellor : Dr. S. Jayaraj

Secretary to Government : Thiru G. Ranga Rao, I.A.S.
Agriculture Department and
Agrl. Production Commissioner

Secretary to Government : Thiru N. Narayanan, I.A.S.
Finance Department

Director of Agriculture : Thiru P. Kolappan, I.A.S.
(upto 6.10.1992)

Thiru N. Govindan, I.A.S.
(from 7.10.1992)

Director of Animal Husbandry : Dr. T. K. Govindarajan,
(upto 31.7.1992)

Dr. S. P. Anbumani
(from 1.8.1992)

Commissioner of Fisheries : Tmt. Latika D. Padalkar, I.A.S.

Principal Chief Conservator of : Thiru M. Harikrishnan, I.F.S.
Forests

ICAR Nominee : Dr. S. Nagarajan
(upto 7.4.1992)

Dr. P. N. Bahal
(from 8.4.1992)

Member of Legislative : Thiru N. S. Palaniswami, M.A., M.L.A.
Assembly

Member-Secretary & : Dr. C. Ramaswami
Registrar

CONTENTS

	Page
1. Introduction	1
2. University Administration	13
3. Education	48
4. Research	70
5. Extension Education	124
Appendices	
i) Important Civil Works Completed	
ii) List of Schemes	
iii) List of Books & Booklets Published	
iv) List of Research Papers Published	

1. INTRODUCTION

The twenty second annual report of Tamil Nadu Agricultural University covers the period from 1.4.1992 to 31.3.1993. Steady and significant progress has been made during the year in the fields of agricultural education, research and extension education. Semester system of education has been introduced for all the undergraduate and post-graduate programmes. A new three months certificate course in agriculture has been started. The BSc(Ag) degree programme at Tamil Nadu Government Agricultural College and Research Institute, Kumulur was shifted to KFSC, Navalur Kuttapattu. The B.E.(Ag) degree programme was started at Kumulur from the academic year 1992-93. During the year, 555 students were admitted in various undergraduate degree programmes in the six campuses and 712 students in post-graduate courses in the four campuses of the University. Fourteen new crop varieties were released for general cultivation. New agricultural implements and tools were designed to reduce the cost of cultivation and also to increase the efficiency of inputs. Apart from varietal improvement work new production techniques were developed in the faculties of agriculture, horticulture, forestry and agricultural engineering to enhance the productivity and production potential of various crops. Socio-economic studies covering cost of cultivation of major crops, employment of rural labour force, techno-economic studies at district level, economics of sericulture, dairy and mixed farming, diffusion and adoption of new technologies, demographic studies etc., were also undertaken. The reports provide data support for grass root planning.

The research programmes of the University are multidisciplinary, field oriented and applied in nature to ensure quick impact on rural economy. Regional Research Councils, Research Council and Scientific Workers' Conference provide ample opportunities for close interaction between research workers and extension staff. These were the major fora for identification of priority areas of research and also for faster dissemination of results generated during the year. Further more, the status reports of the seven agro-climatic zones involving microlevel details serve as guides in project formulation and planning. The Research Project Approval Committee continue to monitor the effective planning and implementation of the sub-projects. At present there are around 3200 research sub-projects in operation covering different branches of Agriculture, Horticulture, Agricultural Engineering, Forestry, Food Technology, Basic Sciences, Humanities and Social Sciences.

In tune with the national consensus the University has strengthened research areas like biotechnology and genetic engineering, water management, biological

control of insect pests and diseases, integrated farming system, environmental sciences, dry farming, agro-forestry, sericulture, post-harvest technology, designing and development of new farm implements and tools, women participation and social engineering and upliftment of scheduled castes and other backward communities.

Tamil Nadu Agricultural University had always given special importance to popularise new innovations and technologies developed by the scientists. This has been possible through the strong extension education net work comprising of communication centres, Krishi Vigyan Kendras, National Demonstration Centres and Plant Clinic Centres located at different agroclimatic zones of the State. The training division offers training programmes in agriculture and related subjects. Agricultural Information Service wing of the Directorate convenes weekly meetings on Wednesdays involving identified scientists for immediate dissemination of the latest technologies. Field days, Farmers' days and training programmes were organised to discuss and disseminate the latest technologies. Mass media like radio, television, newspapers and farm magazines were utilised to disseminate new technologies to increase the production and productivity in agriculture and allied fields.

A students counselling and placement centre is functioning in the University with the objective to provide information on curriculam advancement and help them to secure good jobs. Coaching classes for competitive examinations are organised. The Extension Education Directorate also helped the farming community in weather forecast, agro-industry, soil, water, fertilizer and pesticide testing besides child care and nutrition services.

The University has a well organised seed production programme. Breeder seeds of various crops were produced under strict quality control towards meeting the entire needs of the State. The successive viz., foundation, registered and certified class of seeds were produced by the development department of the State making use of the breeder seeds produced by the University. Thus through the three pronged approach on Education, Research and Extension, Tamil Nadu Agricultural University is serving Tamil Nadu in the upliftment of economic status of the farmers at large. In all these years, the contribution of the University through manpower development, training and development of new crop varieties, agricultural machinaries and crop production and protection techniques is really substantial.

The major achievements of the University in the fields of education, research and extension education are summarised below :

Education

- * During the year 555 students were admitted in the under-graduate programmes and 712 in the post-graduate courses in the four campuses of the University.

- * Semester system of education has been introduced for all the under-graduate and post-graduate programmes in the University.
- * A new three months certificate course in agriculture was started.
- * The syllabi of all under-graduate and post-graduate programmes have been restructured and updated.
- * The B.Sc. (Ag) degree programme at Tamil Nadu Government Agricultural College and Research Institute, Kumulur was shifted to Kumaraperumal Farm Science Centre, Navalur, Kuttappattu. The B. E. (Ag) degree programme was started at Kumulur during the academic year 1993.
- * The TNAU students have won 64 Junior Research Fellowships out of a total of 230 awarded in 12 disciplines by ICAR based on national level competitive examination conducted in April 1992. The TNAU students have topped the list in the disciplines of Agricultural Entomology, Agricultural Extension and Seed Technology. The first five ranks in Agricultural Entomology were won by TNAU students.

Research

During the year under report around 320 research schemes and 3855 research sub-projects were in operation in the University.

The following new schemes were sanctioned and implemented during the year 1992 - 93.

University Plan Schemes

- * Development of wastelands in Alfisols of Pasumpon Muthuramalingam and Ramanathapuram districts through crop husbandry, agro-forestry and horticultural crops, Ramanathapuram.
- * Identification of efficient strains of micro-organisms and development of processes in bioconversion of farm wastes, rural and urban wastes, Cuddalore.
- * Physiological studies on salt tolerance and development of rice varieties tolerant to coastal and inland salinity, Tirur.
- * Strengthening research on medicinal and herbal plants in plains (Killikulam) and hills (Yercaud).
- * Setting up of agro based industry for processing vegetables, jack, sugarcane and coconut, Periyakulam.

- Standardisation of vegetative propagation techniques in tree species, Thadiyankudisai
- Scheme for delineation of pollutants in Uyyakondan river and identification of crop varieties and technologies to overcome the problem, Trichirapalli.
- Pollution due to tannery, cement factory, paper industry and sugar factory and development of technology to overcome the problem, Killikulam.
- Scheme for maximising yield of rainfed crops in red soils of Dharmapuri district, Paiyur.
- Agricultural Research Station - Establishment - Field laboratories - improvement of irrigation facilities - construction of screen house.

ICAR - Schemes

- Genetic manipulation of algal symbiont *Anabaena azollae* and induction of sporulation process in Azolla, Coimbatore.
- VA - Mycorrhizae as a dynamic microsymbiont in association with horticultural plantation crops, Paiyur and Yercaud.
- Development of osmoregulatory and salt resistant strains in *Azospirillum* for use in problem soils, Madurai.
- Scheme for the use of biotechnology for disease management in rice, Coimbatore.
- Utilisation of *Frankia* and its symbiosis with *Alnus* for afforestation in Nilgiris, Uthagamandalam.
- Exploiting the genetic potential of the rhizobium nodulating *Sesbania rostrata* and *Aeschynomene indica*, Coimbatore.
- Genetic improvement of *Rhizobium* sp (Cowpea Group), Coimbatore.
- Oilseeds production programme - creation of revolving fund for production of breeder seed of oilseeds, Vridhachalam.
- Research capabilities for varietal improvement, varietal testing and uninterrupted basic and breeder seed production under NSP III, Bhavanisagar.
- Demonstration studies on *Gymnema sylvestra* schult., Coimbatore.
- Strengthening of research capability - Resource characterisation of rainfed farming system in peninsular India (NARP), Kovilpatti.

- * Augmentation of irrigation facilities for breeder seed production, Tindivanam, Vridhachalam.
- * Methane emission in rice based cropping system, Aduthurai.

Government of India Schemes

- * Induced variability for the improvement of oilseeds and forage crops, Coimbatore.
- * Genetic and biochemical basis of rice bacterial blight pathogen interactions and characterisation of resistance to *Xanthomonas campestris* p.v. *Oryzae*, Coimbatore.
- * Bio-control of soil borne disease of national importance using fluorescent pseudomonas, Coimbatore.
- * Union planning commission - Agro-climatic regional planning exercise to district level of Tamil Nadu and Pondicherry, Coimbatore.
- * Technology extension project on Agro-forestry, Coimbatore and Periyar districts (Farmers' field), Mettupalayam.
- * Strengthening the existing facilities of the Botanic Gardens of TNAU, Coimbatore.
- * Strengthening of plant quarantine facilities, Coimbatore.
- * Crop pest control by plant derivatives, Aduthurai

International Collaborative Scheme

- * Rockefeller Foundation - Measuring sustainability in long term experiments of TNAU, Coimbatore.
- * ISRIC, Netherlands - Establishment of University soil reference collection centre, Coimbatore.
- * IFPRI - Projection and policy implications of medium and long term rice supply and demand, Coimbatore.
- * WINROCK - Natural resource economics, Coimbatore.
- * WINROCK - Development of agro-forestry in Tamil Nadu, Coimbatore.

Private Agency Scheme

- * Studies on the assessment of the problems of sea water intrusion and reclamation of the east coast in Radhapuram Taluk, Tirunelveli district, Killikulam.

- * Studies on continuous use of mussorie rock phosphate on normal / alkaline soils and its effect on soil crop environment, Coimbatore.
- * Evaluation of revenue oriented soil conservation and water harvesting techniques of Natranpalayam mini watershed of Dharmapuri district, Paiyur
- * Development and performance evaluation of package of tractor and power tiller operated implements for machanisation of mulbery farming, Coimbatore.
- * Evaluation of anilofos (50% EC) residues in transplanted rice, Coimbatore.
- * Biological evaluation and determination of residues of Ekalux 20 EW, Coimbatore.
- * Application of small portable engines in farm machines suitable for Indian conditions, Coimbatore.
- * Seed village concept for generation system of seed production, Coimbatore.
- * Guidelines for maintaining purity and seed quality, Coimbatore.
- * Studies on the effect of potash application for early drought management in sugarcane, Coimbatore.
- * Exploiting mycorrhizae for neem nursery, Coimbatore.

Varieties released

Concerted efforts made by the TNAU scientists in different colleges and research stations have resulted in the release of 14 new varieties as "Pongal Gift" during January, 1993 for the benefit of the farming community.

The 14 varieties released are as follows :

Rice	: JJ 92 (ADT 41) TPS 3
Hybrid cumbu	: X6
Blackgram	: APK 1
Cowpea	: Co 6
Cotton	: K 11
Sugarcane	: CoG 93076 Co 8208
Chilli	: PMK 1
Tapioca	: Co 3
Pandal Avarai	: Co 1
Water melon	: PKM 1
Timla Fig	: Yercaud Timla Fig.
Gladiolus	: KKL 1

Apart from varietal improvement work, several new crop management and protection technologies were developed for increasing production and profit of the farmers. The most important ones are :

- Through N¹⁵ studies, it was ascertained that basal application of N to rice crop can be skipped, if green manure is applied.
- Seed treatment of IR 50 with *Pseudomonas fluorescens* protected the seedlings from rice blast in the nursery. In the treated nursery bed, there was no incidence of blast, while untreated check recorded 67% incidence of blast.
- Application of tank silt at 25 t/ha recorded high yields in rainfed rice.
- Planting 20 day old seedlings of *Sesbania rostrata* at 1.5 m interval and incorporating on 30 days produced the highest yield of 4561 kg/ha in direct sown wet seeded rice as against 3332 kg/ha in sole crop of rice.
- Groundnut-rice-gingelly was found to be the best profitable multiple cropping system for new delta of Thanjavur district and it gave the highest net return of Rs. 29248/ha with B:C ratio of 3.49.
- *Trichogramma japonicum* against stem borer and *T. chilonis* against leaf folder were found effective at 5 cc/ha release.
- Monocrotophos @ 1000 ml/ha or acephate @ 625 g/ha or NSKE 5% effectively controlled rice black bug.
- Spraying of tricyclazole 75 WP @ 0.1% significantly reduced the leaf blast and also increased the yield.
- Application of chopped paddy straw treated with quinalphos 1-5 D @ 50 kg/ha reduced the harvester termite (*Anacanthotermes viarum*) damage to a significant level.
- Release of parasitized galls at the rate of one per 10 m² in the main field 10 days after transplanting was effective in controlling the gall midge.
- For rainfed pearl millet, combined application of 20 kg N + 10 kg P/ha with seed and soil inoculation of *Azospirillum* and phosphobacteria gave higher net return.
- Mussorie rock phosphate with composted coir pith can be recommended for increasing the yield and P use efficiency in irrigated ragi based cropping system as compared to Single Super Phosphate and DAP as sources of P.
- A new rhizobial strain CoC 10 has been developed at Coimbatore for cowpea which registered 18% increased yield over the existing strain.

- * Intercropping of sesamum in chickpea at 4:2 ratio recorded the highest net return of Rs. 2015/ha accounting for an additional income of Rs. 1040/ha over the sole crop of chickpea.
- * Bengal gram seeds treated with the inoculum of *Pseudomonas fluorescens* and application of peat soil inoculum (1 kg/ha) at the time of sowing controlled the chick pea wilt caused by *Fusarium oxysporum* effectively.
- * Combined application of gypsum at 200 kg/ha with MgSO₄ at 30 kg/ha in two splits viz., 50% basal + 50% top dressing on 45 DAS significantly increased the pod yield in irrigated groundnut.
- * Groundnut followed by blackgram or greengram increased the net return by Rs. 3140 and Rs. 2700/ha respectively over sole crop of groundnut under rainfed condition.
- * Seed treatment with *Trichoderma* effectively controlled root rot of sesamum and significantly increased the yield over control.
- * Late application of N by 20-30 days in CoC 85061, CoC 86062, CoC 92061 and CoC 671 significantly increased the cane yield.
- * In Gudlatham tract, sugarcane varieties Co 6304 and CoC 85061 recorded the highest jaggery yield of good quality.
- * In South Arcot district, application of 'N' in three splits viz., 45, 90 and 135 days increased the cane yield by 11.4 t/ha and sugar yield by 1.27 t/ha over the existing recommendation of N application at 30, 60 and 90 days.
- * When polluted water of Uyyakondan river is used for irrigation in sugarcane, incorporation of coir pith at 10 t/ha or daincha at 10 t/ha can be adopted as soil amendment for increasing the cane yield.
- * Sett treatment with triadimefon 0.05% or carbendazim 0.05% followed by foliar spray with either of these chemicals 30 DAP controls sugarcane smut disease effectively.
- * In Lower Bhavani project area, in tobacco based cropping system, onion or coriander (for greens) as intercrop was most profitable with an additional income of Rs. 3000/-/ha.
- * In Srivilliputhur tract, seed row tillage immediately after rice harvest and sowing cotton increased the kapas yield by 16% over the existing practice of sowing under zero tillage.
- * Protoplast culture for two *indica* rice varieties viz. IR 50 and Co 45 has been standardised.

- Paring banana suckers upto 1 cm depth and dipping the suckers in monocrotophos 0.75% for 15 minutes prior to planting enhanced the fruit yield by 49 per cent over control.
- In papaya application of NPK at 50:50:50 g/plant at bimonthly interval starting from fourth month of planting recorded highest yield of 100 fruits weighing 202 kg in 20 months.
- For *Begonia*, a potting mixture containing decomposed coirpith, shola leaf mould and sand in the ratio of 3:1:1 proved to be better than the conventional medium.
- Application of 120 kg of P_2O_5 in the form of mussooriephos was better than superphosphate to improve the yield of coffee.
- Paddy seeds exposed between North and South pole of magnet at 200 gauss for 7 hours enhanced the yield by 6-10 per cent.
- In bhendi black LLDPE mulching recorded significantly high yield of 10492 kg/ha which was 45.1% higher than no mulch plots.
- A stored grain insect trap has been designed and developed. Rice weevil, flour beetle, lesser grain borer, saw toothed beetle and flat grain beetle can be successfully trapped using this device.
- Incorporation of full fat soyflour upto 30% level was found to be acceptable in the preparation of biscuits and noodles.
- Harvesting the fodder crops at 100% flowering stage and hay making by shade drying gave high fodder yield. The nutrient contents were high when the crop was cut at 50 per cent flowering.
- For rainfed vertisols, the integrated farming system including cropping, livestock (goat) and orchard crops was found to be profitable.
- In cotton-greengram-rice cropping system at Srivilliputhur, application of 60 kg N alone per ha for cotton, 50 kg P_2O_5 alone for greengram and recommended dose of NPK/ha for rice along with greengram stubble incorporation gave high yield.
- Cropping system studies conducted at Tirur showed that rice-gingelly-blackgram recorded the highest B-C ratio of 5.53 followed by rice-groundnut-blackgram (5.16).
- Application of 10 ml of glyphosate + 0.5 g of 2, 4-D Na salt + 1 ml of tee-pol per litre of water was found to be the most effective measure for the control of *Cyperus*.

Transfer of Technology

The Directorate of Extension Education effectively and rapidly disseminated the research information developed at various centres to the farmers. A brief summary of the activities is presented below :

- The five Krishi Vigyan Kendras conducted on-campus and off - campus training programmes in agriculture and allied activities. A total of 865 training programmes were conducted for the benefit of 17939 farmers, 6977 farm women, 3094 extension workers, 808 youths and 1807 other categories of personnel.
- The scientists of the five plant clinic centres diagnosed various crop maladies and suggested timely solution. Farm advisory services numbering 490 were organised besides conducting training, demonstrations, group meetings, field days and farmers' days.
- Communication centre offered lessons through Farm School on All India Radio and correspondence courses.
- New audio cassette lessons on crop cultivation were prepared and recorded cassettes were sold.
- The video production unit produced 109 general programmes. About 141 video lessons were duplicated and sold. Totally 15 programmes were tele-cast through Doordarshan Kendra.
- The training unit conducted 44 training programmes benefiting 761 participants of State Department of Agriculture, administrators, defence personnel, scientists of Tamil Nadu Agricultural University etc.
- Students counselling and placement centre organised coaching classes for various competitive examinations, self employment training programmes for farm graduates, campus interviews and also provided information on employment opportunities.
- Timely and need based messages were processed and sent to the mass media and extension functionaries through agricultural Information Service Centres.

Focus for 1993-94

Education

- Restructuring of the syllabi and curricula of undergraduate and post-graduate courses to suit the needs of clientele groups.

- Starting of new degree programmes with specialisation in identified areas.
- Introducing certificate courses in agriculture

Research

- Great emphasis on developing high yielding location specific crop varieties tolerant to biotic and abiotic stresses.
- Developing refined integrated pest, disease, nutrient and weed management practices.
- Emphasis on hybrid rice research.
- Development of hybrids in oilseeds
- Improvement of rice fallow pulses.
- Development of maize varieties for industrial purposes.
- Forestry research including agro-forestry and farm forestry.
- Emphasis on microbial research and biofertilizers.
- Exploitation of biotechnology and genetic engineering for crop improvement.
- Developing farming systems integrating animal husbandry and fisheries.
- Intensification of research on water management.
- Post-harvest research in agricultural and horticultural crops.
- Research on fruit processing and fruit based products.
- Seed production, processing and storage techniques for vegetables.
- Strengthening breeder seed programme.
- Design and development of new farm implements and tools.
- Efficient use of agricultural and industrial wastes.
- Developing pest and disease management techniques through bio-control agents.
- Intensification of research on dry farming and rainfed agriculture
- Bio-energy and plasticulture.

- Identification of pollutants in specific situations inclusive of industrial pollutants and developing strategies to mitigate such problems.

Extension Education

- Intensification of training programmes to field level staff, development officers and farmers.
- Preparation of video films on crop production technologies.
- Bringing out required publications with timely information for the benefit of farming community.
- Starting of Video school programme through Doordarshan Kendra.
- Starting of certificate courses for self-employment of farm graduates.

2. UNIVERSITY ADMINISTRATION

OFFICERS OF THE UNIVERSITY

Chancellor	Shri Bhisma Narayan Singh His Excellency the Governor of Tamil Nadu
Pro-Chancellor	Thiru K. P. Krishnan Hon'ble Minister for Agriculture
Vice-Chancellor	: Dr. S. Jayaraj
Registrar	Dr. C. Ramaswami
Director of Research	: Dr. S. Chelliah
Director of Extension Education	: Dr. G. Perumal
Dean (Agri)	: Dr. S. Sankaran
Dean (Post Graduate Studies)	: Dr. M. Gopalan
Dean (Ag. Engineering)	: Prof. K. R. Swaminathan
Dean (Hort)	: Dr. I. Irulappan
Dean (Forestry)	: Thiru G. Kumaravelu, I. F. S. (upto 18.5.1992) Dr. I. Irulappan i/c (upto 15.11.1992) Thiru R. Annamalai, I. F. S. (from 16.11.1992)
Dean, AC & RI, Madurai	: Dr. G. Soundarapandian
Dean, AC & RI, Killikulam	: Dr. M. Rangarajan
Dean, TNGAC & RI, Kumulur	: Dr. K. M. Ramanathan (upto 27.10.1992)

Dean, HC & RI, Periyakulam	Dr. R. Arumugam
Director, School of Genetics	Dr. A. Narayanan
Director, Soil & Crop Management Studies	Dr. SP. Palaniappan
Director, Centre for Plant Protection Studies	Dr. P. Vidyasekaran
Director, CARDS	Dr. V. S. Subramanyan
Director, Water Technology Centre	Dr. A. Rajagopal
Director, Centre for Plant Molecular Biology	Dr. S. R. Sree Rangaswamy
Director, Planning and Monitoring	Dr. K. M. Ramanathan (from 28.10.1992)
Director, TRRI, Aduthurai	Dr. A. Abdul Kareem
Estate Officer	Thiru K. R. Belle (upto 31.1.1993) Prof. K. R. Swaminathan i/c. (from 1.2.1993)
Comptroller	Thiru G. Srinivasan

BOARD OF MANAGEMENT

Chairman	
Vice-Chancellor	Dr. S. Jayaraj
Secretary to Government Agriculture Department and Agricultural Production Commissioner	Thiru G. Ranga Rao, I. A. S.
Secretary to Government Finance Department	Thiru N. Narayanan, I. A. S.
Director of Agriculture	Thiru P. Kolappan, I. A. S. (upto 6.10.1992) Thiru N. Govindan, I.A. S. (from 7.10.1992)

Director of Animal Husbandry	Dr. T. K. Govindarajan, M.V.Sc. (upto 31.7.1992)
	Dr. S. P. Anbumani (from 1.8.1992)
Commissioner of Fisheries	Tmt. Latika D. Padalkar, I.A.S.
Principal Chief Conservator of Forests	Thiru M. Harikrishnan, I.F.S.
ICAR Nominee	Dr. S. Nagarajan (upto 7.4.1992)
	Dr. P. N. Bahal (from 8.4.1992)
Member of Legislative Assembly	: Thiru N. S. Palaniswami, M.A., M.L.A.
Member-Secretary & Registrar	Dr. C. Ramaswami

Meeting of the Board of Management

The Board of Management met four times during the year on 16.3.1992, 5.5.1992, 11.8.1992 and 3.12.1992.

The following were some of the important decisions taken by the Board of Management at these meetings.

1. Approved the starting of 3 months certificate course in Agriculture in the University.
2. Approved the awards of Rs. 5000/- for best teacher/best researcher, best extension education worker for the year 1991-92.
3. Approved the shifting of B.Sc.(Ag) degree programme to KFSC, Navalur Kuttapattu from Tamil Nadu Government AC&RI, Kumulur.
4. Approved the admission of first year B. E. (Ag) degree programme students at Kumulur from 1992-93.
5. Approved the accommodation of students studying in II, III and IV year degree programmes at Kumulur in three campuses viz., Coimbatore, Madurai and Killikulam.
6. Approved the balance sheet of the year 1988-89.
7. Approved the Annual Report of the University of the year 1991-92.

8. Approved the Annual Accounts and Audit Report of the University of the year 1990-91

Academic Council

Chairman

Vice-Chancellor : Dr. S. Jayaraj

Members

Secretary to Government
Agriculture Department and
Agricultural Production
Commissioner : Thiru G. Ranga Rao, I. A. S.
(from 1.11.1991)

Dean, Agricultural College and
Research Institute, Coimbatore : Dr. G. Soundrapandian
(upto 13.2.1992)

Dr. S. Sankaran
(from 14.2.1992)

Dean, Post-graduate Studies
Coimbatore : Dr. M. Gopalan

Dean, Horticultural College and
Research Institute, Coimbatore : Dr. J. Irulappan

Dean, College of Agricultural
Engineering, Coimbatore : Prof. K. R. Swaminathan

Dean, Forest College and
Research Institute, Mettupalayam : Prof. G. Kumaravelu, I. F. S.
(upto 17.5.1992)

Dr. J. Irulappan i/c.
(from 18.5.1992 to 15.11.1992)

Prof. R. Annamalai, I. F. S.
(from 16.11.1992)

Dean, Agricultural College and
Research Institute, Madurai : Dr. S. Sankaran
(upto 13.2.1992)

Dr. G. Soundrapandian
(from 14.2.1992)

Dean, Agricultural College and Research Institute, Killikulam	Dr. M. Rangarajan
Dean, Horticultural College and Research Institute, Periyakulam	Dr. R. Arumugam
Dean, Tamil Nadu Government Agril. College & Research Institute, Kumulur	Dr. K. M. Ramanathan (upto 27.10.1992)
Dean, Pandit Jawaharlal Nehru College of Agriculture, Karaikal	Dr. A. Gopalswamy
Director of Research, Coimbatore	Dr. S. Chelliah
Director of Extension Education, Coimbatore	Dr. G. Perumal
Director, CARDS, Coimbatore	Dr. V. S. Subramanyan
Director, Centre for Plant Protection Studies, Coimbatore	Dr. P. Vidyasekaran
Director, Water Technology Centre, Coimbatore	Dr. A. Rajagopal
Director, Soil & Crop Management Studies, Coimbatore	Dr. SP. Palaniappan
Director, Centre for Plant Molecular Biology, Coimbatore	Dr. S. R. Sree Rangaswamy
Director, Planning and Monitoring, Coimbatore	Dr. K. M. Ramanathan from 28.10.1992
Director, TRRI, Aduthurai	Dr. A. Abdul Kareem
Six members among the Heads of Departments nominated by the Vice-Chancellor	<ol style="list-style-type: none"> 1. Prof. R. Karunanithi, Prof. of Agril. Engineering, Zonal Research Centre, Coimbatore. 2. Dr. K. Mayalagu, Prof. of Soil Science and Agril. Chemistry, Agril. College & Res. Institute, Madurai. (upto 21.11.1992)

3. Dr. Tmt. Sukanya Subramanian,
Prof. of Agrl. Botany,
Forest College and Research Institute,
Mettupalayam.
(upto 21.11 1992)
4. Dr. A. Mohamed Ali,
Prof. and Head,
Dept. of Agronomy and Soil Science &
Agrl. Chemistry,
Agrl. College & Res. Institute, Killikulam.
(upto 21.11.1992)
5. Dr. JBM. Md Abdul Khader,
Professor and Head,
Dept. of Floriculture & Plantation Crops,
Horticultural College and Res. Institute,
Coimbatore.
(upto 21.11.1992)
6. Dr. T. V. Karivaratharaju,
Prof. and Head,
Dept. of Seed Technology,
Soil & Crop Management Studies,
Coimbatore.
(upto 21.11.1992)
7. Dr. M. Balasubramaniam,
Professor and Head,
Dept. of Farm Machinery,
College of Agrl. Engineering,
Coimbatore.
(from 22.11.1992)
8. Dr. S. Sadasivam,
Professor and Head,
Dept. of Bio-chemistry,
Agrl. College & Research Institute,
Coimbatore.
(from 22.11.1992)
9. Dr. S. Thamburaj,
Professor and Head,
Dept. of Olericulture,
Hortl. College and Research Institute,
Coimbatore.
(from 22.11.1992)

10. Dr. C. Surendran,
Professor and Head,
Forest College and Res. Institute,
Mettupalayam.
(from 22.11.1992)
11. Dr. P. C. Sundara Babu,
Professor and Head,
Dept. of Agrl. Entomology,
Centre for Plant Protection Studies,
Agrl. College and Research Institute,
Coimbatore.
12. Dr. V. Veerabadran,
Professor and Head,
Department of Agronomy,
Agrl. College and Res. Institute,
Madurai.
(from 22.11.1992)

Three members having special knowledge or practical experience in different aspects of Agriculture nominated by the Vice-Chancellor

1. Dr. A. Alam,
Asst. Director General(Agrl. Engineering)
ICAR, Krishi Bhavan,
New Delhi - 110 001.
(upto 21.11.1992)
2. Dr. R. Yamdagni,
Regional Director,
Haryana Agrl University,
Regional Research Station,
Bhawal - 123 501
(Rewari) Haryana.
(upto 21.11.1992)
3. Dr. C. Sreedharan,
Dean, College of Agriculture,
Kerala Agrl. University,
Trivandram - 695 522
(upto 21.11.1992)
1. Dr. T. P. Ojha,
Deputy Director General,
(Agrl. Engineering), ICAR,
Dr. Rajendra Prasad Road,
Krishi Bhavan,
New Delhi - 110 001
(from 22.11.1992)

2. Dr. Anupam Varma,
Head, Division of Mycology and
Plant Pathology, IARI,
New Delhi - 110 012
(from 22.11.1992)
3. Dr. B. S. Chundawat,
Principal and Dean, Aspee College of
Forestry and Horticulture,
Gujarat Agrl. University, Navsari
Campus, Navsari 396 450
Gujarat State,
(from 22.11.1992)

Meetings of the Academic Council

The Academic Council met two times during the period under report. The following important decisions were taken.

1. Accepted the Government order changing the name of Tamil Nadu G. D. Naidu Agricultural University, as Tamil Nadu Agricultural University.
2. Approved the syllabus for the new degree programme B.C.A. (Bachelor of Commercial Agriculture).
3. Approved the semesterwise course distribution for II B. Sc. (Ag) and B. Sc. (Hort) degree programmes.
4. Approved the implementation of central evaluation for all the subjects from second semester onwards.
5. Approved the proposal to have a separate minimum of marks of 50% for theory and practicals with an aggregate average of 60% for a pass under semester system.
6. Accepted the proposal to dispense with the minimum OGPA requirements for moving to the next year from I/II/III years under trimester system.
7. Accepted the proposal to dispense with the rule that students cannot move to III and IV years without completing all the courses in I and II years respectively under trimester system.
8. Accepted to reserve 25 seats for Asst. Agrl. Officers for the four year B.Sc.(Ag) course during 1992-93 as per the G. O. Ms. No. 226, Agriculture (T&V) Department dated 23.4.1992.

9. Accepted the Dean's Committee recommendations on the collection of fees for the undergraduate degree programmes in the I Semester.
10. Accepted to start certificate courses in Commercial Agriculture for 3 months duration.
11. Accepted the UGC guidelines on admission of SC ST candidates including the inter-transferability of seats for adoption in the University.
12. Accepted the reservation of seats in M. E. (Ag) for the officers deputed from the Agricultural Engineering Department.
13. Accepted the inter-transferability of Post-doctoral fellowships positions among different disciplines.
14. Accepted the recommendations of the Standing Recognition Committee for diploma in agriculture regarding the conduct of examinations.
15. Accepted the creation of the post of Lecturer in the place of Instructor for offering Agricultural Engineering courses at Sri Ramakrishna Mission Vidyalaya Institute of Agriculture and Rural Development, Periyanaickenpalayam, Coimbatore.
16. Accepted the shifting of the B. E. (Ag) degree programme to Kumulur, shifting of B. Sc. (Ag) degree programme from Tamil Nadu Government Agricultural College and Research Institute, Kumulur to Kumaraperumal Farm Science Centre, Trichirapalli and also accommodating all the students selected for B. Sc. (Ag) degree programme at Agricultural College and Research Institute, Madurai, Killikulam and Trichirapalli.

Board of Studies

The Boards of Studies in the Faculty of Agriculture, Agricultural Engineering, Horticulture and Post-graduate education constituted during the year 1991 were continued. The Board of Studies in Forestry was reconstituted during the year 1992. Each Board of Studies was constituted with the following members.

1. Dean of the Faculty
2. Other Deans within the Faculty.
3. Heads of Departments of concerned Faculty.
4. All the Professors of the Faculty.
5. Two experts in the concerned subjects from outside the University nominated by the Vice-Chancellor.

Post - graduate Studies

Dean (Post-graduate Studies) : Chairman

Registrar, Deans and Directors
in all Faculties : Members

One Professor representing from each
faculty of Agriculture, Horticulture,
Agrl. Engineering, Forestry

- i) Dr. V. Veerabadrán, Faculty of Agriculture
Professor and Head,
Department of Agronomy,
AC & RI, Madurai.
- ii) Dr. M. Kadar Mohideen, : Faculty of Horticulture
Professor of Horticulture,
Horticultural College and
Research Institute,
Periyakulam.
- iii) Dr. M. Balasubramaniam : Faculty of Agrl. Engineering
Professor and Head,
Dept. of Farm Machinery,
College of Agricultural
Engineering, Coimbatore.
- iv) Dr. C. Surendran, : Faculty of Forestry
Professor and Head,
Forest College and
Research Institute,
Mettupalayam.

Two outside experts nominated by the Vice-Chancellor

1. Dr. C. C. Abraham,
Associate Dean,
College of Horticulture,
Kerala Agrl. University,
Vellanikara-680 654,
Trissur, Kerala.
2. Dr. C. Raja Reddy,
Principal,
S. V. Agrl. College,
Tirupathi-517 502.

Faculty of Agriculture

Associate Professors

1. Thiru C. R. Vijayarayanan,
Associate Professor,
Agrl. Research Station,
Vrinjipuram,
North Arcot Ambedkar District,
Vellore-632 104.
2. Dr. N. Nadarajan,
Associate Professor,
Dept. of Agrl. Botany,
Agrl. College & Res. Institute,
Madurai-625 104.

Assistant Professors

- 1 Thiru P. Nasurudeen,
Assistant Professor,
Dean's office,
Agricultural College and
Research Institute,
Coimbatore.
2. Thiru C. R. Anandakumar,
Assistant Professor,
Agrl. Research Station,
Kovilpatti.
3. Thiru M. Subash Chandra Bose,
Assistant Professor,
Dept. of Forage Crops,
Agrl. College and Res. Institute,
Coimbatore.
4. Thiru A. Balraj,
Assistant Professor of Physics,
Dept. of Agrl. Engineering,
Agrl. College & Res. Institute,
Killikulam.

Nominated Members

1. Dr. V. Gopinathan Nair,
Professor and Head,
Dept. of Plant Breeding and
Genetics, College of Agriculture,
Vellayani, Trivandrum.

2. **Dr. M. Santharam,**
Professor and Head,
Dept. of Soil Science and Agri. Chemistry,
Andhra Pradesh Agri. University,
Rajendranagar,
Hyderabad-500 030

The Board of Studies (Agri) met once during the year under report and recommended the following to the Academic Council.

1. Approval of syllabus for B.C.A. degree programme.
2. Approval of semester-wise course distribution for III B.Sc. (Ag).
3. Approval of external evaluation under semester system based on the experience of I semester 1991 - 92.
4. Approval of separate minimum of 50% for theory and practicals with aggregate average of 60% for a pass under semester system.
5. Dispensing of minimum OGPA for I, II, III year Undergraduate students to move to next year under trimester system.
6. Dispensing of the rule that the student cannot move to III and IV year without completing all the courses of I year and II year for the students studying under trimester system.

Faculty of Forestry

Dean (Forestry)	Chairman
Deans of other Faculties and all Deans and Directors in the main campus	: Members
Registrar	: Member
All Professors in Faculty of Forestry	: Members

Associate Professors

1. **Thiru A. Shanmugam,**
Associate Professor,
Forest College and Res. Institute,
Mettupalayam 641 301
(upto 10.12.1992)

2. Dr. K. Vanangamudi,
Associate Professor,
Forest College and Res. Institute,
Mettupalayam 641 301
(upto 10.12.1992)
3. Dr. V. Murugappan,
Associate Professor,
Forest College and Res. Institute,
Mettupalayam 641 301
(from 11.12.1992)
4. Thiru K. L. Chellapillai,
Associate Professor,
Forest College and Res. Institute,
Mettupalayam 641 301
(from 11.12.1992)

Assistant Professors

1. Thiru K. K. Suresh,
Assistant Professor,
Forest College and Res. Institute,
Mettupalayam 641 301
2. Thiru K. Sivagnanam,
Assistant Professor,
Forest College and Res. Institute,
Mettupalayam 641 301
(upto 10.12.1992)
3. Thiru R. Narayanan,
Assistant Professor,
Forest College and Res. Institute,
Mettupalayam 641 301
(from 11.12.1992)
4. Thiru V. Chellamuthu,
Assistant Professor,
Forest College and Res. Institute,
Mettupalayam 641 301
(from 11.12.1992)

Nominated outside members

1. Dr. S. Chinnamani,
Assistant Director General
(Agri. Forestry),
ICAR, Krishi Bhavan,
New Delhi 110 001
(upto 10.12.1992)
2. Thiru T. C. Ramakrishna,
Deputy Conservator of
Forests (Retd.),
90, Tatabad, Street No. 11
Coimbatore 641 012
(upto 10.12.1992)
3. Thiru G. Kumaravelu, I. F. S.
Conservator of Forests (Res.),
Southern Forest Rangers College,
Coimbatore 641 002
(from 11.12.1982)
4. Dr. S. Chand Basha,
Kerala Forest Research Institute,
Peechi Post, Trisoor District,
Kerala.
(from 11.12.1992)

Faculty of Horticulture

Associate Professors

1. Thiru S. Balasubramanian,
Associate Professor,
Agricultural College,
Navalur Kuttappattu,
Tiruchirapalli.
2. Thiru V. Ponnuswamy,
Professor,
Department of Olericulture,
Tamil Nadu Agrl. University,
Coimbatore

Assistant Professors

1. Tmt S. Sarala Devi,
Assistant Professor (Hort),
Horticultural College and
Res. Institute,
Periyakulam.
2. Thiru M. Selvarajan,
Assistant Professor (Hort),
Sugarcane Research Station,
Sirugamani
3. Thiru L. Puhazhendi,
Assistant Professor (Hort.),
Department of Olericulture,
Horticultural College and
Res. Institute,
Coimbatore.
4. Thiru M. Kannan,
Assistant Professor (Hort),
Horticultural Research Station,
Kodaikanal

Nominated outside members

1. Dr. M. N. Khan,
Prof. and Head,
Div. of Horticulture,
University of Agrl. Sciences,
GKVK Campus,
Bangalore 560065
2. Dr. V. Suryanarayana,
Professor and Head,
Department of Horticulture,
S. V. Agrl. College,
Tirupathi 517 503

Faculty of Agricultural Engineering

Associate Professors

1. Thiru V. Murugesan,
Associate Professor,
Department of Bio-energy,
College of Agrl. Engineering,
Coimbatore.

2. Thiru M. Koteeswaran,
Associate Professor,
Soil & Water Conservation,
College of Agri. Engineering,
Coimbatore.

Assistant Professors

1. Thiru D. Palanisamy,
Assistant Professor,
Soil and Water Conservation,
College of Agri. Engineering,
Coimbatore.
2. Thiru I. Seegan Paul,
Assistant Professor (Engg),
Agri. College and Res. Institute,
Killikulam.
3. Thiru D. Mandhur Jesudass,
Assistant Professor,
Department of Farm Machinery,
College of Agri. Engineering,
Coimbatore.
4. Thiru K. Kathirvel,
Assistant Professor,
Agri. College and Res. Institute,
Killikulam

Nominated outside members

1. Dr. C. P. Singh,
College of Agri. Engineering,
Punjab Agricultural University,
Ludhiana.
2. Dr. Nawab Ali,
ICAR Scientist,
Central Instt. of Agri Engineering,
Bhopal.

Courses and Curricula

The trimester system of education was followed for the undergraduate and postgraduate degree programmes and Ph. D. programme of all disciplines upto 1990-91 in the University.

From the academic year 1991-92, semester system of education has been introduced for all the undergraduate and postgraduate programmes

A total number of 9676 application forms for the degree courses in Agriculture, Forestry, Agricultural Engineering and 45 applications for B. Sc. (Home Science) were received.

With regard to postgraduate programme selections were made for 301 seats in 25 disciplines in M. Sc. (Ag.) degree programme.

The following are the different programmes in the University.

Degree	Subject
B.Sc. (Ag.)	Agriculture
B.Sc. (Hort)	Horticulture
B.E. (Ag.)	Agricultural Engineering
B.Sc. (Home Science)	Home Science
B.Sc. (Forestry)	Forestry
Ph.D. & M.Sc. (Ag.)	Crop Physiology
Ph.D. & M.Sc. (Ag.)	Agricultural Microbiology
Ph.D. & M.Sc. (Ag.)	Plant Pathology
Ph.D. & M.Sc. (Ag.)	Agricultural Entomology
Ph.D. & M.Sc. (Ag.)	Seed Technology
Ph.D. & M.Sc. (Ag.)	Agricultural Extension
Ph.D. & M.Sc. (Ag.)	Agricultural Economics
Ph.D. & M.Sc. (Ag.)	Soil Science & Agrl. Chemistry
Ph.D. & M.Sc. (Ag.)	Plant Breeding & Genetics
Ph.D. & M.Sc. (Ag.)	Agronomy
Ph.D. & M.Sc. (Hort.)	Horticulture
M Sc. (Ag.)	Sugarcane Production
M.Sc. (Ag.)	Farming System Management
M.Sc. (Ag.)	Plant Protection

M.Sc. (Ag.)	Agri. Marketing Management
M.Sc. (Ag.)	Plant Nematology
M.Sc. (Ag.)	Water Management
Ph.D.	Agricultural Engineering
M.E. (Ag.)	Agro-Energy & Power
M.E. (Ag.)	Farm Power & Machinery
M.E. (Ag.)	Soil & Water Conservation Engineering
M.E. (Ag.)	Post Harvest Technology
M.E. (Ag.)	Water Management
M.Sc. & Ph.D.	Food Science and Nutrition
M.B.M.	Master of Business Management
M.Sc. & Ph.D.	Bio-Technology
M.Sc. & Ph.D.	Environmental Science
M.Sc. & Ph.D.	Forestry
P. G. Diploma in Sericulture	

The candidates selected for various undergraduate and postgraduate degree programmes were approved by the Vice-Chancellor

During the year under report, number of students passed out and admitted in the different undergraduate degree programmes are furnished below :

Name of the Degree Programme	No. of students passed out	No. of students admitted
B.Sc. (Ag.)	303	383
B.Sc. (Hort.)	46	66
B. E. (Ag.)	108	69
B.Sc. (Home Science)	4	19
B.Sc. (Forestry)	20	18
	481	555

Post-graduate Education

The following are the number of post-graduate students passed out and admitted during the period under report.

Name of the degree programme	No. of students passed out	No. of students admitted
Masters' degree programme		
M.Sc. (Ag.)	144	273
M.Sc. (Hort.)	4	20
M.E. (Ag.)	5	6
M.Sc. (Bio-tech)	3	8
M.Sc. (Env. Sci.)	4	5
M.Sc. (Forestry)	4	5
M.Sc. (Sericulture)		6
MBM	3	13
Total	167	336
Post-graduate diploma in Sericulture	9	9
Ph. D. degree programme		
Ph.D. (Agriculture)	23	288
Ph.D. (Horticulture)	2	24
Ph.D. (Agrl. Engineering)	—	30
Ph.D. (Forestry)	—	8
Ph.D. (Env. Sci.)		8
Ph.D. (Bio-technology)		11
Ph.D. (Food Science and Nutrition)	—	3
Total	25	372

Scholarships Fellowships

Sl. No	Name of the Scholarship	No. of students	Total amount
1.	ICAR Junior Fellowship	41	6,18,600
2.	Aspee Fellowship	6	75,710
3.	Govt. of Pondicherry Post Metric Scholarship (Junior)	2	3,120
4.	Ponni Sugars & Chemicals Ltd., (Junior)	1	34,800
5.	T. Stanes & Co. Sr. Fellowship	1	50,000
6.	ITEC Vietnamese - Sr. Fellowship	1	26,830
7.	ICCR (Fiji) Jr. Fellowship	1	29,227
8.	Indo-ARE Scholarship - Senior	1	29,265
9.	Madras Fertilizers Ltd., Junior	1	13,000
10.	Gharda Chemicals Ltd., Junior	1	40,800
11.	Bagyanagar Laboratories Junior	1	40,800
12.	The National Organic Chemicals Industries Ltd.	1	40,000
13.	AC & RI Merit Scholarship	1	6,093
14.	Andaman & Nicobar Scholarship U. G.	12	32,959
15.	Adhoc Merit Grant for UG	13	3,900
16.	Bright Student Award - UG	2	3,960
17.	Gandhi Memorial Grant for UG	1	1,000
18.	National Merit Scholarship	10	34,680
19.	SC Scholarship	30	1,02,155
20.	SC Loan Scholarship	37	35,500
21.	BC Scholarship	38	42,183

BOARD OF EXAMINATIONS

The meeting of the first Board of Examinations was held on 14.12.1992.

In the meeting, the Deans of Colleges with the help of Heads of Departments were requested to organise college level teaching seminar at the beginning of every semester and discuss about the question papers of previous semester, marks obtained by the students, practical difficulties experienced by them and suggestions for improvement.

Prizes and Medals

The Hon'ble Minister for Agriculture, has instituted the following endowments in the XVI Annual Convocation held on 6.5.1992 for the award of Prizes & Medals in honour of the Chancellor, Chief Guest and Special Guest of the XVI Annual Convocation.

1. Chancellor Dr. Bishma Narayan Singh Prize for the best Farmer's Discussion Group (FDG).
2. Chief Guest Dr. V. L. Chopra Prize for the best Research in Bio-Technology.
3. Special Guest Dr. Narong Minanandana, Prize for the best TOT/KVK/PCC/NDS.
4. Best Research work in Environmental Protection and Organic Farming
5. Best Research Work in Agro-Forestry
6. Best Research Work in Horticulture
7. Best Research Work in Agricultural Engineering
8. Best maintained Research Station

Convocation

XVI Convocation of TNAU was held on May 6, 1992. Degrees were conferred in person on 893 candidates and 554 were conferred in absentia. Honorary degree of Doctor of Science was conferred on Mr. Narong Minanandana, Director General, Department of Agricultural Extension, Government of Thailand, Bangkok.

His excellency Bishma Narayan Singh, Chancellor of the University and the Governor of Tamil Nadu presided.

Prof. V. L. Chopra, Director General, Indian Council of Agricultural Research delivered convocation address.

Seminars / Symposia / Conferences

- **Millets, Pulses and Forage scientists meet at Coimbatore. April 2-3, 1992.**
- **Oilseeds Scientists Meet at Coimbatore. April 6-7, 1992.**
- **Indo-US Workshop-cum training on eco-system at Coimbatore. April 20, 1992.**
- **Thirtieth Research Council Meeting at TNAU, Coimbatore. April 23, 1992.**
- **Rice Scientists Meet at TRRI, Aduthurai. April 27-28, 1992.**
- **Scientific Workers' Conference (Agriculture) at Coimbatore. May 25-26, 1992.**
- **Workshop on cropping systems research and experiments on cultivators' fields at TNAU, Coimbatore. June 1-4, 1992.**
- **Workshop on pressure irrigation systems in agriculture at Water Technology Centre, Coimbatore. June 9-18, 1992.**
- **AICCIP Central and South zone workshop 1991-92 at TNAU, Coimbatore. June 9-10, 1992.**
- **Cotton Scientists Meet 1992 at Coimbatore. July 15-16, 1992.**
- **Palm Scientists Meet at TRRI, Aduthurai. July 21, 1992.**
- **Seminar on maximisation of use of available water resources at Water Technology Centre, Coimbatore. August 7-8, 1992.**
- **Summer Institute short courses on commercial flower production technology at Coimbatore. August 20-29, 1992.**
- **Seminar on samba rice cultivation at TRRI, Aduthurai. September 8, 1992.**
- **Seminar on cultivation of guava at CRS, Srivilliputhur. October 27, 1992.**
- **Workshop on planning for better land and water use under normal and scarcity condition at water Technology Centre, Coimbatore. November 10-21, 1992.**

- **Workshop on planning for better land and water use under normal and scarcity condition at Water Technology Centre, Coimbatore. November 10-21, 1992.**
- **Seminar on jasmine cultivation at AC & RI, Madurai. November 19, 1992.**
- **Annual workshop on seed spice at Coimbatore. November 23-24, 1992.**
- **Seminar on banana production technology at HC & RI, Periyakulam. December 14, 1992.**
- **International workshop on simulation of potential production of rice at TRRI, Aduthurai. January 25-28, 1993.**
- **Seminar on recycling of waste water at Water Technology Centre, Coimbatore. February 9-11, 1993.**
- **Seminar on drip and sprinkler irrigation systems at Water Technology Centre, Coimbatore. February 9-16, 1993.**
- **National seminar on papaya at Coimbatore. March 6, 1993.**
- **Seminar on flower cultivation at Coimbatore. March 17, 1993.**

Trainings / Farmers' Days

- **Indo-US Workshop cum training on ecosystem studies in agroforestry for India at Agricultural College and Research Institute, Madurai. April 20-May 2, 1992.**
- **Training on extension methodology and communication at TNAU, Coimbatore. May 4-11, 1992.**
- **Training on planning and management at TNAU, Coimbatore. May 4-11, 1992.**
- **National level training on BTIS Network facilities at Coimbatore. May 11, 1992.**
- **Training on sugarcane cultivation technology at Sugarcane Research Station, Sirugamani. July 9, 1992.**

- One day training on mushroom cultivation at Agrl. College and Research Institute. Killikulam. July 10, 1992.
- Training on fodder development and bio-energy at TNAU, Coimbatore. July 27-31, 1992.
- Training on Soil and Water Management at TNAU, Coimbatore. August 3-7, 1992.
- Training on Kharif pulse production at TNAU, Coimbatore. August 25-28, 1992.
- Training on water management at SWMRI, Thanjavur. August 27, 1992.
- Training on paddy cultivation at TNAU, Coimbatore. September 1-30, 1992.
- Training on fruit and vegetable cultivation at Horticultural College and Research Instt., Periyakulam, September 4, 1992.
- Training on NP Virus at TNAU, Coimbatore. September 7-8, 1992.
- One day training on mass production of *Chrysopa* and *Trichogramma* at TNAU, Coimbatore. September 10, 1992.
- State level training programme on rice, millets and maize production technology at TNAU, Coimbatore. September 13-15, 1992.
- Training on IPM technology at TRRI, Aduthurai. September 18-21, 1992
- Training on mass culturing of *Trichoderma* at AC & RI, Madurai. September 22, 1992.
- Training on seed health testing at TNAU, Coimbatore. October 13-14, 1992.
- Training on integrated watershed development at TNAU, Coimbatore. November 2-6, 1992.
- Training on horticulture for bank officers at Coimbatore. November 9-13, 1992.
- Training on agroforestry at TNAU, Coimbatore. November 10-17, 1992.

- Training on cultivation of common pear trees at HRS, Pechiparai. November 24, 1992.
- Training on tractor maintenance and operation at RRS, Vridhachalam. November 27, 1992.
- Women in Agriculture day at RRS, Vridhachalam. December 4, 1992.
- Training on integrated farming systems at TNAU, Coimbatore. December 11-18, 1992.
- Training on kitchen gardening at TNAU, Coimbatore. December 14-16, 1992.
- Farmers' day at RRS, Tirur. December 23, 1992.
- Farmers' day at TNAU, Coimbatore. January 7, 1993.
- Training on hybrid cotton cultivation at Agri. College and Res. Institute, Killikulam. January 19-23, 1993.
- Farmers' Day at Agricultural College and Research Instt., Killikulam. January 23, 1993.
- Farmers' Day at RRS, Kovilpatti. January 23, 1993.
- Training on Palmarosa at RRS, Kovilpatti. January 23, 1993.
- Farmers' Day at Agricultural College and Research Institute, Madurai. January 24, 1993.
- Farmers' day at AC & RI, Madurai. January 24, 1993.
- One day training on management of red banana diseases at HRS, Pechiparai, January 28, 1993.
- Training on crop production and protection of plantation crops at HRS, Pechiparai. January 29, 1993.
- Training on dairying at TNAU, Coimbatore. February 1-28, 1993.
- Farmers' day at NPRC, Vamban. February 4, 1993.
- Training on agricultural technology to media persons at TNAU, Coimbatore. February 8-13, 1993.

- Training on the development and use of bio-fertilizers for rice at TRRI, Aduthurai. February 25, 1993.
- Farmers' day at ORS, Tindivanam. February 25, 1993.
- Farmers' day at RRS, Ambasamudram. February 25, 1993.
- Training on farm machinery at TNAU, Coimbatore. March 1-31, 1993.
- Farmers' day at Coconut Research Station, Veppankulam. March 3, 1993.
- Training on fruit and vegetable preservation at TNAU, Coimbatore. March 3-5, 1993.

Important events / Visitors

- Hon'ble Speaker of Tamil Nadu Legislative Assembly Thiru Sedappatti Muthiah visited TNAU, Coimbatore on May 5, 1992.
- Dr. Narong Minanandana, Director General, Agril. Extension, Thailand visited TNAU, Coimbatore on May 6, 1992.
- Sixteenth convocation of TNAU was held at TNAU, Coimbatore on May 6, 1992. His Excellency Bishma Narayan Singh, Chancellor of the University and Governor of Tamil Nadu presided. Prof. V. L. Chopra, Director General, ICAR, delivered convocation address. Thiru Ku. Pa. Krishnan, Hon'ble Minister for Agriculture, and Pro-chancellor of the University distributed the prizes.
- Thiru Ku. Pa. Krishnan, Hon'ble Minister for Agriculture, Govt. of Tamil Nadu visited TRRI, Aduthurai on May 10, 1992.
- Hon'ble Minister for Agriculture, Govt. of Tamil Nadu, Thiru Ku. Pa. Krishnan visited HRS, Yercaud on May 20, 1992.
- Environment day was celebrated at TNAU, Coimbatore on June 5, 1992.
- Biofertilizer day was celebrated at TNAU, Coimbatore on June 10, 1992.
- Thiru Mullapally Ramachandran, Hon'ble Minister of State for Agriculture, Govt. of India visited Horticultural College and Research Institute, Periyakulam on July 2, 1992.

- Dr Bowden and Dr. John of Ford Foundation visited Water Technology Centre, Coimbatore, on July 7-16, 1992.
- Dr. C. Balasubramanian, Vice-Chancellor, Tamil University visited TRRI, Aduthurai on July 14, 1992.
- Neem day was celebrated at Agrl. College and Research Institute, Killikulam, on July 22, 1992.
- Dr. Heinten Berge, SARP Project Leader, CABO, Netherlands visited TRRI, Aduthurai on August 31, 1992.
- Dr. Linguist, Royal College of Technology, Sweden visited Water Technology Centre, Coimbatore on September, 1992.
- Minister of State for Agriculture, Govt. of India, Hon'ble Sri K. C. Lanka visited TNAU, Coimbatore on September 9, 1992.
- All India Co-ordinated Cotton Improvement Project Silver Jubilee Celebrations were held at TNAU, Coimbatore on September 17-18, 1992.
- Dr. H. K. Srivastava, Department of Biotechnology, New Delhi and Dr. S. K. Sinha, Director, IARI, New Delhi visited the Paddy Breeding Station, Coimbatore on September 19, 1992.
- Dr. C. T. Wheeler, Colusgon University, U. K. visited the Paddy Breeding Station, Coimbatore on September 24, 1992.
- Dr. V. Vasanthi Devi, Vice-Chancellor, Manonmaniam Sundaranar University, Tirunelveli visited Agrl. College and Res. Institute, Killikulam on September 29, 1992.
- Seventh Annual Sports Meet was held at Agricultural College and Research Institute, Killikulam on September 30, 1992.
- Dr. M. Velayutham, Asst. Director General, ICAR, New Delhi visited Agrl. College and Research Institute, Killikulam on October 7, 1992.
- His Excellency Dr. Har Swarup Singh, Lt. Governor of Pondicherry visited HRS, Yercaud on October 13, 1992.
- World Food Day Celebrations at TNAU, Coimbatore on October 16, 1992.
- Dr. Shugo Iida, Plant Genetic Resource Centre, Japan, visited the Centre for Plant Molecular Biology, TNAU, Coimbatore on October 26, 1992.
- Dr. Roy Steiner, Scientist, Rockefeller Foundation, U. S. A., visited the Department of Soil Science, TNAU, Coimbatore on October 26, 1992.

- Dr. Long Ping, Director of Hunan Hybrid Rice Research Centre, China visited TNAU, Coimbatore on November 11, 1992.
- INGER Advisory Group visited the Paddy Breeding Station on December 4, 1992
- Prof. Mc. Dame, Consultant, Ford Foundation visited Horticultural College and Research Institute, Periyakulam on December 16, 1992.
- Dr. R. D. Macadam of Ford Foundation visited Home Science Department, Agrl. College and Research Institute, Madurai on December 12, 1992.
- Agricultural College and Research Institute, Trichi and College of Agricultural Engineering, Kumulur were inaugurated on December 20, 1992 by Hon'ble Minister for Agriculture. Hon'ble Minister for Public Health Thiru S. Muthuswamy and Hon'ble Deputy Speaker, Tamil Nadu Legislative Assembly Prof. K Ponnuswamy graced the function. Dr. S. Jayaraj, Vice-Chancellor, welcomed the gathering.
- Hon'ble Minister for Public Health, Govt. of Tamil Nadu Thiru S. Muthuswamy laid foundation stones for students' hostel and Workshops at College of Agrl. Engineering, Kumulur on December 20, 1992.
- Hon'ble Minister for Agriculture, Govt. of Tamil Nadu Thiru Ku. Pa. Krishnan declared open the office cum laboratory building complex and staff quarters at SRS, Sirugamani on December 20, 1992.
- Hon'ble Minister for Science and Technology, Govt. of India, Thiru Ranga- rajan Kumaramangalam visited the Centre for Plant Molecular Biology, TNAU, Coimbatore on December 30, 1992
- Thavathiru Kundrakudi Adigalar visited Horticulture College and Research Institute, Periyakulam on January 6, 1993.
- Hon'ble Minister for Agriculture, Govt. of Tamil Nadu, Thiru Ku. Pa. Krishnan visited TNAU, Coimbatore on January 9, 1993.
- Hon'ble Minister for Agriculture, Govt. of Tamil Nadu Thiru. Ku. Pa. Krishnan, released 14 new crop varieties at TNAU, Coimbatore on January 12, 1993.
- Pongal Vizha at TNAU was celebrated at Coimbatore on January 15, 1993.
- Dr. M. S. Swaminathan, eminent agricultural scientist, visited TNAU on February 9, 1993.
- National Science Day Celebration was held at TNAU, Coimbatore on March 3, 1993.

FOREIGN VISITS

List of scientists deputed abroad to participate in training workshop symposium seminar etc during 1992-93.

Sl. No.	Name and Designation	Country visited	Period	Purpose
1.	Dr. C Ramasamy, Professor of Agrl. Economics, Dept of Agrl. Economics, CARDS, Coimbatore	IFPRI, Washington USA	15.4.92 to 15.6.92	For analysis of data in the first component and to write the assigned book chapters for the second component of TNAU, IFPRI collaborative project.
2.	Thiru M. Ramanathan, Professor (Bio energy), Dept. of Bioenergy, CAE, Coimbatore	Royal Institute of Technology, Sweden	29.3.92 to 28.5.92	Second year training programme of the Indo-SAREC Project on Stand Alone Fuel cell power plants for rural electrification.
3.	Dr. SP. Palaniappan, Director, SCMS, TNAU, Coimbatore	IRRI, Manila, Philippines	21.4.92 to 25.4.92	To attend the 1992 International Rice Research Conference held at IRRI
4.	Dr. T. M. Thiyagarajan, Assoc. Professor (SS & AC), TRRI, Aduthurai	-do-	-do-	-do-
5.	Dr. M Rangeswamy, Professor, Genetics, Dept. of Rice, TNAU, Coimbatore	-do-	-do-	-do-

6.	Dr. M. Balasubramanian, Professor and Head, Dept. of Farm Machinery, CAE, Coimbatore	U.S.A.	Two months from 18.4.92	USAID Project-Estt. of farm equipment manufacturing technology centre (to be established at TNAU).
7.	Thiru G. Doraiswamy, Assoc. Professor (FM), TNAU, Coimbatore	-do-	-do-	-do-
8.	Dr. R. J. Rabindra, Prof. Agrl Entomology Dept. of Agrl. Entomology, CPPS, Coimbatore	U.S.A.	14 days from 17.5.92	USIF PL 480 Research Project under scientist exchange programme (Grant No. FG-IN-704).
9.	Thiru P. Veeraraghavan, Asst. Professor (Ag. Bot), FC & RI, Mettupalayam	U.S.A Texas Univ.	Three years from 11.6.92	Ph. D. Programme - Higher studies at Texas University, USA by Rotary Foundation Scholarship.
10.	Dr. R. J. Rabindra, Prof. of Agrl. Entomology, Dept. of Agrl. Entomology, CPPS, Coimbatore	Vienna, Austria	28.6.92 to 1.7.92	To attend training programme on hand- ling of ultra microtome at Vienna.
11.	Thiru M. Kalyanasundaram, Asst. Professor (Ag Ento), Dept. of Agrl. Entomology, CPPS, Coimbatore	Bangkok, Thailand	6.7.92 to 31.7.92	Group Training course in Plant Protec- tion services (Govt. of Thailand Fellowship).
12.	Thiru K. Eraivan Arutkani Aiyathan, Asst. Professor (Pl. Path), Dept. of Plant Pathology, CPPS, Coimbatore	-do-	-do-	-do-

- | | | | | |
|-----|---|-------------------------------------|---------------------------------------|--|
| 13. | Dr. V. Krishnasamy,
Assoc. Prof. (Seed Tech),
Dept. of Seed Technology,
TNAU, Coimbatore | Taiwan | 13.8.92
to
18.8.92 | International symposium on adaptation of vegetables and other food crops to temperature and water stress, AVRDC. |
| 14. | Thiru N. Raju,
Asst. Professor (Ento),
TRRI, Aduthurai | Khon Keen
University
Thailand | 3.8.92
to
5.8.92 | SARP-Workshop on Mechanism of stemborer damage and its effect on yield under IRR. SARP project. |
| 15. | Dr. S. Thangavelu,
Professor and Head,
RRS, Vridhachalam | Nairobi
Kenya | 11.8.92
to
14.8.92 | IDRC - Oilcrop Network - Final Steering committee meeting and workshop. |
| 16 | Dr. M. Rangaswamy,
Professor (Genetics),
Dept. of Rice, School of
Genetics, Coimbatore | China | Four months
from end of
July 92 | UNDP Project - Hybrid Rice Seed Production training programme at China. |
| 17 | Dr. P. Rangasamy,
Professor and Head,
Dept. of Agri. Botany,
AC & RI, Madurai | IRRI,
Manila,
Philippines | Four months
from
17.8.92 | UNDP Project - Training Programme - Hybrid Rice Seed Production. |
| 18. | Dr. S. Thangavelu,
Professor and Head,
RRS, Vridhachalam | Nepal | 1.9.92
to
14.9.92 | Visit to Nepal to take up the sesame consultancy. |
| 19. | Thiru S. Sukumar,
Asst. Prof (Tissue culture),
CPMB, Coimbatore | CNRRI,
China | 12.10.92
to
24.10.92 | To attend workshop on anther culture for Rice Breeders-Rockefeller Foundation |

20.	Thiru K. Natarajamoorthy, Asst. Professor (Pl. Breeding), TRRI, Aduthurai	CNRRI, China	12.10.92 to 20.10.92	To attend workshop on anther culture for Rice Breeders - Rockefeller Foun- dation.
21.	Tmt. P. Srimathi, Asst. Professor (Seed Tech.), Dept. of Seed Technology, TNAU, Coimbatore	Sweden	7.9.92 to 30.10.92	Training programme on 'Organisation and management of seed production and supply', Svalof, Sweden.
22.	Dr. S. Mohandass, Asst. Professor (Crop Physiology), TRRI, Aduthurai	Japan	11.10.92 to 16.10.92	IRRI-SARP Meeting and International Symposium on disturbed climate vege- tation.
23.	Thiru A. Chandrasekaran, Asst. Professor (Pl. Path), Dept. of Pulses, TNAU, Coimbatore	IRRI, Manila, Philippines	5.10.92 to 30.10.92	Rice Seed Health Testing course.
24.	Dr. C. Chinnusamy, Asst. Professor (Agronomy), Dept. of Pulses, TNAU, Coimbatore	Sri Lanka	2.11.92 to 5.11.92	Asian Farming Systems Association Symposium at Colombo.
25.	Mrs. S. Geetha, Asst. Professor (Ag. Bot.), TRRI, Aduthurai	-do-	-do-	-do-
26.	Dr. S. Kannaiyan, Professor of Bio-technology, TNAU, Coimbatore	University of London, U.K.	5.11.92 to 16.12.92	Visit to Kings College to undertake British Council Academic Link Rese- arch Programme for six weeks.

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|-----|--|------------------------------|-------------------------------|--|
| 27. | Dr. SP. Palaniappan,
Director, S & CMS,
TNAU, Coimbatore | CSIRO,
Australia | 9.11.92
to
13.11.92 | National Conference and workshop on
sodic soils at University of Adelaide. |
| 28. | Dr. K. Palanisamy,
Professor, (Agrl. Econ.),
Water Tech. Centre,
Coimbatore | IRRI,
Philippines | 9.11.92
to
11.12.92 | IRRI Project - collaborative research
To write the final report. |
| 29. | Dr. C. Ramaswamy,
Professor (Agrl. Econ),
Dept. of Agrl. Economics,
TNAU, Coimbatore | Korea | 13.10.92
to
20.10.92 | Seminar on structural adjustment of
agriculture to changing economic situ-
ations, APO-NPC. |
| 30. | Dr. A. Rajagopal,
Director, WTC,
Coimbatore | Bulgaria
and Sweden | 23.10.92
to
30.11.92 | Visit to Bulgaria under Indo-Bulgarian
cultural exchange programme |
| 31. | Thiru S. Elangovan,
Asst. Professor (Agrl. Econ.),
Dept. of Agrl. Economics,
TNAU, Coimbatore | Colombo,
Sri Lanka | 12.12.92
to
21.12.92 | The UNU/WIDER Organised Teaching
Workshop on Environmental Econo-
mics. |
| 32. | Thiru K. S. Subramanian,
Asst. Professor (SS & AC),
WMS, Agrl. Res. Station,
Bhavanisagar | Univ. of
Ottawa
Canada | Two years
from
19.12.92 | Higher Studies - Ph. D. programme by
Canadian Common Wealth Scholarship. |
| 33. | Dr. C. Surendran,
Professor and Head,
FC & RI, Mettupalayam | Bangkok,
Thailand | 18.1.93
to
22.1.93 | To attend the "inter-regional Consulta-
tion on Neem Improvement" organised
by the Forestry Fuel Wood Research
and Dev. Project WINROCK Inter-
national Institute. |

FINANCE AND ACCOUNTS

The following statement indicates the classified summary of the transactions of the University during 1992 - 93.

	Amount (Rs. in lakhs) (Unreconciled & unaudited figures)	
Details		
Receipts		
Agriculture		
Non Plan	867.91	
Plan	989.66	1857.57
ICAR Grant		
ICAR (Fully financed),		
ICAR (Partly financed)	666.17	
Development Grant	28.00	694.17
Government of India Schemes		151.55
Outside Agencies		
Foreign and Indian Agencies, Research Schemes		75.95
Other Receipts		
Agriculture (Fee, rent, farm receipts etc)		300.65
Loans and Advances including deposits		55.00
	Total	3134 89
Expenditure		
1. Agriculture Non-Plan		1338 75
2. Agriculture Plan		1200.25
ICAR fully financed schemes - including National Agricultural Research Project and KVK, Pondicherry,		
ICAR Partly financed scheme		688.76
Government of India Schemes		148 33
Other Agencies		70.37
ICAR Development Grant		28.00
Deposit transaction including Loans and Advances		132 00
		3606.46

The Finance Committee at its 41st meeting considered and recommended the budget estimate of 1992 - 93 of Tamil Nadu Agri. University and recommended the estimate to the Board of Management. The annual audited accounts for the year 1991 - 92 have since been finalised. As the accounts for 1992 - 93 are yet to be compiled and sent to audit, the figures furnished for the year 1992 - 93 will be treated as provisional.

University Budget Estimate for 1993 - 94

Subject to approval of full annual financial estimates of Tamil Nadu Agri. University for the year 1993 - 94 by the Government, the estimates are tentatively fixed as detailed below.

	(Rs. in lakhs)
Gross appropriation	Rs. 3,405.10
Net grant by the State Government	Rs. 2,234.76
Grants from ICAR including the implementation of ICAR development grants and NARP schemes	Rs. 579.31
Government of India	Rs. 212.20
Other Agencies	Rs. 58.59
University Receipts	Rs. 320.24
Total	Rs. 3,405.10

FINANCE AND ACCOUNTS

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	Amount (Rs. in lakhs) (Unreconciled & unaudited figures)	
Details		
Receipts		
Agriculture		
Non Plan	867.91	
Plan	989.66	1857.57
ICAR Grant		
ICAR (Fully financed),		
ICAR (Partly financed)	666.17	
Development Grant	28.00	694.17
Government of India Schemes		151.55
Outside Agencies		
Foreign and Indian Agencies, Research Schemes		75.95
Other Receipts		
Agriculture (Fee, rent, farm receipts etc)		300.65
Loans and Advances including deposits		55.00
	Total	3134.89
Expenditure		
1. Agriculture Non-Plan		1338.75
2. Agriculture Plan		1200.25
ICAR fully financed schemes - including National Agricultural Research Project and KVK, Pondicherry, ICAR Partly financed scheme		688.76
Government of India Schemes		148.33
Other Agencies		70.37
ICAR Development Grant		28.00
Deposit transaction including Loans and Advances		132.00
		3606.46



Workshop on Human Resource Management



Chinese scientists inspecting Hybrid Rice at Paddy Breeding Station, Coimbatore



Inauguration of AC and RI, Trichy and College of Agri. Engineering, Kumalur by Thiru Ku. Pa. Krishnan, Hon'ble Minister for Agriculture

The Finance Committee at its 41st meeting considered and recommended the budget estimate of 1992 - 93 of Tamil Nadu Agrl. University and recommended the estimate to the Board of Management. The annual audited accounts for the year 1991 - 92 have since been finalised. As the accounts for 1992 - 93 are yet to be compiled and sent to audit, the figures furnished for the year 1992 - 93 will be treated as provisional.

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Grants from ICAR including the implementation of ICAR development grants and NARP schemes	: Rs. 579.31
Government of India	: Rs. 212.20
Other Agencies	: Rs. 58.59
University Receipts	: Rs. 320.24
Total	: Rs. 3,405.10

3. EDUCATION

AGRICULTURAL COLLEGE AND RESEARCH INSTITUTE, COIMBATORE

Dr S. Sankaran was the Dean (Agri), Coimbatore. The college offered B.Sc. (Agri) degree programme under the semester system. The particulars of students on roll (boys and girls) in different years of degree programme are furnished below.

Degree Programme	Year	Boys	Girls	Total
B.Sc. (Agri)	I	79	10	89
	II	30	39	69
	III	109	24	133
	IV	78	93	171

Educational Tour

Study tours were conducted for II Year B Sc. (Ag) students. The students were taken in two batches to the following research stations.

1. Sugarcane Research Station, Sirugamani
2. Soil Salinity Research Centre, Trichy
3. Tamil Nadu Rice Research Institute, Aduthurai
4. Sugarcane Research Station, Cuddalore
5. Krishi Vigyan Kendra, Pondicherry
6. Agricultural Research Station, Vridhachalam and
7. Horticultural Research Station, Yercaud

The students were exposed to the different agro-climatic regions and taught about the existing cropping pattern, soil types, common package of practices and socio-economic conditions of the local farming community. A total of 84 students participated in the tour.

All India Study Tour

The final year B.Sc. (Ag) students were taken on All India Study Tour during 24.8.92 to 9.9.92 to the following places : ICRISAT, APAU, CPPRI, AICRIP, CRIDA and NAARM at Hyderabad; IFRI and IARI, New Delhi and Haryana Agricultural University, Hisar. One hundred and thirteen students took part in the tour.

Village Stay Programme

The 30 day Village Stay Programme for the final year B.Sc. (Ag) students numbering 112 was organised from 23.7.92 to 21.8.92. The students were placed in small groups of 6-7 each. All the girl students were placed in Periyar and Salem Districts while the boys in Dharmapuri district. The Joint Directors of concerned districts and Heads of Research Stations / Centres of Bhavanisagar, Paiyur and Namakkal provided necessary assistance for coordination of this programme. The students were placed in the following villages :

Modakurichi, Chettihottamputhur, Kugalur, Kallipatti, Konnamadai, Nambiyur, Senbagaputhur of Periyar District, Seelanaickenpatty, Ammapalayam, Namakkal, Narayanampalayam, Mettur Dam and Rasipuram of Salem District and Dharmapuri, Krishnagiri, Paiyur and Hosur of Dharmapuri District.

During the village stay programme the students were attached to the contact farmers and they met the farmers with the help of local Assistant Agricultural Officers to gather the information. They conducted demonstrations of improved practices, small group discussions and meetings involving private firms and government officials. They broadcast the information about the meeting through All India Radio, pamphlets, charts and other models were prepared and displayed during their demonstration activities.

Scholarships

Many scholarships were available to the students. Following is the list of such scholarships.

Sl. No	Name of the Scholarship	No of recipients	Total amount
1.	ICAR Junior Fellowship	41	6,18,600
2.	Aspee Junior Fellowship	5	
	Aspee Senior Fellowship	1	75,710
3.	Govt. of Pondicherry Post Matriculation Scholarship	2	3,120
4.	Ponn. Sugar & Chemicals Ltd.	1	34,800
5.	T. Stanes & Co., Sr. Fellowship	1	50,000
6.	ITEC Vietnamese - Sr. Fellowship	1	26,830
7.	ICCR (Fiji) Jr. Fellowship	1	29,277
8.	Indo-ARE Scholarship	1	29,265
9.	Madras Fertilizers Ltd	1	13,000
10.	Gharda Chemical Ltd	1	40,800
11.	The National Organic Chemicals Industries Ltd	1	40,000
12.	AC & RI Merit Scholarship	2	6,093
13.	Andaman & Nicobar Scholarship	12	32,959
14.	Adhoc Merit Grant	13	3,900
15.	Bright Student Award	2	3,960
16.	Gandhi Memorial Grant	1	1,000
17.	National Merit Scholarship	10	34,680
18.	SC Scholarship	30	1,02,155
19.	SC Loan Scholarship	37	35,500
20.	BC Scholarship	38	42,183

Students' Hostel

The students including boys and girls were accommodated in various hostels. Seven messes were functioning efficiently and economically on the basis of dividing system. The mess representatives nominated by the warden in consultation with the students managed the messes successfully. Most of the academic requirements, viz., record note books, herbarium sheets, etc, besides eatables and cosmetics for the students were supplied by the Students' Canteen. The University Medical Officer took care of the medical facilities of the inmates of the hostel. The Lady Medical Officer was attending to the medical needs of girl students in Ladies' Hostel by visiting the hostel daily between 4.00 and 5.00 p.m.

Students' club

Main Campus Orchestra team participated in the State Level Cultural competition organised and conducted by PSG College of Arts and Science, Coimbatore and won second place. It also participated in the District Level Inter-Collegiate Cultural Competition organised by CPM College, Kovaipudur and won first prize. It also gave cultural programme at Thottipalayam and Thaliyur villages organised by main campus NSS volunteers.

Social Service League Night School's 38th Annual Day was celebrated on 23.9.92 at night school premises. Dr. S. Sankaran, Dean (Agri) presided over the function. Dr. C. Ramaswami, Registrar was the Chief Guest.

Competition on Chief Minister's Prize for the best orator of TNAU students was conducted on 27.3.92. Totally nine students from Coimbatore, Madurai, Karaikal, Kumulur and Mettupalayam participated in the competition. A fourth B.Sc. (Ag) student of Madurai was selected as best orator.

Orchestra team participated in the "COTERIE - 92" CCIT's Cultural Festival held at R.S. puram Nekaratchi Kalaiaragam on 10th and 11th July 1992 and won second prize. Independence Day was celebrated in a grand manner at Social Service League Night School on 15.8.1992. Dr. M. Gopalan, Dean, P. G. Studies unfurled the National Flag and distributed sweets to school children. Republic Day was celebrated in the Social Service League Night School on 26.1.1993. Dr. S. Sankaran, Dean (Agriculture) hoisted the National Flag and distributed sweets to SSL night school children.

Sports and Games

Men and women students participated in the 4th TNAU Inter Collegiate games and sports held at Agril. College & Research Institute, Madurai. Shuttle Badminton and Table Tennis for women and Cricket and Chess for men were conducted at Coimbatore campus. Women teams won runners up trophies. Mr. S. Jayaraj, Vice-Chancellor, Tamil Nadu Agricultural University distributed the prizes. Dr. S. Sankaran, Dean (Agriculture) presided over the function. Dr. I. Irulappan, Dean (Hort.) felicitated the athletes. Dr. N. Kempuchetty, Staff Adviser proposed vote of thanks.

Best men and women athletic meet was conducted at main campus grounds on 2nd and 3rd May 1992. Students from Coimbatore, Mettupalayam, Madurai, Killikulam, Kumulur and Periyakulam Colleges, participated in the Athletic Meet. Selvi M. Mahalakshmi, III B.Sc. (Hort.) and Thiru S. Sivakumar, III B.Sc. (Hort.) of Coimbatore campus won the "Best Women Athlete" and "Best Men Athlete" awards respectively. Main campus men ball badminton and Kabaddi teams participated in the TNAU 4th Inter Collegiate tournaments held at Pandit Jawaharlal Nehru College of Agriculture, Karaikal and won winners trophy in Kabaddi and runners up in ball badminton.

Women Table Tennis and Shuttle Badminton teams participated in the Coimbatore District Inter-Collegiate Athletic Association Table Tennis and Shuttle badminton tournaments held at PSG College of Technology and secured third place in the league matches.

Women Basket ball team participated in the district level basket ball tournament and won in preliminary and quarter final rounds against Pollachi Government Higher Secondary School and Pollachi Sports Council teams. Women Kabbadi team played friendly matches against Pollachi Friends Club and Coimbatore District Local Club and won all the matches.

Men and women teams participated in the State Level Inter Engineering Tournament and sports "TIES 93" held at Karunya Institute of Technology, Karunya Nagar.

NCC

One hundred cadets were enrolled in NCC. The guard of honour presented during Republic Day celebrations. The NCC cadets, Thiru S. Palaniswamy, and Thiru V. Venkatarohan of B.S. (Agri) have participated in the Annual Training Camp at Mettupalayam from 24.12.92 to 4.1.1993.

National Service Scheme

The National Service Scheme of the Tamil Nadu Agricultural University has a strength of 800 student volunteers. The NSS student volunteers participated in various useful activities such as adult education, tree planting, road relaying, blood donation and parthenium eradication. The volunteers rendered their service during the university functions viz., Science Day, Farmers' Day and Convocation. An awareness programme on AIDS was organised in collaboration with the TNAU Hospital and Koval Medical Centre for the benefit of the students of the main campus. Special camps were conducted in Coimbatore and Madurai. New NSS units were started in Trichy and Kumalur campuses from the academic year 1992-93. The University level NSS advisory committee meeting was convened on 8.12.1992 under the chairmanship of Dr. S. Jayaraj, Vice-Chancellor, Tamil Nadu Agricultural University.

HORTICULTURAL COLLEGE AND RESEARCH INSTITUTE, COIMBATORE

Dr. I. Irulappan continued as the Dean (Hort) during the period under report. The Faculty of Horticulture continued to offer B.Sc. (Hort), M.Sc. (Hort) and Ph.D. degree programmes under the semester system of education. The faculty also offered courses to B.Sc. (Agri), B. Sc. (Forestry) and B.E.(Ag) degree programmes.

Admission

The number of students on roll in I, II, III and IV year B.Sc. (Hort) is as follows :

Class	Boys	Girls	Total
I B.Sc. (Hort)	—	—	—
II B.Sc. (Hort)	—	—	—
III B.Sc. (Hort)	—	—	—
IV B.Sc. (Hort)	35	17	52

Educational Tour

Final B.Sc. (Hort) students had an educational tour for two weeks. They visited plantation areas at Kanyakumari, Courtallam, Veppankulam and Vridhachalam for the study of rubber, coconut, palmyrah and cashew. They were given intensive training in production technology of tea at Krishi Vigyan Kendra, Coonoor for a period of one week. An All India tour was also arranged for the benefit of the students. The students visited a number of research and educational institutions of national repute in Karnataka, Delhi, Uttar Pradesh and Haryana States.

COLLEGE OF AGRICULTURAL ENGINEERING, COIMBATORE

Prof. K. R. Swaminathan, continued as Dean (Engg). The faculty continued to offer B.E. (Ag.) degree programme and M. E. (Ag.) degree programme in Soil and water Conservation, Farm Machinery and Power, Post Harvest Technology and Agro-energy and Power and Ph. D. programme besides offering courses in Agricultural Engineering for B.Sc. (Ag.), B. Sc. (Forestry) and B.Sc. (Hort.) students.

Admission

Eighty students were admitted to I.B.E. (Ag.) course. The first trimester for the I.B.E. (Ag.) commenced on 11.2.1992 and for the II, III and final B.E. (Ag.) on 20.4.92, 1.4.92 and 6.4.92 respectively. The number of students as on roll in I, II, III and IV year B. E. (Ag.) was as follows:

Class	Boys	Girls	Total
I B. E. (Ag.)	58	22	80
II B. E. (Ag.)	80	33	113
III B. E. (Ag.)	56	14	70
IV B. E. (Ag.)	82	13	95
Supplementary students	48	—	48
	324	82	406

Educational tour

The III B. E. (Ag) students were on tour in Tamil Nadu from 16.12.92 to 23.12.92 and they visited the following industries and institutions:

Seshasayee Paper Mills, Erode. Sago Factory, Micro level hydro electric project, Mettur Chemicals and Metkem Silicon, Mettur Dam; NAFED Processed Foods and Institute of Hydraulics and Hydrology, Vellore; T.T.T.I. and J. Farm, Madras. Sri Murugappa Chettiar Research Institute, Tharamani; Drip Irrigation System, Mahabalipuram, CIPET, Gundy. Integral Coach Factory, Perambur; National Engineering Company Ltd., Ambatur; Thermal Power Station, Neyveli; Annamalai University, Chidamparam, PPRC and Modern Rice Mill, Tiruvarur; BHEL, Bharathidasan University, School of Energy, Irrigation Management and Training Institute, KVK and SSRC and Grand Anaicut, Trichy; Cauvery Sugar and Chemicals, Pettavarthalai, Pugalur Paper Mills, Pugalur; and Pongalur Watershed, Pongalur

The final year students went on All India Study Tour from 20.2.93 to 5.3.93 and they visited the following institutions and industrial organisations:

- a) IARI and WTC New Delhi,
- b) Soil and Water Conservation Training and Research Institute and Forest Research Station, Dehradun and
- c) Soil and Water Management Centre, Agra.

Scholarship

Details of scholarships awarded during 1992-93 are detailed below :

S. No.	Details of Scholarships	No. of recipients
1.	ICAR Merit Scholarship	30
2.	Scheduled Caste Loan	52
3.	Scheduled Caste Scholarship	50
4.	Teacher's Welfare Scholarship	2
5.	Backward Class Scholarship	78
6.	TNAU Merit Scholarship - UG	30
7.	National Merit Scholarship	16
8.	Ex-Servicemen Scholarship	2
9.	Govt. of Pondicherry Scholarship	2
10.	USAID - Scholarship	2
11.	CFTC Scholarship	1
12.	Arunachal Pradesh Govt. Scholarship	2
13.	Nagaland Govt. Scholarship	2
14.	Indo-Ethiopian Exchange Cultural Programme Scholarship	3
15.	Jammu and Kashmir State Loan Scholarship	1
16.	Gandhi Memorial Prize Award	1
17.	S. J. Jindal Trust Scholarship	1
18.	Andaman Nicobar Island Scholarship	2
19.	TNAU Merit Scholarship - PG	2
	Total	279

Students' Hostel

Dr. M. Balasundaram, Professor and Head, Department of Farm Machinery continued as Warden. He was assisted by two Deputy Wardens. Student office bearers were also elected to help in the efficient functioning of the hostel. Regular meetings of the mess representatives were held to discuss the points for smooth management of the messes.

FOREST COLLEGE AND RESEARCH INSTITUTE, METTUPALAYAM

Mr. G. Kumaravelu, continued as Dean (Forestry) till 18.5.92. Mr R. Annamalai, assumed charge as Dean on 16.11.92. The College offers B. Sc. (Forestry), M.Sc. (Forestry) and Ph. D. (Forestry) degree programmes and the current strength in each is indicated below :

Programme	Boys	Girls	Total
I B. Sc. (Forestry)	13	1	14
II B. Sc. (Forestry)	16	—	16
III B. Sc. (Forestry)	23	1	24
IV B. Sc. (Forestry)	12	1	13
I M. Sc.	5	—	5
II M. Sc.	3	1	4
I Ph. D.	5	1	6
II Ph. D.	3	—	3

Educational Tour

Thirteen final B.Sc. (Forestry) students were on an All India Tour from 1.3.1993 to 17.3.1993. They visited places of educational interest at Bangalore, Dharwad, Panaji, New Delhi, Dehradun, Solan and Bharatpur.

Students of final B.Sc. (Forestry) were on an educational tour from 19.11.1992 to 25.11.1992. They visited agroforestry systems and forest types at Erode, Salem, Yercaud, afforestation programme at Neyveli, Mangrove forests at Pitchavaram, bird sanctuary at Vedaranyam, Silvicultural systems at Arimalam, Vamban and interface forestry at Ayyalur and Kodaikanal.

The forests in the Nilgiris Eastern slope about seven kilometers from the institute are frequently visited by students as part of their practical schedules. They also visit the shola forests and grass lands at Nilgiris. A bus exclusively for the forestry students is being fully exploited for trips to these places. The field facilities provided by the State Forest Department in their Plantation Corporation,

natural forests in Kodaikanal, Top Slip, Shervoroys and Mangrove vegetation in the coast have immensely helped the students in gaining practical insights and visual skills

Forest Stay Programme

Final year B.Sc. (Forestry) students numbering 13 were on a forest stay programme for one month from 3.6.1992 to 27.1992. The students were placed in the forest ranges at Srivilliputhur, Kutralam and Top Slip. The students were apprised of the different forest types, flora and fauna, forest operations, timber sale procedure, tribal settlement, forest fire protection measures etc.

AGRICULTURAL COLLEGE AND RESEARCH INSTITUTE, MADURAI

Dr. G. Soundarapandian was the Dean during the period under report. There are 14 departments, ten under the Faculty of Agriculture and four under Faculty of Basic Sciences and Humanities. The College offered B.Sc. (Ag) and B.Sc. (HSc) degree programmes besides postgraduate programmes leading to MSc. and Ph.D. degrees in different disciplines in Agriculture and Food Science and Nutrition.

Admission

The number of students on roll was as follows :

	Boys	Girls	Total
I B.Sc. (Ag)	56	50	106
II B.Sc. (Ag)	72	26	98
III B.Sc. (Ag)	69	51	120
IV B.Sc. (Ag)	19	55	74
I B.Sc. (HSc)	—	19	19
II B.Sc. (HSc)	1	17	18
III B.Sc. (HSc)	3	10	13
I M.Sc. (Ag)	48	21	69
II M. Sc. (FSN)	3	9	12
Ph.D	20	4	24
Ph.D. (FS & N)	—	2	2
Total	291	264	555

Educational Tour

One hundred and twenty two B.Sc. (Ag) second year students were taken on educational tour to Regional Research Station, Kovilpatti; Agricultural College and Research Institute, Killikulam; Rice Research Station, Ambasamudram; Cotton Research Station, Srivilliputhur and Horticultural Research Station, Periyakulam from 27.1.92 to 1.2.92 in two batches.

Third year students were taken on an educational tour to Vedasandur, Mettupalayam, Bhavanisagar, Sirumugai, Trichy, Thanjavur, Aduthurai, Veppankulam, Vamban and Tamil Nadu Agricultural University, Coimbatore and also Sugarcane Breeding Institute, Coimbatore from 8.12.92 to 22.12.92.

Village Stay Programme

The programme was organised for a period of 30 days from 16.11.92 to 15.12.92. During their stay, the students organised and conducted method demonstrations on latest aspects of farm technologies. They also organised village meetings and mini exhibitions.

Students' Hostel

There were five hostels functioning in this campus to accommodate the students. The hostel was administered by the Dean. He was assisted by a warden, four deputy wardens and one resident tutor besides administrative personnel.

Students' Club

The students' club activities were inaugurated on 12.1.93. Thiru P. W. C. Davidar, Commissioner, Madurai Corporation delivered the inaugural address. The students participated in a number of literary and cultural events and competitions and proved their talents in arts, photography, orational elegance, light music etc.

Sports and Games

Twenty seventh Annual Sports meet was conducted on July 17, 1992. Dr. G. Soundrapandian, Dean distributed the prizes. College cricket, tennis, foot ball and volley ball teams participated in a number of tournaments and friendly matches. Inter-class matches in various games were conducted for boys and girls.

National Cadet Corps

Cadets belonging to different undergraduate classes were enrolled during this period. Training in foot drill, weapon handling, field craft, map reading and first aid was imparted to the cadets.

National Service Scheme

NSS volunteers actively participated in save tree campaign, adult education, tree planting and campus cleaning programmes.

AGRICULTURAL COLLEGE AND RESEARCH INSTITUTE, KILLIKULAM

Dr M Rangarajan continued as the Dean during the period under report. There are 10 departments functioning in this college. The college offered B Sc (Ag) and M Sc (Ag) and part time Ph.D. degree programmes.

Admission

The number of students on roll was as follows :

	Boys	Girls	Total
I B Sc (Ag)	39	69	108
II B Sc (Ag)	39	46	85
III B Sc (Ag)	43	80	123
IV B.Sc. (Ag)	67	—	67
I M Sc (Ag)	17	6	23
II M.Sc. (Ag)	22	6	28
Ph D part time	11	4	15
Total	238	211	449

Educational Tour

Final B Sc. (Ag) students undertook educational tour by visiting ICRISAT at Patancheru, the Forest Research Institute, Dehradun, NAARM at Hyderabad, Agricultural Universities at Hisar and Hyderabad and IARI and ICAR at New Delhi from 11.7.1992 to 26.7.1992. They studied the different agricultural systems which are in operation in various agro-climatic, socio-economic and cultural conditions.

Third B.Sc. (Ag) students visited Tobacco Research Station, Vedsanthur, TNAU Main Campus at Coimbatore, Agricultural Research Stations at Bhavanisagar, Paiyur, Cuddalore, Vridhachalam, Trichy, Pudukkottai and Vamban, Govt. Botanical Garden, Ootacamund and Forest Research Station, Mettupalayam during their study tour from 27.1.1993 to 2.2.1993.

Second B.Sc. (Ag) students visited Agricultural Research Station, Kovilpatti-Regional Research Station, Aruppukkottai, Agricultural College and Research Institute, Madurai, Horticultural College, Periyakulam, Brayants park, Kodaikanal, Rice Research Station, Ambasamudram, Agricultural Research Station, Thirupathisaram, Regional Research Station, Pechiparai and Government Orchard, Kanyakumari during the period from 8.3.93 to 13.3.93.

Village Stay Programme

Sixty seven final B.Sc. (Ag) students stayed with 67 identified progressive farmers in southern districts of Tamil Nadu from 12.10.1992 to 10.11.1992. During this programme, students learnt local cultivation practices and farmers' problems in agriculture. They were also in touch with extension functionaries of Agricultural Department. They organised method demonstrations, exhibitions and village meetings on latest technologies suited to the area.

Scholarships

S. No.	Name of the Scholarship/Award	No. of students
1.	Backward Class Scholarship	65
2.	Scheduled Class Scholarship	60
3.	TNAU Merit Scholarship	6
4.	Physically handicapped Scholarship	1
5.	S. C. Loan Scholarship	49
6.	Ex-servicemen Scholarship	2
7.	Bright Student Award	1
8.	Rashtriya Chemicals Fellowship	2
9.	Gandhi Memorial Award	1
10.	Pondicherry Post Matric Scholarship	5
11.	National Merit Scholarship	4
12.	ICAR Junior Research Fellowship	8
13.	Release of Stipend (post matric)	5
14.	ICAR post Matric Scholarship	8
15.	Adhoc Merit Grant	1
		218

Students' Hostel

There are five hostels in this campus to accommodate the students. During the period under report there were 193 boys and 197 girls in the hostel. The hostel was run under the chairmanship of Chief Warden, assisted by Warden, 2 Deputy Wardens, 2 Assistant Wardens and 3 Residential Tutors. The messes were run on dividing system basis involving student representatives with committees to monitor the purchase of materials, preparation of menu etc.

A full time Medical Officer and one part time Lady Medical Officer attended on the students and provided them the needed medical care.

Students' Club

Students' Club activities for the year 1992-93 were inaugurated on December 30, 1992 by Dr. C. Ramaswami, Registrar, Tamil Nadu Agricultural University. Students participated in "YUFONEC-92" organised by the National Engineering College, Kovilpatty and ranked first in total points and won the overall championship. In the cultural festival conducted by Siddha College Palayamkottai the students were placed as third in the overall championship. Students also participated in a number of literary and cultural events and competitions and proved their talents in arts, photography, oration, elegance, music etc.

Sports and Games

In the Inter Collegiate Athletic Meet held at Madurai campus, Miss. Sujatha Lilly of III B Sc (Ag) won the first place in the individual (Women's section) championship. A foot-ball tournament named as 'foot ball fever' was conducted for a week. College kabaddi, volley ball, foot ball, badminton and hockey teams participated in a number of tournaments. Seventh track and field meet was conducted for boys and girls at Killikulam.

National Service Scheme

The NSS Unit of Killikulam Campus was selected as the best unit in TNAU and awarded the rolling shield and appreciation certificate instituted by the Department of Sports and Youth Services, Govt. of Tamil Nadu. The shield and certificates were received by the Dean and Programme Officer in a function held at Kalaivanar Arangam, Madras on July 6, 1992 from Hon'ble Minister for Education Thiru C. Aranganayagam.

A ten days special camp was organised at Siruthondanallur near Eral, Chidambaram District during March 16-25, 1992. NSS volunteers assisted in institutional development work like maintenance of lawns, roads and cleaning the surroundings of class room. They actively participated in adult education, Arivoli Iyakkam, mass tree planting, avenue planting etc.

National Cadet Corps

Capt. Dr. P. Rajasekaran, ExNCC P. T. Officer, Agricultural College & Research Institute, Killikulam was awarded the "7 years long service N. C. C. Medal" by the Director General, NCC, New Delhi.

AGRICULTURAL COLLEGE AND RESEARCH INSTITUTE, TRICHY

The Agricultural College and Research Institute, Navalur Kuttapattu, Trichy started functioning with the joining of the first batch of B.Sc.(Ag) students on 7.10.92. The formal inauguration of the college was made on 20.12.92 by Thiru Ku. Pa. Krishnan, Honourable Minister for Agriculture, Government of Tamil Nadu.

The number of students on roll during the year was as follows:

Admission

Year	No. of students
I B.Sc. (Ag)	34

Scholarships

Following are the details of scholarships availed by the students.

Sl. No.	Name of the Scholarship	No. of recipients	Total amount
1.	SC/ST Scholarship	6	22726
2.	BC Scholarship	8	10238
3.	MBC Scholarship	7	9257
4.	DNC Scholarship	1	1591

Students' Hostel

There is one hostel in the campus exclusively for boys. Presently 31 students are residing in the hostel. Adequate facilities have been provided to the students for their comfortable stay in the hostel. A medical officer on part-time basis attends on the students and provides them required medical care.

COLLEGE OF AGRICULTURAL ENGINEERING, KUMULUR

The College of Agricultural Engineering, Kumulur started functioning from 7.10.92. The college was inaugurated by Thiru. Ku. Pa. Krishnan, Hon'ble Minister for Agriculture on 20.12.1992.

Admission

Year	No. of Students		
	Boys	Girls	Total
I BE (Ag)	55	10	65

Scholarships

Following scholarships were availed by the students.

Sl. No.	Name of the Scholarship	No. of recipients
1.	S. C. Scholarship	10
2.	B. C. Scholarship	12
3.	B. C. Free education	4
4.	National Scholarship	2

Students' Hostel

The students including boys and girls were accommodated in separate hostels. A student mess was functioning efficiently and economically on dividing system. Two student representatives looked after the running of the mess under the direct supervision of the warden and deputy warden. One part-time medical officer looked after the medical needs of the students.

Sports and games

The annual sports day was celebrated in a fitting manner on 22.7.92. Dr. K. M. Ramanathan, Dean, Tamil Nadu Govt. Agricultural College and Research Institute, Kumalur inaugurated the sports meet and hoisted national flag. Thiru B. R. Kumar, Director, AIR, Trichy was the chief guest and distributed the prizes. The students participated in a number of tournaments and friendly matches.

HORTICULTURAL COLLEGE AND RESEARCH INSTITUTE, PERIYAKULAM

Dr. R. Arumugam, continued as Dean during the period under report. The College offered B.Sc. (Hort) degree programme under semester system.

Admission

Sixty two students comprising of forty boys and twenty two girls were admitted in B. Sc. (Hort) programme during the year 1992-93. The number of students on roll in I, II and III year BSc (Hort) is as follows:

Class	Boys	Girls	Total
I B. Sc. (Hort)	33	19	52
II B. Sc. (Hort)	25	21	46
III B. Sc. (Hort)	40	22	62

Educational tour

Students of II B.Sc. (Hort) were taken on a tour to Kodaikanal to study ornamental gardening. They learnt various aspects of ornamental gardening and involved themselves in the arrangements of annual flower show at Kodaikanal. Third year students were on Coffee Training Camp for 15 days between 18.1.93 and 2.2.93. The boys were placed at Horticultural Research Station, Yercaud and girls at Horticultural Research Station, Thadiyankudisai. Starting from jungle clearing, the students practically did all operations related to coffee cultivation.

Scholarships

Sl. No.	Name of the Scholarship	No. of recipients
1.	TNAU Merit Scholarship	10
2.	Post Matric Scholarship BC	21
3.	Post Matric Scholarship MBC	10
4.	Post Matric Scholarship DNC/DNT	9
5.	Post Matric Scholarship SC:ST	14
6.	Post Matric Scholarship - National Merit Scholarship	5

Students' Hostel

At present 160 students comprising of 98 boys and 62 girls are accommodated in the hostels within the College Campus. The girl students are accommodated in the staff residential complex and the boys are accommodated in the new hostel as well as in the NARP Phase II trainees hostel. The hostels were run by the Dean who was assisted by two deputy wardens and one assistant warden. A part time medical officer was attending to medical needs of the students.

Students' Club

Students' club activities for the year 1992-93 were inaugurated by Thiru C. Sylendra Babu, Superintendent of Police, Dindigul on 11.2.1992. Second

Annual Club Day was celebrated under the presidentship of Thiru S. Adiseshiah, Collector of Madurai on 25.8.92. The students participated in a number literary and cultural events and competitions and proved their talents in arts, photography, orational elegance, light music etc.

Sports and Games

Second sports meet was conducted on 26.8.92. Thiru S. V. Venkatakrishnan, DIG of Police, Madurai was the chief guest. The college teams participated in a number of tournaments and friendly matches.

National Service Scheme

NSS volunteers actively participated in the tree planting, kitchen gardening, adult education programmes etc. They took part in a quiz programme on the occasion of 50th anniversary of "Quit India" movement.

POST GRADUATE EDUCATION

Dr. M. Gopalan continued as Dean (PGS). Masters and Ph.D. degree programmes were offered in 23 disciplines in Agriculture, Horticulture, Agrl. Engineering, Forestry and Food Science and Nutrition. In addition PG Diploma in Sericulture and MSc programme in Sericulture were also offered during the year. New MSc programme in sericulture was started with a strength of 10 students.

Admission

During the academic year 1992-93, 268 students were admitted for various masters degree programme in Agriculture, Horticulture, Agrl. Engineering, Forestry and Food Science and Nutrition.

Details regarding the number of students admitted and passed out from various post graduate programmes of the University during 1992-93 are furnished below.

a) MSc degree programme 1992 - 93

S.No.	Discipline	Coimbatore		Madurai		Killikulam		Total	No. of students passed out
		Boys	Girls	Boys	Girls	Boys	Girls		
1.	Agronomy	7	2	4	6	5	2	26	19
2.	Plant breeding & Genetics	7	7	3	7	4	1	29	17
3.	Soil Sci. & Agrl. Che.	1	5	—	5	3	—	14	11
4.	Agrl. Entomology	3	5	3	2	1	4	18	13
5.	Plant Pathology	7	3	2	4	—	—	16	14
6.	Agrl. Economics	5	3	1	2	3	—	14	12
7.	Agrl. Extension	8	9	9	7	6	—	39	17
8.	Agrl. Marketing management	1	3	—	—	—	—	4	5
9.	Agrl. Microbiology	4	2	2	2	—	—	10	7
10.	Seed Technology	9	9	—	—	—	—	18	9
11.	Plant Nematology	1	3	—	—	—	—	4	—
12.	Plant Protection	—	—	—	—	—	—	—	2
13.	Crop Physiology	—	—	5	2	—	—	7	4
14.	Sugarcane Prodn.	4	—	—	—	—	—	4	2
15.	Horticulture	9	19	—	—	—	—	28	13
16.	Forestry	6	—	—	—	—	—	6	4
17.	Biotechnology	4	4	—	—	—	—	8	11
18.	Env. science	3	2	—	—	—	—	5	3
19.	MBM	8	2	—	—	—	—	10	5
20.	Post harvest tech.	—	—	—	—	—	—	—	4
21.	Soil & Water conservation	—	—	—	—	—	—	—	—
22.	Agro Energy & Power	—	—	—	—	—	—	—	3
23.	Water management	—	—	—	—	—	—	—	—
24.	Food Science	—	—	—	4	—	—	4	2
25.	Sericulture	3	2	—	—	—	—	5	—
26.	Farm Power & Machinery	—	—	—	—	—	—	—	2
27.	Dip. in Sericulture	—	—	—	—	—	—	—	—
Total :		90	80	29	41	22	7	269	179

b) Ph. D. degree Programme

Sl. No.	Subject	Coimbatore		Madurai		Total	No. of students passed out
		PT	FT	PT	FT		
1.	Agronomy	4	3	—	—	7	13
2.	Plant Breeding & Genetics	1	6	—	2	9	9
3.	Agri. Entomology	5	7	—	—	12	7
4.	Pl. Pathology	—	7	—	2	9	5
5.	Soil Sci. & Agri. Chem.	4	6	—	—	10	8
6.	Agri. Economics	1	7	—	—	8	7
7.	Agri. Extension	—	2	—	—	2	10
8.	Seed Technology	1	4	—	—	5	1
9.	Agri. Microbiology	1	—	—	—	1	1
10.	Crop Physiology	—	—	—	—	—	3
11.	Bio-technology	1	1	—	—	2	—
12.	Plant Nematology	1	1	—	—	2	—
13.	Envi. Science	—	2	—	—	2	—
14.	Forestry	—	2	—	—	2	—
15.	Horticulture	2	4	—	—	6	2
16.	Food Science	—	—	—	1	1	—
17.	Soil & Water Conservation	1	—	—	—	1	—
18.	Farm Power & Mach.	1	—	—	—	1	—
19.	Post Harvest Tech.	—	2	—	—	2	—
20.	Bio-energy	—	1	—	—	1	—
		23	55	—	5	83	66

PT : Part Time

FT : Full Time

Scholarships and Fellowships

The following scholarships, fellowships and stipends have been awarded to post graduate students of various disciplines during 1992-93.

S.No.	Particulars	Senior	Junior	Total
1.	ICAR	1	48	49
2.	CSIR	7	—	7
3.	TNAU Merit	—	6	6
4.	AC & RI Merit	—	1	1
5.	Govt. of Pondicherry	—	2	2
6.	ICCR	—	1	1
7.	GCSS	1	—	1
8.	Madras Fertilizer Ltd.	—	1	1
9.	Gharda Chemicals Ltd.	—	1	1
10.	NOCIL	—	1	1
11.	T. Stanes & Co	1	—	1
12.	Aspee	1	—	1
13.	Bagynaga Lab	—	1	1

University Library

The Tamil Nadu Agril. University Library is a learning resource centre for the students, post graduate and doctoral scholars, teachers and scientists of Tamil Nadu Agril. University, its constituent colleges and Regional Agricultural and Horticultural Research Stations. It has been fully used by post graduates and teachers of Bharathiar University, Colleges and Research Institutes in and around Coimbatore city. Apart from these users, the Tamil Nadu Agril. University Library also cater to the information needs of scientist belonging to the Sugarcane Breeding Institute, Central Institute for Cotton Research and Institute for Tree Breeding and Genetics situated at Coimbatore. TNAU Library is also regularly used by the under-graduate and post-graduate students and teachers of other universities and colleges in the neighbouring districts of Coimbatore.

The library was kept open for 334 days with 3644 hours for use during the year 1992-93.

During the year 1992, 10 new titles of periodicals have been added to the list of 624 titles of current periodicals. About 461 renewal orders have been made

to subscribe 558 periodicals (both foreign and Indian origin). Totally 4998 issues of current periodicals have been in receipt against the orders made and displayed for use. On the whole 476 issues of periodicals, reports, bulletins and newsletters were received and displayed in the respective areas for use.

Totally a sum of Rs. 26.62 lakhs had been spent for the subscription of current periodicals during the year under report.

Under the NARP Phase II, an amount of Rs. 9.50 lakhs (Rupees nine lakhs and fifty thousand only) has been allotted for the purchase of new books. With the funds allotted 1387 books were purchased and included in the stock of the library.

About 725 titles of new books were suggested for purchase by various Heads of Departments. After scrutiny 482 titles were ordered. All together 159 books were purchased in the regular budget provision for books. Totally 3066 (Theses 36, Review serials 68, Books by gratis 300, Back volumes of periodicals 1116, Books 1546) volumes of books, back volume of periodicals and theses were included in the stock of the library during the period under report.

Under the technical processing, 648 books have been classified according to the colon classification system to organise and shelving for use. In all, 542 subject entry cards, 612 author entry cards and 635 shelf register cards were prepared and inserted in the catalogue cabinet in the appropriate area for use. A total of 466 book cards, tracing cards and date labels have been prepared.

During the year 6,29,855 documents have been utilised by 2,56,997 users. A total of 58,095 documents were issued on loan for home reading, 52,542 documents were received back after use. During the year 8192 users belonging to other institutions of Tamil Nadu and elsewhere were given permission to use the library.

The traditional service of reference and literature search assistance has been made to locate the reading materials to those who requested for the same. Nine hundred and twenty two content pages of current periodicals were photocopied and supplied to the constituent colleges and regional research stations of Tamil Nadu Agril. University. A total of 38 research papers of interest have also been photocopied and supplied as a feedback to those researchers who requested for the same.

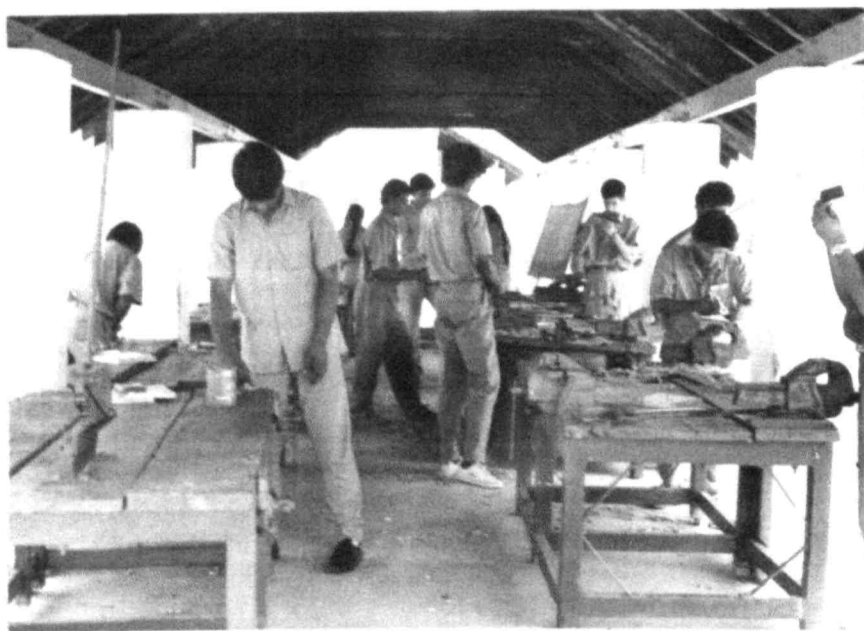
Under the programme of course work, 3 under-graduate classes were conducted as an orientation class for library use. A class for a period of 2 hours had been conducted under the Library User Education Programme to the post graduates in the departments of agronomy, horticulture, plant pathology, forestry, etc. Four batches of in-service trainees from the Department of Sericulture, Government of Tamil Nadu were given an orientation class on the use of Scientific Literature and Library use.



Adult literacy Programme - Involvement of NSS Students.
AC and RI, Coimbatore



Vice-Chancellor with students at field practicals.
AC and RI, Madura



Learning by doing - IBE (Ag) students at workshop practice.
College of Agricultural Engineering, Kumalur

Under the programme of maintenance as a routine job of the library, the issues of current periodicals, back volumes of periodicals, subject books, reference books, reports, bulletins, newsletters, etc. have been reshelved then and there after use, during all the working days of the year in the library.

About 2468 back volumes of periodicals were prepared and kept ready for binding and 1400 newly bound volumes were checked after binding. A total of 1116 bound volumes have been brought into stock, prepared for use and shelved in the respective racks of back volumes section for use.

The Library Committee met three times during the year and made useful suggestions for the collection development and improvements in the facilities of the library for the users.

Under Graduate Library

The under graduate library is kept open for use from 4.00 p.m. to 8.00 p.m. on all working days for the use of under graduates. All together 10,207 students visited the library, about 20,260 books were used in the library premises and 8148 books were issued on loan for home reading. In all 7702 books were received back after use.

4. RESEARCH

The major research achievements of the University in the areas of crop improvement, horticulture, agricultural engineering, water technology and agricultural and rural development studies are presented in this chapter.

AGRICULTURE

RICE

Crop Improvement

Varieties Released

JJ 92 (ADT 41): It is a short duration dwarf Basumathi rice. It was isolated by selection from the dwarf mutant of Basumati 370. It matures in 105-110 days and gives an average yield of 4.7 t/ha. The kernel is translucent, extra long, slender with pleasant and mild aroma. The length of cooked rice is 11.4mm with an elongation ratio of 1.44. It is rich in protein (9.81%). It is recommended for cultivation during Sornavari / Kar / Kuruvai seasons in Tamil Nadu.

TPS 3: It is a medium duration variety with 135 days duration. It is suitable for cultivation in the second season under water logged (Ela) situation in Kanyakumari district. It registered an average grain yield of 6061 kg/ha. It is resistant to blast and moderately resistant to BPH. It is having short, bold, white rice with protein content of 9.15%.

Promising cultures

ACM 10: This culture matures in 100 days. It performed well with an average yield of 5488 kg/ha. It is resistant to leaf yellowing syndrome and Rice Tungro Virus.

BG 915: It is a short duration rice culture with tolerance to RTV. It has recorded an average yield of 5.0 t/ha which is 20.6% and 19.5% increased yield over ADT 36 and IR 50 respectively. It has been advanced to OFT during 1993-94.

TM 9423: A drought tolerant, high yielding medium duration rice (120 days). It has recorded an average yield of 2641 kg/ha which is 52.9% increase over TKM 2 under semi-dry condition.

ACM 14: It is a short duration rice culture maturing in 110 days and capable of yielding 6.5 t/ha. It is resistant to blast, leaf folder and BPH under field conditions.

IRTP 10509 and 4595-54-1-13: These cultures are tolerant to cold. They have recorded a mean grain yield of 5519 and 5652 kg/ha accounting for 16 and 19% increased yield over MDU 2 and MDU 5 respectively.

PM 1390: This culture has been developed for rainfed cultivation in Ramanathapuram and Pasumpon Muthuramalingam districts. It matures in 110-115 days with a mean yield of 3201 kg/ha as against 2713 kg/ha in PMK 1. It is being tested under ART.

AD 85065: It is a cross derivative of ADT 36/TKM 9 and matures in 105 days. This culture is capable of yielding 5 t/ha. It has medium slender grain.

AD 90072: It is a medium duration rice culture which matures in 125-130 days. It is resistant to sheath rot. Average yield potential is 6.0 t/ha

Hybrid Rice: The hybrid TNRH 1 (IR 62829A/IK 10198-66-2R) performed well under multilocation trials during 1991 in different Rice Research Stations of Tamil Nadu giving 30.9% and 13.9% increased yield over IR 50 and ADT 36 respectively. During 1992, the hybrid recorded 6614 kg/ha accounting for 41.4 per cent and 18.7 per cent increased yield over IR 50 (4678 kg/ha) and Co 37 (5552 kg/ha) respectively under OFT in Periyar District. It will be tested under front line demonstration in farmers' holdings during 1993 first season in 10 locations each with 5 acres of contiguous plots.

Crop Management

Seed hardening experiments conducted under rainfed conditions in farmers' fields in Ramanathapuram district during 1991 - 93 revealed that ASD 17 recorded high grain yield in both the years and was on par with ADT 36. Both the varieties were superior to PMK 1 and Norungan (local). Soaking the seeds in 1% KCl registered high yield and was on par with 0.1% succinic acid.

Field experiments conducted in farmers' fields in Ramanathapuram district to study the effect of tank silt and level and time of NPK application in rainfed rice during 1991 - 93 revealed that the application of tank silt at 25 t/ha recorded the highest grain yield in both the years and was superior to control. Application of 75% of N with seed and soil inoculation of *Azospirillum* recorded equal yield as that of 100% N in both the years and increased the net return by Rs. 600/ha. Application of recommended P through enriched FYM as basal and N and K in two equal splits viz., 20 - 25 and 40 - 45 days after germination increased the mean grain yield by 24% and net return by Rs. 1200/ha over the existing recommendation.

The effect of drainage on rice productivity was studied at Coimbatore during 1990 to 1992 with IR 50 in Kuruvai season. It was found that provision of open drainage to a depth of 60 cm all around the plot significantly increased the grain yield by 1.3 t/ha and net return by Rs. 3300/ha over no drainage plots.

Intercropping in wet seeded lowland rice with two green manure crops viz., *S. rostrata* and *S. speciosa* under two spacings and two stages of incorporation revealed that planting 20 day old seedlings of *S. rostrata* at 1.5 m interval and incorporation on 30 days produced the highest yield of 4561 kg/ha as against 3332 kg/ha in control accounting for an increase in yield of 1228 kg/ha over sole crop of rice.

Studies conducted at Madurai have shown that growing and incorporating green manure crops viz., *S. rostrata*, *S. speciosa* and *S. aculeata* increased the mean grain yield of rice by 19.2% (669 kg/ha), 11.7% (408 kg/ha) and 9.3% (325 kg/ha) respectively over control.

Evaluations made in 5 locations in farmers' fields in Ramand and Pasumpon districts during 1991 - 92 under irrigated condition to develop integrated nutrient management practice for lowland rice - rice system revealed that for the first crop of rice recommended level of NPK at 100 : 50 : 50 kg/ha registered a yield of 4998 kg/ha which was on par with NPK 75 : 50 : 50 + Azospirillum (4959 kg/ha) and NPK at 50 : 50 : 50 + Azospirillum + 12.5 t FYM/ha (5044 kg/ha). The different NPK levels imposed in the 1st crop did not have any significant residul effect on the succeeding rice crop yield. For the first rice crop, application of 75 kg N/ha with Azospirillum inoculation or 50 kg N/ha + Azospirillum + FYM at 12.5 t/ha can be recommended.

Studies on the integrated nutrient management for rice conducted in farmer's field in North Arcot district revealed that application of 50% recommended NPK as fertilizer with Azospirillum + 25% N through FYM increased the grain yield by 200 kg/ha over recommended NPK of 150 : 75 : 75 kg/ha.

A study on time of application of nitrogen for wet seeded rice conducted at Madurai during 1992-93 revealed that application of 50% at 15 DAS followed by 25% at active tillering and 25% at panicle initiation gave 12.7% increased yield over 50% basal followed by 25% at active tillering and 25% at panicle initiation.

Studies to substitute inorganic N through local green leaf manure in rice in Tambirabarani command area, conducted at Killikulam during Pishanam and kar seasons with rice ADT 36 and ASD 18 revealed that application of 75% of recommended N through fertilizers and 25% through daincha recorded the highest mean rice grain yield of 6.33 t/ha. The increase was 1.77 t/ha over 100% recommended application through urea. 25% of N substitution through *Cassia* sp. also increased the grain yield by 0.64 t/ha over 100% N through urea.

Time of N application to lowland transplanted rice based on 15 N studies revealed that basal application of N to rice crop can be skipped if green manure is applied. In the absence of green manure incorporation, 10% of the total requirement may be given as basal dressing and the remaining N as 50%, 20%, 20% at active tillering, panicle initiation and flowering stages respectively.

For rapid decomposition of Kuruvai rice stubbles, application of extra dose of 20 kg N/ha was recommended earlier. Current studies at Thanjavur have revealed that application of *Trichoderma viride* to Kuruvai rice stubbles was equally effective in hastening decomposition. This would save extra dose of N.

With a view to identify a profitable multiple cropping system to suit the filter point situation of Thanjavur district, a field experiment was conducted during 1991-92 at Kattuthottam with six different cropping systems. In blackgram + watermelon intercropping system, watermelon seeds were dibbled 1.2 m apart amongst blackgram crop. Among the cropping systems evaluated, the system, groundnut-rice-gingelly gave the highest net return of Rs. 29248/ha with B-C ratio of 3.49, followed by the system, groundnut-rice-blackgram + watermelon, which recorded a net return of Rs. 25960/ha with B-C ratio of 3.21. In places where adequate irrigation source is available throughout the year (both through borewell and canal water) the cropping system, groundnut rice-gingelly can be adopted. While adopting the above system, groundnut should be sown well in advance (first week of May) so as to avoid the water stagnation.

To study the effect of amendment on rice under saline soil conditions, field trials were conducted during Pishanam seasons 1990-91 and 1991-92 at Killikulam with six organic amendments and three rice varieties. It was found that among the rice varieties, ASD 16 recorded significantly high grain yield of 5.54 and 5.01 t/ha during 1990-91 and 1991-92 respectively and was superior to ADT 36 and AST 18. Significant grain yield increase was recorded due to incorporation of subabul (4.93 and 4.65 t/ha) followed by banana waste (4.74 and 4.58 t/ha) and *Cassia nigricans* (4.42 and 4.65 t/ha).

Field experiment with rice-cowpea cropping system at Trichirapalli with different amendments and Zn levels revealed that amending the sodic soils with gypsum @ 50% gypsum requirement with daincha @ 5 t/ha lowered the soil pH from 9.40 to 8.36 and ESP from 43.01 to 13.50 and accounted for 2.4 times and 1.4 times high grain yields of rice (Co 43) and cowpea (C 152) over control. Besides, application of ZnSO₄ @ 37.5 kg/ha increased the grain yield of rice and cowpea by 17 and 12 per cent respectively over ZnSO₄ application @ 25 kg/ha. Hence it is recommended to apply 37.5 kg ZnSO₄ + 50% gypsum requirement + daincha (5 t/ha) for highest per cent utilisation of applied zinc and for increased yield in the main crop of rice and residual crop of cowpea in sodic soil

Azospirillum lipoferum mutant Az 204 M developed at Coimbatore proved to be suitable for using as tagged strain to check the quality of the inoculum. Mutant Az 204 M increased the grain yield (4674 kg/ha) by 27.9 per cent over parent strain (3654 kg/ha). This strain could be tested at different bio-fertilizer production centres in the State to release as developed strain for rice.

Inoculation of Az 208 increased the grain yield (3750 kg/ha) by 15.3 per cent over the existing Az 204 strain (3250 kg/ha). This strain (Az 208) is under evaluation along with the standard strains in different research stations to release as a new strain.

To develop the management strategy for salt stress conditions a field experiment was conducted in the farmer's holding at Elanthaikulam Village, Thiruppuvanam Taluk with Co 43 rice. In the first and second crop, treatment consisting of seed treatment with one per cent calcium chloride along with P enriched coir pith application at the rate of 12.5 t/ha under high doses of N (150 kg/ha) recorded the highest grain yield of 5213 and 5029 kg/ha respectively.

Studies on the effect of incorporation of preceding cotton stalks on succeeding rice (IR 50) at Aduthurai indicated that *in situ* incorporation of cotton stalk 2 weeks before planting (22.6 t/ha) as fresh biomass increased the grain yield of rice by 810 kg/ha and net return by Rs. 2580/ha over cotton stalks removed.

Utilising remote sensing technique, the identification of rice varieties was possible at 60 DAT using spectral reflectance in the red and near infra-red bands. Rice IR 50 showed high spectral reflectance followed by ASD 18 and ADT 36. The high reflectance in IR 50 was due to high LAI, chlorophyll and biomass.

An experiment conducted to study the enriched rock-phosphate as a source of phosphatic fertilizer to rice with ADT 36 revealed that FYM enriched with MRP at 10:1 ratio recorded high net return followed by 15:1 ratio compared to application of P₂O₅ at 50 kg/ha as SSP.

The mutant culture (developed with EMS 200 ppm) of *Azolla caroliniana* tolerates summer temperature (upto 40.5°C) and grows well. The inoculation of this culture as dual crop in rice and subsequent incorporation increased the grain and straw yield of rice (ADT 36). Better sporulation was noticed in mutant culture of *A. caroliniana* than in *A. microphylla* and *A. filiculoides*.

Foliar spray with 2% DAP given thrice at boot leaf stage, 50% flowering and post milk stage enhanced seed yield by 12 - 40% and seed quality in terms of germination, vigour index and storage potential in IR 50 and Co 45 rice cultivars.

Crop Protection

Botanical powder formulations viz., neem seed kernel extract (NSKE), nochi leaf powder, *Ipomea* leaf powder and *Prosopis* leaf powder were on par in reducing

the earhead bug population in rice. NSKE, *Ipomea* leaf powder and *Prosopis* leaf powder were also effective in reducing the sheath rot incidence and increased the grain yield by about 20.0 per cent compared to control.

Application of neem cake in the nursery followed by NSKE 5% or neem oil 3% or carbendazim at 250 g/ha effectively controlled rice sheath blight

The results of field experiments conducted at Coimbatore have shown that release of *Trichogramma japonicum* against stem borer and *T. chilonis* against leaf folder were effective at 5 cc/ha/release.

Application of monocrotophos @ 1000 ml/ha or acephate 625 g/ha or NSKE 5% effectively controlled rice black bug. The mean leaf damage was 9.5%, 8.0% and 15.5% respectively as against 66.6% in untreated control.

Experiments conducted at Aduthurai have shown that spraying tricyclazole 75 WP @ 0.1% significantly reduced the leaf blast of rice and also increased the yield (3750 kg/ha) significantly compared to control (1650 kg/ha).

In Ramanathapuram district where rice is cultivated in sandy soil, the harvester termite (*Anacanthotermes viarum*) sometimes causes severe damage. Application of chopped paddy straw treated with quinalphos 1.5 D @ 50 kg/ha reduced the harvester termite damage significantly.

Studies were carried out at Coimbatore to control the rice nursery blast using *Pseudomonas fluorescens* as seed protectant. It was found that treatment of IR 50 seeds with *Pseudomonas fluorescens* bacterial suspension (107) @ of 10 ml/kg of seeds was very effective in controlling the nursery blast. In *P. fluorescens* treated beds no incidence of the blast disease was observed.

A field trial conducted at Madurai showed that biological control of rice gallmidge was possible with the parasite *Platygaster oryzae*. This finding was tested in farmer's field. The results of this trial established that release of parasitized galls at the rate of one per 10 m² in the main field 10 days after transplanting was effective in controlling gallmidge.

Field experiment conducted in farmer's holding indicated that spraying of phosphomidon @ 500 ml/ha was very effective in controlling the rice WBPH.

Study on the vector population, vector indexing and RTV incidence during 1992-93 revealed that, at Tirur the vector population was maximum in July and August 1992 (5192 and 105012) combined with high percentage of viruliferous vector (31% and 35%). But, at TRRI, even though vector population was very high during September and October 1992 (80818 and 260585) the viruliferous vector population was very negligible (20.1% to 4.6% only). Hence it was concluded that the absence of RTV in cauvery delta zone was due to very negligible population of viruliferous vectors.

Dry seed treatment against false smut of rice revealed that mancozeb (or) carboxin @ 2 g/kg of seeds significantly increased the germination percentage and vigour index. Spraying of mancozeb 0.2% or chlorothalonil 0.2% during flowering stage significantly reduced the false smut of rice.

MILLETS

SORGHUM

Crop Improvement

Promising cultures

SPV 881, TNS 47 and TNS 31-1: These promising cultures are being evaluated in ART. Of these, the culture SPV 881 has been promoted for testing in all the three seasons while the remaining two for summer season only.

ICSV 239: This elite culture was identified from the ICRISAT materials. This culture is capable of yielding 3600 kg/ha in summer season accounting for an increase of 16.5 per cent over the check variety Co 26. In Kharif season, it was found to record 2845 kg/ha as against 2050 kg/ha recorded by Co 26. In the ART conducted both in Kharif and winter seasons, this culture recorded 21.2% increase in yield over Co 26. This culture will be tested in 20 locations in Coimbatore district during 1992-93.

TNS 290, TNS 259 and TNS 262: These three promising cultures have recorded 33-47% increased grain yield over the high yielding check Co 26. The straw yield was also high in these entries. These cultures will be promoted for testing in MLT and All India Co-ordinated trials.

AKSS 5: This sweet sorghum culture was found to be promising with high cane yield (44 t/ha), brix value (19.4%), juice yield (17412 l/ha) and sucrose content (13.9%) with high purity of juice (71.4%). The grain yield was 2820 kg/ha.

KS 7666 (SN 351 x SPV 462): This culture has recorded an average grain yield of 5.05 t/ha which is 28.8% increase over K 8 (3.92 t/ha) for the past two years. This culture will be evaluated during summer season along with K 4 to assess its suitability for summer irrigated tract.

KS 7655 and 7657: These two fodder sorghum cultures were found to be promising for the past two years. While KS 7657 recorded 12.18% (8.84 t/ha) increased yield over K 7, culture KS 7655 recorded 2.15% (8.05 t/ha) increased yield over K 7 (7.88 t/ha).

Crop Management

Studies conducted at Koilpatti have indicated that the highest yield of 2870 kg/ha of grain could be obtained in sorghum (K 8) when 50% of recommended P as DAP and 50% as enriched FYM was applied as against 2145 kg/ha in control.

The use of FYM fortified with recommended dose of P_2O_5 (100% and 75%) increased the grain yields (sorghum and blackgram) and P fertilizer efficiency compared to the conventional recommendation of 12.5 t of FYM ha⁻¹ with recommended dose of P_2O_5 . FYM fortified with 75 per cent P_2O_5 proved to be best by recording increased yield (sorghum 4.83 t/ha¹, blackgram 9.3 q/ha) and P use efficiency (sorghum : 26.0%, blackgram 22.5%) besides improving the residual effect of P (5.5%). It is recommended to fortify the FYM (750 kg ha⁻¹) with 75 per cent of the recommended dose of P_2O_5 and apply for irrigated sorghum and blackgram to improve the yield and P use efficiency.

Seed (3 packets) and soil (10 packets) inoculation of phosphobacteria with 50% recommended P (10 kg/ha) recorded comparable yield (3647 kg/ha) of sorghum cv. Co 26 as that of 100% P (3569 kg/ha). Thus there is a saving of 50% of recommended P to the rainfed sorghum.

The effect of soil tilth and nitrogen levels on sorghum grain yield in Alfisol was studied. It was found that ploughing the soil with improved iron plough twice produced 70.5% (< 2.5 mm size) of fine tilth and increased the grain yield of sorghum (907 kg/ha) by 6.0% over country ploughing twice (860 kg/ha). Nitrogen level at 50 kg/ha combined with ploughing with improved iron plough enhanced the grain yield to 1029 kg/ha accounting for 20.0 per cent increase over no nitrogen application and country ploughing.

Sorghum seeds hardened with two percent potassium dihydrogen phosphate and then pelleted with hydropolymer (alcosorb 30 g/kg) in combination with Diammonium Phosphate (60 g/kg) and micronutrient mixture (10 g/kg) enhanced field emergence and growth parameters under restricted irrigations (four irrigations). The harvested seed possessed good sowing quality characteristics. This technique was found to be the best seed management practice applicable under dryland agriculture. Hardened seed maintained 90% germination upto 35 days in storage.

Crop Protection

Seed treatment with imidacloprid 70 WS at 100 g/kg of seed significantly reduced the incidence of shootfly in sorghum.

CUMBU

Crop Improvement

Variety Released

X 6: A new cumbu hybrid UCH 11 (732A x PT 3095) was released as X6 from Tamil Nadu Agricultural University during 1993. This hybrid gives a mean yield of 2400 kg/ha (19-28% increase over WCC 75, Co 7, ICMS 7703 and 32% over KM 2) under rainfed conditions. Under irrigated conditions, this hybrid is

capable of giving 3236 kg/ha. It is 155-175 cm tall, with a duration of 95-100 days and produces 4-6 effective tillers with compact spindle shaped earheads. It is resistant to downy mildew. The grains have higher protein content and good market acceptability. Its uniform tillering and grain size are added advantages.

Promising Cultures

One hybrid ABH 219 (L 111 A x PT 1890) is being evaluated in ART along with Co 7, WCC 75 and X 5. Three composites viz., UCC 2, UCC 3 and UCC 4 were developed and found to record 25.6, 24.8 and 25.8% increased yield respectively over the check Co 7. Hence these entries along with an elite inbred PT 3095 have been entered in MLT and co-ordinated trials.

A 19: This culture has been identified at Vamban and found to perform well for the past three years. It has resistance to downy mildew and tolerance to rust. It is under MLT in eight research stations.

IBH 5539: This new hybrid was developed from a cross between 852 A x PT 1890 and has recorded 40 and 70 per cent increased yield over the check X 5 during the last two seasons of testing. It was found to be completely resistant to downy mildew and rust and has been advanced to MLT.

IBH 5578, 5527 and 5534: These three hybrids are early maturing (75-77 days) with higher yields than the check X5. They are now being tested in co-ordinated trials at All India level.

Experiments conducted during N. E. monsoon season of 1990-92 at Coimbatore for economising the fertilizer N and P by substituting biofertilizers for rainfed pearl millet (Co 6) revealed that application of 40 kg N with 10 kg P₂O₅ + seed and soil inoculation of phosphobacteria recorded high mean grain yield of 1087 kg/ha and was on par with the treatment 20 kg N + 10 kg P + Azospirillum + Phosphobacteria (1073 kg/ha) and recommended NPK of 40 : 20 : 0 (977 kg/ha). The combination of 40 kg N + 10 kg P + Phosphobacteria recorded high net return of Rs. 3635/ha with B:C ratio of 1.50, which was comparable with that of 20 kg N + 10 kg P + Azospirillum + Phosphobacteria, which gave the net return of Rs. 3578/ha with B : C ratio of 1.54. Thus for rainfed pearl millet, combined application of 20 kg N + 10 kg P/ha with seed and soil inoculation of Azospirillum and phosphobacteria can be recommended for good net return.

Permanent manurial experiment conducted at Kovilpatti for the past 10 years with sorghum bajra rotation revealed that excepting in the first two years in the rest of the years the treatment 40 + 20 + 0 NPK as inorganics along with 25 kg ZnSO₄ recorded the highest yield of grain in both sorghum and bajra. Continued application of inorganic sources of N + P resulted in steady decline in the grain yield of sorghum and bajra. The treatment receiving 20 kg N as organic and 20 kg

N as inorganic along with 10 kg P had recorded high grain yield almost consistently in all the years.

MAIZE

Crop Improvement

Promising Cultures

UMH 10 and UMH 13: These double cross hybrids were found to be promising in advanced yield trials. The hybrid UMH 10 recorded the highest grain yield of 6258 kg/ha with 13.7% and 12.1% increased yield over CoH2 and Co 1 respectively under rainfed situations. Under irrigated condition this hybrid registered a yield of 7810 kg/ha with 23.1% and 24.9% increase over CoH2 and Co 1 respectively. It is resistant to downy mildew and also tolerant to drought. It is now under ART in 32 locations in Tamil Nadu.

Crop Management

In Periyanaickenpalayam soil series, ploughing the soil once with mould board and twice with disc harrowing produced fine tilth of 56.3 per cent (size < 2.5 mm) and increased the grain and straw yield of maize (Co 1) by 12 and 11 per cent respectively over no tillage and by 7 and 5 per cent respectively over ploughing thrice with country plough.

RAGI

Crop Improvement

Promising cultures

TNAU 511: It is a cross derivative of Indalf 1 x TNAU 303. It is resistant to blast disease. It is being evaluated in ART.

TNAU 332 (Co 7 x TAH 60): This culture has recorded the highest yield of 4074 kg/ha under irrigated condition and 1507 kg/ha under rainfed condition, the per cent increase being 37 and 15 respectively for irrigated and rainfed condition over the check Co 13.

KM 67: This promising ragi culture has been identified at Paramakudi. This culture recorded the highest yield of 1880 kg/ha accounting for 16.8 per cent increase over Paiyur 1.

Crop Management

In Periyar and Coimbatore districts, non-calcareous entisols occupy 35 per cent of the area where application of recommended dose of mussorie rock phosphate (MRP) with composted coir pith (CCP) mobilised the added phosphorus and

enhanced the P use efficiency in irrigated ragi-based cropping system as compared to SPP and DAP as sources of phosphorus. (PUE for SSP: 30.53%, DAP: 26.72% and MRP: 31.30%). Similarly, the value: cost ratio is also high for MRP (4.06) followed by DAP (2.28) and SSP (1.81). Hence MRP with CCP is recommended for increasing the yield and P use efficiency in ragi based cropping systems under irrigated condition, considering its cost effectiveness.

In ragi, among the growth regulators tried, ethep is found to be the best in enhancing the yield. Two sprays of 200 ppm of ethep at 45th and 60th day after sowing enhanced both grain yield (19.30%) and straw yield (14.55%).

A manually operated rotary type cleaner cum gader for ragi has been designed and developed at Palayam. With this unit, the ragi grain lot can be separated from larger as well as smaller size impurities. This machinery can be used for grading ragi seeds. It costs only Rs. 2 - to grade one quintal of ragi. The cost of the unit is Rs. 2500/-

KUTHIRAVALI

Crop Improvement

Promising Culture

TNAU 80: This promising culture is being evaluated under on-farm trials. It has recorded 2325 kg/ha as against 986 kg/ha recorded by Co. 1.

SAMAI

Crop Improvement

Promising Culture

TNAU 5/49: This promising culture is capable of giving an average yield of 975 kg/ha. The yield performance was consistent for the past four years. It has been recommended for All India release.

TENAI

Crop Improvement

Promising Culture

TNAU 43: This culture has been recommended for All India release based on its consistent yield performance (1470 kg/ha) for the past four years (1988-92). Release proposal has been sent to Central Variety Release Committee.

VARAGU

Crop Improvement

Promising Culture

KMV 20: This culture has a duration of 100 days and a yield potential of 1600 kg/ha under rainfed condition. Considering its consistent yield performance over many years, it is being proposed for release on All India basis.

PULSES

REDGRAM

Crop Improvement

Promising Culture

IPH 732: This culture gave a mean yield of 629 kg/ha in MLT in kharif 1991 registering an increase of 31.0% over the high yielding check Co 5. This culture has been advanced to ART in 30 locations during Kharif 1992 and the yield data are being processed.

Crop Management

IAA oxidase activity was studied in redgram genotypes viz., Co 5, ICPL 87, ICPL 83045, CORG 9060, AL 15, ICPL 86005 and ICPL 84023 at Coimbatore. The IAA oxidase activity ranged from 52.45 ug to 57.25 ug. The highest IAA oxidase activity was seen in ICPL 83015. The maximum shedding of abortive pods has been in the genotype CORG 9060 (i. e. 24.50 plant). The fertility co-efficient ranged from 14.05 to 14.25 per cent. The highest fertility coefficient was observed in ICPL 84023.

Among the seed protectants, nochi (*Vitex negundo*) leaf powder at 1:100 ratio, protected the seeds and prolonged the shelf life of the seeds with 75% germination after 12 months of storage. The well dried nochi leaves were ground and sieved with a home sieve. The fine powder was mixed with seed at one kg of powder for every 100 kg of seeds.

Crop Protection

Two field trials were conducted to assess the efficacy of different insecticides and botanicals in the management of redgram pod borers at Vamban. The pooled analysis of two season data indicated that NSKE 5%, Neem oil 2% and phosalone 0.07% were effective in the control of pest complex giving 980 kg/ha, 900 kg ha and 905 kg/ha of grain yield respectively.

BLACKGRAM

Crop Improvement

Variety Released

APK 1 : It is a high yielding blackgram variety and released for cultivation as intercrop with cotton under rainfed condition during September-October season. Maturing in about 70 days, it gives 630 kg of grain yield when intercropped with cotton in addition to the kapas yield of 1200 kg/ha under rainfed conditions. When compared to the ruling blackgram variety TMV 1, APK 1 registered 56.5% increased grain yield under cotton based cropping system. The kapas yield also increased by 34.1% when intercropped with APK 1. The total money value increased by 42%. Besides the high yield, the cooking quality is also good and preferred by consumers. It is highly suited for the preparation of vadai, iddly and dosai. APK 1 blackgram was released as a location specific variety for cultivation in Kamarajar and Chidambaranar districts under rainfed conditions during September-October season.

Promising cultures

YKR2 and YKR4 : These two promising cultures are resistant to yellow mosaic virus and are also high yielding ones. They are being evaluated under MLT.

KBG 512 : This culture has recorded an average grain yield of 950 kg/ha accounting for an increase of 31.6% over Co 5 (712 kg/ha) for the past seven years from 1985 onwards in station trials. In MLT it out-yielded Co 5 by 63.4%. In ART also it has recorded 9.7% increased yield over Co 5. In overall performance KBG 512 yielded 775 kg/ha which was 34.10% higher than Co 5 (577 kg/ha).

Crop Management

Field experiment conducted at Coimbatore with blackgram (Co 5) for the last four years (1989 to 1991) during Kharif indicated that CoC 10 rhizobial strain inoculation increased the grain yield by 35.6 per cent (476 kg/ha) over the uninoculated control (351 kg/ha) whereas existing rhizobial strain (BMB S/P-47) increased the grain yield by 11.9 per cent (393 kg/ha) over the control.

Field experiments conducted during the last two years with blackgram (Co 5) clearly indicated that combined inoculation of both *Azospirillum* and *Rhizobium* (BMB S-P47) was superior in increasing the grain yield by 26.5% (405 kg/ha) over uninoculated control (320 kg/ha). *Rhizobium* alone recorded an increase of only 13.7 per cent (364 kg/ha) over uninoculated control.

At Aruppukottai, under rainfed vertisol in blackgram (Co 5) combined seed and soil inoculation of rhizobium and phosphobacteria with recommended NP increased the seed yield by 62% over recommended NP levels of 12.5:25 kg/ha. Com-

bined inoculation plus 40% of recommended N and P (5 kg N + 10 kg P) increased the seed yield by 26% and 28% over recommended N and P and recommended N and P + Rhizobium. Thus, there is a saving of 60% N and P due to combined inoculation of rhizobium + phosphobacteria.

Under rainfed conditions, application of Rhizobium and Phosphobacteria with inorganic fertilizers viz., 12.5 kg N + 25 kg P₂O₅ gave the highest grain yield of 735 kg blackgram (Co 5) in black soil at Aruppukottai.

Crop Protection

Field trials conducted at Coimbatore reveal that seed treatment with *Trichoderma* effectively controls blackgram root rot with 4.1% disease incidence and a grain yield of 623 kg/ha as compared to 5.8% disease incidence and 540 kg/ha grain yield in control. Similar results were obtained from the three trials conducted in the farmers' holdings.

Experiments conducted at Madurai revealed that neem seed kernel powder 3% effectively controlled (8.0%) the infestation of storage pest *Callosobruchus maculatus* and it was on par with activated clay (2.67%) treatment.

Recently, the blackgram was found to be affected by a new pest, *Liriomyza trifolii* (AGROMYZIDAE - DIPTERA). This is an introduced pest and is commonly known as serpentine leaf miner. This has been reported to be very common on tomato, castor, cotton and cucurbits around Bangalore and irrigated cotton growing areas of northern Karnataka.

GREENGRAM

Crop Improvement

Promising Cultures

TRAM 1 and TRAM 2: These two cultures were obtained through All-India co-ordinated projects. They mature in 70 days with an average grain yield of 748 kg/ha and 727 kg/ha respectively. The increase in yield was 20% and 16% over Co 4 respectively.

VGG 4 (ML 65 × KM 2): It is an yellow mosaic tolerant culture with a yield potential of 850 kg/ha. It is in third year of ART and promoted to Advanced Varietal Trial I (AICPIP).

KGG 373: This culture has recorded an average grain yield of 950 kg/ha which is 27.5% more than KM 2 (745 kg/ha) and 22.3% more than Co 5 (775 kg/ha) in station trials for the past three years.

Crop Management

Field experiments were conducted during 1991-1992 in red laterite soil at Vamban to study the effect of Mussoorie rock phosphate in combination with either phosphobacteria or organic sources. The results revealed that application of 25 kg P₂O₅ / ha as MRP with seed inoculation and phosphobacteria was superior in increasing the grain yield of greengram by 375 and 410 kg/ha to 50 kg and 25 kg P₂O₅ / ha as SSP, respectively.

Field experiments conducted at Coimbatore for the last four years (1989-91) to find out the performance of improved strains in greengram (Co 5) indicated that the inoculation of rhizobial strain COG 15 registered the highest grain yield of 704 kg/ha accounting for 29.1% increase over uninoculated control (545 kg/ha) whereas the existing recommended strain CMBS-1 recorded 577 kg/ha accounting for 5.9% increase in yield over uninoculated control.

Field experiments conducted at Coimbatore for two kharif seasons during 1989 and 1990 indicated that combined inoculation of *Azospirillum* and *Rhizobium* recorded an average grain yield of 676 kg/ha in greengram Co 5 as against 616 kg/ha in *Rhizobium* alone. This is 28.0% over uninoculated control.

Crop Protection

Experiments conducted at Vridhachalam and Kattumannar Koil indicated that *Trichoderma* seed treatment @ 4 kg/ha effectively reduced the root rot incidence to 5.5% and increased the yield to 875 kg/ha as against 8.0% and 662 kg/ha in uninoculated control. The cost benefit ratio was 1.0 : 2.1.

COWPEA

Crop Improvement

Variety Released

Co 6: In Coimbatore the culture 1-26, a hybrid derivative of the cross combination of the MS 9804 x C152 possessing resistance to mosaic disease and tolerance to root rot has been released as Co 6 during the year for general cultivation. It gives a mean yield of 671 kg/ha in 65-70 days, which is 25.2% and 13.5% higher than C 152 and Co 4 respectively. The grain is light cream in colour.

Promising Cultures

COVU 95 and COVU 623: These two cultures were identified from Coimbatore. They are under MLT in 13 research stations.

VCP 5: It has a duration of 65-70 days and is being evaluated in ART for the last three years.

GC 82-7: This promising culture has been advanced to MLT during 1992 based on the performance for the past four years in station trials. This culture has a yield potential of 1100 kg/ha which is 11.8% higher than Co 4 (964 kg/ha).

Crop Management

Field experiment conducted at Coimbatore during the last four Kharif seasons indicated that the improved rhizobial strains CoC 10 in cowpea (Co 4) increased the grain yield by 39.1% over uninoculated control. The existing rhizobial strain increased the grain yield only by 21.1% over uninoculated control.

BENGAL GRAM

Crop Improvement

Promising Cultures

Under joint TNAU / ICRISAT diversified bulk population breeding programme a total of 30 test entries along with 10 checks were tested. The population of cross derivatives of Co 3 x ICC 12237 and ICC42 x ICC 12237 have been found suitable to Coimbatore condition. The same population is currently under test at Aruppukottai and Kovilpatti.

Crop Management

Studies to evaluate profitable intercrops for chickpea (Co 2), conducted during winter season of 1990-91 and 1991-92 at Coimbatore, with three intercrops viz., sesamum (Co 1), mustard (Seetha) and soybean (Co 1) in 4:2 ratio revealed that intercropping of sesamum, mustard and soybean did not adversely affect the yield of chickpea. Among the systems, chickpea + sesamum at 4:2 ratio recorded the highest net return of Rs. 2015/ha with B-C ratio of 1.49, which increased the net return by Rs. 1040/ha, over the sole crop of chickpea.

Experiment conducted at Coimbatore in rainfed vertisol revealed that application of sulphur at 30 kg/ha in the form of gypsum (55 kg) increased the seed yield (654 kg/ha) by 31% over control (499 kg/ha).

Crop Protection

A bacterium *Pseudomonas fluorescens* was found to effectively control chickpea wilt caused by *Fusarium oxysporum* sp. ciceri and increased the yield. The bacterium was mass multiplied in peat soil. The seeds were treated with the inoculum and the peat soil inoculum @ 1 kg/ha was applied to the soil at the time of sowing. The treatment gave an average yield of 1530 kg/ha as against 700 kg/ha in untreated control.

Chickpea root rot caused by *Macrophomina phaseolina* was controlled by seed treatment with *Trichoderma* @ 4 g/kg of seed. Trials were conducted for two

seasons and in both the seasons significant yield increase was observed due to seed treatment. The yield increase was 65-75% over untreated control.

SOYBEAN

Crop Improvement

Promising Cultures

UGM 34: This promising culture was tested under ART during 1991-92 and found to record 8% yield increase over the check Co 1. It was again tested in ART during 1992-93 with 30 trials in kharif, 36 trials in rabi and 42 trials in summer. The yield data are being processed.

UGM 52: This high yielding short duration culture will be tested in ART during 1993-94. It matures in 75 days and suitable for intercropping.

Crop Management

Field experiments conducted during 1990-92 at Coimbatore revealed that higher plant density of 6.6 lakhs/ha adopting a spacing of 30 x 5 cm recorded higher mean grain yield of 1054 kg/ha accounting for a yield increase of 12.5% over the recommended plant density of 3.3 lakhs/ha with 30 x 10 cm spacing (937 kg/ha).

Spraying 1% solution of potassium chloride once at peak flowering stage increased the yield by 19.0% (218 kg/ha) over untreated control (1145 kg/ha). The cost benefit ratio works out to 1.0 : 6.8.

Among the soybean genotypes evaluated for intercropping in coconut at Coimbatore, Co 1 recorded the higher grain yield of 892 kg/ha followed by UGM 34 (680 kg/ha) and Monetta (655 kg/ha). The yield of soybean under coconut was 60.5% compared to sole cropping of soybean.

LAB LAB (Avarai)

Crop Improvement

Promising Culture

A high yielding lab lab culture with flong and light green pods evolved at Coimbatore is under multilocation trial. It is a hybrid derivative of Co 9 x Floriki-field (Pandal) and matures in 100 days with 10% increased pod yield over Co 12.

LAB LAB (Mochai)

Promising Culture

DL 3196 : It is a short duration, photoinsensitive mochai culture evolved at Coimbatore. It is now under MLT. It matures in 100 days and has synchronous pod maturity.

OILSEEDS

GROUNDNUT

Crop Improvement

Promising Cultures

VG 119 : It is an early maturing (90 days) bunch culture of the cross Co 1 x Robut 33-1 and is being tested in ART in 10 locations in kharif and 24 locations in Rabi in Tamil Nadu. In the Research Station Trials, the culture gave a mean pod yield of 1520 kg/ha under rainfed conditions and 1750 kg/ha under irrigated conditions. The culture recorded an average yield of 1635 kg/ha with 19% increase over JL 24.

VG 8901 : It is yet another bunch culture of the cross Robut 33-1 x VRI 1 maturing in 105 days. In the station trials, the culture gave a mean yield of 1750 kg/ha under rainfed conditions and 1980 kg/ha under irrigated conditions respectively. The culture recorded a mean pod yield of 1865 kg/ha with 27% increase over VRI 2. This culture is being evaluated in 40 locations in ART both in kharif and rabi.

VG 108 : It is an interspecific derivative of the cross *A. hypogaea* x *A. cardenasii*. This culture is being evaluated in ART in 24 locations in Tamil Nadu. This culture is semi-spreading in habit and has recorded a mean dry pod yield of 2000 kg/ha with 13.7% increase over TMV 10 in the Station Trials. The culture is resistant to rust and late leaf spot disease and tolerant to leaf miner.

VG 115 : This culture is a derivative of the cross Ah 352 x Co 1. It is a spreading type. It is being evaluated in ART in 30 locations. This culture has recorded a mean pod yield of 1340 kg/ha with 16.4% increase in yield over TMV 1. Based on the performance in the ART, the culture will be considered for release.

Culture 8625 : It is a cross derivative of Ah 954 x ICGS 11. This culture recorded a mean yield of 1200 kg/ha compared to 1026 kg/ha by VRI 2 with 16.9% increase in yield. It is being advanced to MLT during 1993 kharif.

VG 113: It is a semi spreading culture of the cross, *A. hypogaea* x *A. cardenasii* and is being evaluated in multilocation trial in six Research Stations. At Vridhachalam VG 113 recorded a mean dry pod yield of 2100 kg/ha with 21% increase in yield over TMV 10.

VG 8918: This is a promising bunch culture of the cross VG 5 x NCAC 17090. This culture matures in 100 days and records a mean dry pod yield of 1750 kg/ha under rainfed condition and 1900 kg/ha under irrigated condition. On an average the culture recorded a mean yield of 1805 kg/ha with 17.7% increase over VRI 2. It is moderately resistant to late leaf spot and rust by recording grades of 5 and 4, respectively. It is proposed for MLT during 1993-94.

VG 8934: It is a bunch culture maturing in 105 days. It is a derivative of the cross between Robut 33-1 x M13. In the trials conducted at Vridhachalam, the culture recorded a mean dry pod yield of 2067 kg/ha under rainfed condition as compared to 1840 kg/ha recorded in VRI 2. This culture is also proposed for multi-location trials during 1993-94.

TNAU 12: It is a spanish bunch type. It gives an average yield of 1450 kg/ha as against the yield of 487 kg recorded by the best check VRI 3.

Crop Management

The results of onfarm trials conducted in three locations viz., Chittiraisavadi, Nagar and MN Kuppam revealed that combined application of gypsum at 200 kg/ha with MgSO₄ at 30 kg/ha in two splits i.e., 50% basal + 50% top dressing on 45 DAS was superior to split application of 400 kg gypsum/ha in lateritic soils of NE zone. The increase in pod yield was 303 kg/ha.

To develop a crop intensification programme under rainfed condition in Ramnad and Pasumpon districts, trials were laid out in seven locations with five different groundnut based systems during 1991-92. The comparative economics clearly indicated that groundnut followed by blackgram/greengram was more profitable which increased the net return by Rs. 3140 and Rs. 2700/ha respectively over sole crop of groundnut under rainfed condition.

Sulphur sludge, a rayon factory waste, containing 50.4 per cent of S could profitably be used as a source of sulphur for oilseed crops, particularly for groundnut. Application of 30 kg S ha⁻¹ as sulphur sludge with recommended dose of NPK (18:36:54 kg/ha) either in the presence or absence of 12.5 t ha⁻¹ of FYM improved the yield of pods (16.5% over control) and oil content of Co 1 groundnut (2.14% over control). It is recommended to apply 30 kg S ha⁻¹ as 60 kg of sulphur sludge/ha with recommended dose of NPK and FYM at 12.5 t ha⁻¹ to improve the pod yield and oil content of groundnut.

An integrated package involving tank silt 100 t/ha + soil test based fertilizer recommendation including bio-fertilizers + FYM (12.5 t/ha) to ameliorate the con-

straints of low clay, low fertility and poor organic matter at Paiyur ranked best with highest pod yield increase of groundnut TMV 7 (29%) and the highest net additional return of Rs. 2393/ha.

Studies carried out to arrest the excessive vegetative growth and to synchronise flowering in groundnut Co 1 indicated that use of Mepiquat chloride (cham, atkar) enhanced the yield to an extent of 42.0 per cent over control, the C:B ratio being 1.00 : 4.15.

Studies on micronutrient schedule for rainfed groundnut in Vannappatti soil series revealed that iron enriched FYM (24 kg/ha of ferrous sulphate with 750 kg of FYM incubated for a month) gave 17% enhanced pod yield with a net gain of Rs. 1832/ha.

Studies on interaction of nitrogen and potassium on groundnut yield and quality conducted for three years with different levels of N, K and FYM showed that application of 6.25 tons FYM, 9 kg N and 54 kg K₂O/ha had the beneficial effect of increasing the pod yield (1633 kg/ha) compared to control (1492 kg/ha) under irrigated condition. There is a saving of 50% of N as against the blanket recommendation.

Experiment conducted at Virudhachalam revealed that combined application of rhizobial culture (2 kg/ha) and 750 kg enriched FYM with 75% recommended dose of NPK viz., 7.5 kg N and P₂O₅ and 33.75 kg K₂O/ha resulted in higher pod yield (1319 kg/ha) compared to recommended NPK (1213 kg/ha). Thus, there is a saving of 25% of NPK for rainfed groundnut with biofertilizers and enriched FYM.

Experiments conducted during Kharif 1991 and 1992 on irrigated groundnut at Virudhachalam revealed that pre-emergence application of metolachlor at 1.0 kg ai/ha with one hand weeding at 30 DAS gave better weed control and pod yield than the existing recommendation of fluchloralin at 1.0 kg ai/ha with one hand weeding on 30 DAS.

Crop Protection

Field experiments conducted at Virudhachalam, Coimbatore and Tindivanam indicated that the *Trichoderma* seed treatment (4 g/kg of seed) was very effective in controlling the root rot disease and increased the yield. The average disease incidence was 2.5% in treated plots as against 9.9% in untreated control. The average pod yield was 1180 kg/ha and 880 kg/ha in the treated and control plots respectively.

Field studies conducted for the evaluation of combined use of NPV of *S. litura* and *H. armigera* on groundnut indicated that single application of NPV of each pest at 250 LE/ha with crude sugar 2.5 kg/ha was effective as that of two applications of chlorpyrifos at 200 g ai/ha at 7 days interval in reducing the larval populations. The groundnut pod yield was also significantly increased.

(2335 kg /ha) over untreated check (1625 kg /ha) and was on par with chlorpyrifos treated plots (2390 kg /ha). The cost benefit ratio was 1.00 : 3.97 in NPVs as against 1.00 : 3.83 in chemical treatment.

SESAMUM

Crop Improvement

Promising Cultures

VS 117 : It is an early maturing (70-75 days) culture. It is superior to TMV 3, TMV 4 and Co 4. It is tolerant to powdery mildew registering a grade of 1.8 as against 4.5 for TMV 3. It has profusely branching habit with brownish yellow seed coat. This culture is being tested in ART.

VS 339 : It is a high yielding culture derived from the cross TMV 4 x No. 45. It has a duration of 85-90 days. This culture recorded 440 kg /ha during Kharif in the MLT which was 26 per cent and 8 per cent more than TMV 3 and Co 1 respectively. It is profusely branching. It has been promoted to ART.

VS 350 : It is an early maturing type and is a selection from Thirukkattupalli local. It matures in 70-75 days. In the MLT conducted during summer 1992, it has registered an average seed yield of 404 kg /ha which is on par with TMV 4 and Co 1. The plant type is compact with basal branching. It has 47.5 per cent oil.

VS 9003 : It is a high yielding type and is a selection from a natural cross between SO 355 and an unknown pollinator parent. It matures in 85-90 days. This culture yielded 637 kg /ha during Kharif season which is 50% higher than the checks TMV 3 and Co 1. During rabi season it has recorded a mean yield of 594 kg /ha as against 430 and 464 kg /ha of TMV 3 and Co 1 respectively. It is a profusely branching type with black seed coat.

Crop Management

In North-Western Zone, sesame is sown 3 or 4 days after irrigation and then next irrigation is given on 20th day. To develop weed management practice for this condition, on-farm trials were conducted in farmers' holdings in North-Western zone during summer 1992 with alachlor and the result showed that application of alachlor at 1.25 kg ai /ha on 20th day followed by irrigation increased the seed yield by 2.0 q /ha over the conventional weeding with highest marginal rate of return (6.02).

On-farm trials conducted in North Eastern zone for standardising the method of sowing in sesame revealed that sowing the seeds through centrifugal seed broadcaster and thinning to 19 plants/m² increased the mean seed yield by 31% (134 kg/ha) over broadcasting with farmer's method (428 kg/ha).

Crop Protection

Studies on the management of root rot of sesamum revealed that seed treatment with *Trichoderma* effectively controlled the root rot disease (4.3%) and increased the yield to 824 kg/ha compared to 16.2% disease incidence and a yield of 720 kg/ha in untreated control.

A field experiment on the management of sesamum phyllody was laid out during the summer season rice fallows using TMV 6 sesamum as test variety at Kilikulam. Among several treatments neem oil and pinnai oil at 2.0% spray recorded the least disease incidence (10.8 - 12.9%) and increased the yield (152 - 211 kg/ha) compared to control which registered 28.9% disease incidence and 126 kg/ha yield.

SUNFLOWER

Crop Improvement

Promising Cultures

In the MLT conducted over three locations, three hybrids 85151 (2A x Co 2), 85144 (2A x EC 68414 - 10 KR) and 85131 (1A x Co 2) gave the mean hectare yield of 1785, 1671 and 1559 kg respectively.

TNAU SUF 7 (Dwarf x Surya): This promising culture has recorded a mean yield of 1266 kg/ha in All India Co-ordinated Advanced Varietal Trial as against the yield of 1219 kg/ha by the variety Co 2.

Crop Management

Field experiments conducted on sunflower (Co 2) under rainfed condition at Coimbatore with three graded levels of NPK revealed that though NPK at 50 : 40 : 40 recorded high seed yield for all the three years, NPK at 50 : 20 : 20 kg/ha registered high net return of Rs. 3475 with B:C ratio of 2.22. NPK at 50 : 20 : 20 kg/ha increased the grain yield by 11.6% and net return by Rs. 930 ha over recommended NPK at 40 : 20 : 20 kg/ha.

Studies at Bavanisagar showed that based on percentage of seed recovery, 100 seed weight, germination per cent and seedling vigour, a sieve size of 2.7 mm was found to be the optimum size for grading Morden sunflower seed.

Studies on optimum planting methods and polination systems for BSH 1 Hybrid seed production conducted at Bavanisagar showed that hand pollination was found to be better than natural pollination in terms of yield and benefit cost ratio. Among the ratios of female to male, 4 : 1 was found to be better than the rest.

Studies conducted to evaluate the time of sowing on the seed yield and quality of sunflower hybrids at Bhavanisagar revealed that the performance of MSFM-17 was better than BSH 1 in all the parameters studied except oil content in which BSH 1 was found to possess 35.2 per cent and in MSFH-17 it was estimated to be 34.3 per cent. Highest yield was registered under June 1st and December 15th sowings in both the seasons and the yield decreased linearly as the days passed on. Marked difference in the oil content due to different sowing dates was observed and oil content was highest in the earlier sowing in both the seasons. To exploit the real potentiality of hybrids, the correct date of sowing can be fixed as 1st June during Kharif and 15th of December during winter for Periyar district.

Experiment conducted during summer and Kharif 1992 in Bhavanisagar revealed that foliar application of borax at 0.2% concentration at ray floret initiation stage increased the seed yield of sunflower (BSH 1) by 208 kg/ha over control. This treatment recorded the highest B : C ratio of 1.42.

Crop Protection

Trichoderma seed treatment @ 4 g/kg of seed and carbendazim @ 2 g/kg of seed reduced the charcoal rot disease incidence besides increasing the yield of sunflower by 45 per cent over control.

CASTOR

Crop Improvement

Promising cultures

TVC 11 (Aruna x HO 4) : This culture matures in 120 - 150 days and it is under testing in ART along with TMV 2 and TMV 5. The results received so far showed that TVC 11 out yielded both TMV 5 and TMV 2 in eight locations under both pure crop and intercrop situations. It will be proposed for release.

TVC 31 : This is a medium duration culture maturing in 180 days. In the multilocation trials, it recorded 707 kg/ha registering 20.6% increase over TMV 5. It will be nominated for ART for Salem and Dharmapuri districts.

TVC 15 : It is an early maturing culture (120 - 150 days). In the MLT conducted during 1991 - 92 it recorded 840 kg/ha which was 43.3% higher than TMV 5.

Crop Management

Experiment conducted in Bhavanisagar indicated that the optimum ratio of female and male parents to have a maximum yield of quality seed was 3 : 1 which

recorded the seed yield of 810 kg/ha. The high yield was primarily due to increased number of capsules per inflorescence and 100 seed weight.

COCONUT

Crop Improvement

Promising cultures

Vettaikaran Iruppu: A new land race (Tall ecotype) namely Vettaikaran Iruppu of Velankanni, noted for high copra yield and drought tolerance was identified and added to the gene pool.

Malaysian Orange Dwarf: This was obtained from Ettankulam, Tirunelveli Kattabomman district. It is a high yielding type which is under evaluation.

Crop Improvement

Intercropping studies conducted at Veppankulam, indicated that cultivating yam, (*Typhonium trilobatum*) in 23 year old coconut garden (spaced 7.5m x 7.5m) produced 3.5 t/ha of corm with a net profit of Rs. 800/ha. Maintaining NB 21 grass in 25 year old coconut produced 7 t of grass/ha without affecting coconut yield. Other studies indicated that guava and acid lime are not suitable as intercrops in coconut as they failed to give any monetary advantage over sole coconut.

Crop Protection

The mixture of either neem seed powder + sand (1 : 2) @ 150 g per palm or neem seed kernel powder + sand (1 : 2) @ 150 g per palm applied in the base of 3 inner most leaves in the crown, effectively controlled the damage of rhinoceros beetle in coconut. It is equal in efficacy to the application of the conventional method of application of HCH 10% + sand (1 : 1) in the crown. The cost of treatment is considerably less than the conventional method. The locally available cheaper plant product viz., the neem seed can be well utilised for control of the rhinoceros beetle in coconut palm by the coconut growers.

COTTON

Crop Improvement

Variety released

K 11: Karunganni cotton culture TKA 188, a double cross hybrid derivative (0794 - 1 - D/H 876 / 0794 - 1 - D / H450) has been released as K 11. Its duration is 130 - 135 days. It has recorded an average yield of 1208 kg/ha in station trials as compared to 937 kg/ha in K 10 accounting for an increase of 20%. It is a medium staple cotton variety with better fibre properties and tolerance to pests than K 10. It is suitable for spinning 30s counts.

Promising cultures

TCH 1002 This promising culture has been evaluated under ART in 24 locations during summer irrigated season 1992. This culture gave an average yield of 12.3 q/ha which shows an increase of 10.0% over MCU 7 and 13.0% over SVPR. 1. This will be evaluated in 35 locations under ART for confirmation of its earlier performance.

HLS 69 and HLS 72 These two cultures were received from AICCRIP centres. They are high yielders combined with good quality parameters such as fibre length and microspinning. The duration of these cultures was 150 - 160 days. The average seed cotton yield of HLS 69 and HLS 72 is 1126 kg/ha and 1025 kg/ha as compared to 859 kg/ha and 970 kg/ha in MCU 5 and LRA 5166 respectively.

Crop Management

Experiments conducted during winter seasons of 1991 - 92 and 1992 - 93 at Coimbatore to study the effect of advance sowing of grain legumes in cotton under relay intercropping compared to simultaneous intercropping with grain legumes viz., blackgram (Co 3), greengram (Co 3), cowpea (Co 4) and soybean (Co 1) revealed that in advance sowing, cowpea and soybean significantly reduced the yield of cotton, whereas in simultaneous sowing, except greengram, all other intercrops reduced the yield markedly. Advance sowing of soybean and greengram 20 days before sowing of cotton in winter season increased the net return by Rs. 1900 and Rs. 1350/ha respectively over simultaneous sowing of soybean and greengram in cotton.

To study the effect of no tillage and seed row tillage on the yield of summer rice fallow cotton, field experiments were conducted at Srivilliputhur during summer seasons of 1987, 1988 and 1991 and OFT during 1992 in Kamarajar district. The results revealed that seed row tillage immediately after rice harvest increased the kapas yield of rice fallow cotton by 15.8% over the existing practice of zero tillage immediately after rice harvest. Similarly in OFT in Kamarajar district, 10% increase in kapas yield was recorded by the same treatment. Zero tillage and ploughing 20 days after rice harvest reduced the cotton yield by 14 and 16% respectively over the existing practice.

In rainfed cotton application of 20 kg K₂O/ha as basal along with 40 kg N and 20 kg P₂O₅ has recorded significantly high yield of 639 kg/ha as against 312 kg/ha without potassium application in vertisols over 3 years at Kovilpatti. Application of 20 kg K₂O/ha besides increasing the yield of cotton enhanced the uptake of N and P. Hence, 20 kg potassium can be recommended for increasing the yield of rainfed cotton along with recommended dose of 40 kg N + 20 kg P₂O₅/ha.

Studies conducted at Coimbatore have shown that mepiquat chloride foliar spray @ 125 ppm during flowering stage in cotton increased the seed cotton yield by 34% over unsprayed control with cost benefit ratio of 1.0 : 4.7.

Action threshold for management of bollworm, *H. armigera* was fixed under field situations at Coimbatore. Different threshold levels of egg(s) and larval populations were maintained by monitoring the plots at weekly intervals. Data indicated that protecting the crop with threshold of one egg per plant or one to two larvae per plant recorded maximum seed cotton yield. The crop required 3 to 4 sprays with insecticides even at these threshold levels. IPM field demonstrations were conducted in 2 locations in Kharif 1991 in Komangalam (Location I) and Annur (Location II). Three treatments namely IPM plot, Farmers' plot and an untreated check were compared. The IPM plot received the following components

- a. Three rounds of NPV of *Heliothis* at 450 LE + endosulfan 350 g a.i. + crude sugar 2.5 kg + cotton seed kernel 250 g/ha.
- b. Pheromone trap
- c. Mechanical collection of larvae
- d. Three releases each of *Chrysopa* at 1 lakh instar larvae/hectare and *Trichogramma* 1 lakh parasitoids/ha and
- e. Two rounds of insecticides + neem oil.

The farmer's plot received 13 rounds of insecticides. The untreated check received no insecticides and no biocontrol agents.

The incidence, percentage damage by *Heliothis* sucking pests and yield were recorded. The seed cotton yield increase was 1150 kg/ha in IPM plot over absolute control plot and 150 kg/ha over farmer's plot.

Field experiment on MCU 5 cotton in a Farmer's field during the summer season of 1992 showed that ULV application of NPV @ 450 LE/ha + 10% cotton seed kernel extract + 10% crude sugar + 0.1% tinopal + 0.1% teepol gave good control of *Heliothis armigera* and increased the kapas yield with a cost benefit ratio of 1.00 : 3.01.

A new organophosphorus insecticide, pyraclofos (50 EC) was found effective against *Thrips tabaci*, the leaf hopper, *Amrasca biguttula* and bollworms of cotton. Spraying pyraclofos at 750 g ai/ha compared favourably with the current recommendation of monocrotophos 450 g ai/ha, carbaryl 1250 g ai/ha and fenvalerate 75 g ai/ha and this insecticide also gave the highest yield.

SUGARCANE

Crop Improvement

Variety released

CoG 93076 : The clone G 84056 was released for general cultivation in Tamil Nadu as CoG 93076 for mid and late seasons. It is superior to Co 6304 and

Co 8362 in cane yield and quality, besides possessing moderate resistance to red rot. In the plant crop, it has recorded higher cane yield and sugar yield than the ruling variety Co 6304 by 13.0% and 16.4% respectively. In the ratoon crop also, it has recorded 7.5% and 14.2% higher cane and sugar yields over Co 6304.

Co 8208: It is a high yielder with erect medium thick cane. It is moderately resistant to red rot and an ideal variety to replace CoC 671. It has a duration of 330 days. It is capable of giving an average yield of 1366/ha in the plant crop and 147 t/ha in the ratoon crop. It is suited for the entire Tamil Nadu.

Promising cultures

C 87335: The clone C 87335 is promising in the mid/late group, excelling Co 6304 both in cane yield and juice quality. This clone recorded significantly high cane yield, CCS and sugar yield of 130.30 t/ha, 12.12% and 15.76 t/ha respectively, as compared to the check Co 6304 which recorded 119.5 t/ha of cane yield, 10.4% CCS and 12.4 t/ha of sugar yield. This clone has been advanced to CAE trials.

SI 86018, SI 86075 and SI 86242: These three early promising clones were identified at Sirugamani. They are now being tested under CAE in 33 sugar factory zones.

G89069: This promising culture is suited to early season. It has recorded the highest cane yield of 158.0 t/ha and 19.5 t sugar yield/ha as against 140 t cane yield and 17.1 t sugar yield/ha recorded by the standard variety CoC 771, accounting for 12.8% and 14.0% increase in cane yield and sugar yield over the standard CoC 771.

G 88019: It is suited for mid-late season. It has registered 14.7% increase in cane yield, 20.7% increase in sugar yield and 19.0% increase in jaggery yield over the standard Co 6304.

C 88064: This clone has been identified at Cuddalore. It has recorded significantly high cane yield, CCS and sugar yield of 124.7 t/ha, 12.9% and 16.1 t/ha respectively as compared to the check Co 6304 which recorded only 116.5 t/ha of cane yield, 11.9% CCS and 13.8 t of sugar yield/ha.

Crop Management

Field experiments conducted in sandy loam soils in Cuddalore to study the effect of late application of N on yield and quality of plant and ratoon crops of sugarcane varieties, CoC 85061 and CoC 86062 during 1988-89 and 1989-90 and CoC 85061, CoC 92061 and CoC 671 during 1990-91 and 1991-92 with four different times of N application revealed that time of N application increased the cane yield of plant crop only in both the years. The sugar yield of plant crop, cane yield and sugar yield of ratoon crop were not influenced by the time of application.

Application of N beyond 135 days reduced the cane yield and CCS%. Application of N in three splits viz., 45, 90 and 135 days increased mean cane yield by 11.4 t/ha and sugar yield by 1.27 t/ha over the existing recommendation of N application at 30, 60 and 90 days in the plant crop. For plant crop, application of N at 45, 90 and 135 days after planting can be recommended and for ratoon crop, the existing recommendation can be followed for high cane and sugar yield.

Field experiments conducted at Sirugamani to evaluate the performance of sugarcane cultivars viz., CoC 671, CoC 85061 and CoSi 86071 with four different soil amendments under Uyyakondan canal polluted soils revealed that among the varieties, CoSi 86071 recorded the highest cane yield of 113.3 t/ha and was superior to CoC 671 and CoC 85061. The difference in CCS% between varieties was not significant. Application of coir pith at 10 t/ha increased the cane yield by 21.9% and 13.1% over control and press mud application. Similarly sugar yield was increased by 2.41 t/ha and 1.34 t/ha over control and press mud application. Daincha at 10 t/ha was also equally good in increasing the cane and sugar yield compared to control and press mud application. Hence, application/incorporation of coir pith at 10 t/ha or daincha at 10 t/ha can be recommended as soil amendment for increasing the yield of cane under Uyyakondan canal polluted soil conditions.

Experiments conducted at Melalathur with four varieties viz., CoC 671, CoC 85091, Co 6304 and CoC 8201 and five times of harvest viz., 8th, 9th, 10th, 11th and 12th month after planting to evaluate the varieties for jaggery yield and also to fix optimum time of harvest for high jaggery yield revealed that Co 6304 and CoC 85061 recorded high mean jaggery yield of 11.63 and 11.4 t/ha respectively and were superior to CoC 671 and CoC 8201. With regard to time of harvest, harvesting the cane at 12th month recorded high CCS%, jaggery recovery % and jaggery yield and was on par with 11th month harvest. Hence, harvesting the cane between 11 and 12 month is optimum for getting high cane yield, CCS%, jaggery recovery % and jaggery yield.

Experiment conducted at Sirugamani revealed that raising one row of soybean along the sets in the furrow registered higher seed yield of 875 kg/ha besides increasing the cane yield by 2.5 t/ha, as compared to one row of soybean in the middle of the ridge.

Acetobacter diazotrophicus was isolated and tested for its nitrogen fixing capacity with standard *Azospirillum* strain (AZ 204). The result indicated that N₂ fixed by *Acetobacter diazotrophicus* strain SI 7 was 20.6% more than AZ 204 strain under laboratory conditions.

Crop Protection

Field experiments conducted with different strains have indicated that sett treatment with triademefon 0.05% or carbendazim 0.05% followed by foliar spray after 30 days of planting with triademefon 0.05% effectively controlled sugarcane smut disease.

Field experiments conducted to study the effect of acaricides and insecticides on the sugarcane sheath mite, *Aceria sacchari* showed that sprays of dicofol 0.05%, endosulfan 0.07%, dimethoate 0.06%, methyl demeton 0.1%, phosalone 1% wettable sulphur 0.02%, ethion 0.1% and monocrotophos 0.05% were promising.

Among the six intercrops tried viz., blackgram, greengram, cowpea, onion, sunhemp and soybean in comparison with trash mulching showed that greengram reduced the damage by the shoot borer considerably. However, trash mulching was better than all the intercrops in reducing the shoot borer damage.

TOBACCO

Crop Management

The results of the field experiments conducted during 1990-91 and 1991-92 at Bhavanisagar for evolving a viable tobacco based intensive cropping system for Lower Bhavani Project Command Area revealed that finger millet + sunflower (border crop) - tobacco + onion - sorghum + cowpea sequence grown during kharif, rabi and summer respectively was found highly profitable with a net return of Rs. 33,484 and Rs. 25,078/ha with B-C ratio of 2.78 and 2.41 during 1990-91 and 1991-92 respectively. Onion and coriander (greens) were found to be the most suitable intercrops in tobacco resulting in an additional income of about Rs. 3000/ha without any reduction in tobacco yield.

Field experiments conducted during 1990-1992 at Bhavanisagar revealed that seedling dipping and soil inoculation of *Azospirillum* with 75% of recommended N increased the cured leaf yield by 660 kg/ha and 630 kg/ha over 100% recommended N during 1990-91 and 1991-92 respectively. Thus, there is a saving of 25% of recommended N to tobacco by seedling dipping and soil inoculation of *Azospirillum*.

MULBERRY

Crop Management

Forty nine *Azospirillum* strains were screened for the nitrogen fixation and IAA production. AZP 1 and AZP 2 recorded the maximum nitrogen fixation of 33.7 and 32.5 mg of nitrogen per g of malate respectively. A field experiment was conducted to find out the influence of AZP 2 along with standard isolates of SP 7 in mulberry (Var S54) at Salem. The result revealed that AZP 2 increased the leaf weight by 72 per cent over uninoculated control and 48.8 per cent over the *Azospirillum* strain SP 7.

Studies have indicated that two sprays of 2-3, 4 chlorophenoxy triethylamine (photosynthogen) 25 g a.i./ha on 40th and 70th days after pruning increased the leaf biomass production (2800 kg/ha) significantly over control. The silk quality in terms of filament length was also favourably increased due to foliar feeding of photosynthogen to the pruned plants.

FORAGE CROPS

Crop Management

Harvesting the fodder crops at 100 per cent flowering stage and hay making by shade drying produced high dry fodder yield at Paiyur. The nutrient contents were high when the crop was cut at 50 per cent flowering and dried under complete shade.

Pure fodder crop was better suited than intercrops for ensiling. Addition of 15 litres of molasses dissolved in 15 liters of water for 1000 kg of green fodder conserved the fodder quality as well as fodder yield with better palatability

BREEDER SEED PRODUCTION

The breeder seed production programme has been formulated based on the consolidated indent received from the Director of Agriculture, which includes the breeder seed requirement of corporate bodies and seedmen. The details of breeder seed production and supply during the year 1992-93 and the programme for the year 1993-94 are furnished below :

Crop	1992 - 93		1993 - 94
	Target (kg)	Supply made (kg)	Target (kg)
Paddy	24,460	14,312	10,130
Millets	128	69	60
Pulses	23,878	15,423	18,660
Oilseeds	1,50,180	69,940	1,10,338
Cotton	46	51	393
Vegetables	33.5	2.37	2.75

CENTRE FOR PLANT MOLECULAR BIOLOGY

RICE

Protoplast culture

Success was achieved in regenerating plants from two indica varieties namely IR 50 and Co 45. The protoplasts were isolated from seed derived calli by following the standard techniques using cellulase (2.5%) and macerozyme (2%). The protoplasts produced microcalli after 28 days. Six plantlets were obtained in the regeneration medium and these plantlets were established in the field. These plantlets flowered between 80 - 90 days and fertility of these plants ranged from

60 - 89%. In Co 45, four month old cell suspensions obtained from seed calli were used for protoplast isolation using cellulase (0.2%) and macerozyme (0.5%) and Pectyase (0.1%) and griselase (2%). After plating microcolonies were observed within 25 days and microcalli formed between 45 - 50 days. Twelve plants were regenerated from these microcalli and these plants were established in the field.

Anther culture

Through anther culture many plantlets were regenerated and they were established in the field. Plants were also regenerated from CMS lines and F₂s obtained from wide crosses and it was observed that regeneration frequency was high in the maintainer line compared to the CMS line.

Two diverse parents namely *O. latifolia* (resistant to yellow stem borer) and Co 43 (susceptible to yellow stem borer) were used for RFLP analysis. Single copy probes of rice were used for detection of polymorphism. Few restriction enzymes corresponding to specific R. 4 clone, which reveals polymorphism were identified.

SORGHUM

Mitochondrial DNA Studies

It was found that protein content of anthers was higher in B lines than A lines (MS 293 A, MS 2077A). The seed protein content was found to be higher than anther protein content in MS 2077A and MS 296A and 'B' lines.

RAGI

Development of salt tolerant lines

The cultivar Co 11 was used for tissue culture studies. The seed callus induction frequency was high (80%) in MS + 2,4-D (2 mg/l) + Kn (0.5 mg/l) + Suc. 3% and a regeneration frequency of 73% was obtained in MS + BAP (2 mg/l) + NAA (0.5 mg/l) + Suc. 3%. *In vitro* flowering was observed in two regenerating plants and seed setting was more than 90%. These seeds were raised in the field and variations observed were screened for economic attributes.

Screening salt tolerant varieties / lines of ragi through cell culture was carried out. The seed callus induction and proliferation were achieved upto 1.4% NaCl on MS + 2,4-D (2.0 mg/l) + Kn (0.5 mg/l). Plantlet regeneration was obtained upto 1.4% NaCl stress on MS + BAP (2.0 mg/l) + IAA (0.5 mg/l) + Sucrose (3%). Seeds were collected from R₂ generations upto 1.4% NaCl stress. But when the seeds were germinated on MS with NaCl and without any growth hormones, the seeds germinated only upto 1.0% NaCl stress. They failed to germinate in high concentration of NaCl. The K⁺ content of leaf was determined for R₁ and R₂ plants. The K⁺ content increased with increasing salt stress.

SESAME

Anther culture

Seventy two genotypes consisting of cultivars, cultures and F.s of *Sesamum indicum* and two wild species were used for anther culture. Anther callus frequency ranged from 10.2 to 70.0%. In hybrids, it ranged from 4.5% to 23.6%. In wild species it ranged from 5.3% to 81.3%. The medium used for callus induction is MS + 2, 4-D (25 mg/l) + Kinetin (1 mg/l) + Sucrose 3%. The calli were tried in various media combination for regeneration. The anther calli of two cultivars TNAU 34 and TNAU 40 and two hybrids namely Corge Borege GA 15 / TMV 5 and DT 9-6-5/P5 x TMV 5 differentiated for nodular meristematic structures and root hairs.

BLACKGRAM

Protoplast culture

Protoplast isolation from seven days old mesophyll cells yielded 3.2×10^6 protoplast per ml. These protoplasts formed microcolonies in the medium containing B 5 + NAA (2 mg/l) + BAP (0.5 mg/l).

GREENGRAM

Among the different explants namely cotyledon, hypocotyl and leaf studied for protoplast culture, leaf responded better than others. The yield of mesophyll cells obtained was 2.2×10^6 protoplasts per ml in V 47 medium.

Three varieties of greengram Paiyur 1, Co 3 and WGG 37 were tested for their regenerability under cotyledon culture. Out of the various media combinations tested MS salts and B5 vitamins supplemented with $5.2 \mu\text{m}$ (1.1 mg/l) of BAP were found to induce maximum regeneration both in Co 3 (62.3%) and in WGG 37 (37.8%). The progenies were found to be dwarf and early maturing with more branches.

NEEM

Different explants such as cotyledon, shoot tip, leaf, stem and bark were used for tissue culture studies. It was found that seed cotyledon and shoot tips were suitable for micropropagation. The best medium for micropropagation of cotyledon was found to be MS + BAP (1.1 mg/l) + CH (200 mg/l) + Sorbitol 1% + Sucrose 2%.

Seedlings were obtained from a single fresh seed cotyledon. This indicates the potentiality for large scale multiplication of identified neem trees through micropropagation.

HORTICULTURE

POMOLOGY

MANGO

Crop Improvement

Four mango plus trees viz. Kal Neelum, Bangalora, Erwado, and Bangalore from Dharmapuri District and Peter from Salem district were identified for multiplication and large scale evaluation.

BANANA

Crop Improvement

Promising culture

A dwarf diploid red banana Senna Chenkkadali (AA) has been identified and compared with triploid red banana (AAA). It has less duration and it is highly suitable for shady situation.

The hybrid 109 (H 110 Matti x Tongat) and cultivars like Poovan (AAB), Co. 1 (AAB), Karpuravalli (AAB), Nendran (AAB), Monthan (ABB), Rasthali (AAB), and Red banana (AAA) were found to have salt tolerance.

Crop Management

The ratoon crop of robusta banana receiving 100 per cent nutrients as that of main crop i.e., 110 g N, 35 g P₂O₅ and 330 g of K₂O has recorded the highest bunch weight of 27.3 kg as against 17.6 kg when 40% of the nutrient was given to the ratoon.

The robusta plant which received 150 g N in combination with Azospirillum has recorded the highest yield of 42.90 t/ha. The quality in terms of T.S.S., reducing sugar, total sugar and acidity were also favourably influenced by Azospirillum treatment. The cost benefit ratio was maximum (2.60) in the treatment with Azospirillum and it was minimum in the treatment without Azospirillum (2.16).

The foliar application of urea at 1% in combination with muriate of potash at 2% to ratoon poovan has increased the yield by 25% over control. The cost benefit ratio was 1.0 : 4.9 due to this treatment compared to 1.00 : 3.24 in the control.

PAPAYA

Crop Improvement

Promising Culture

A new gynodioecious hybrid CP. 81 has been developed by crossing Coorg Honey Dew with CP. 75 (Pusa Delicious x Co 3). It recorded low incidence of stamen carpelldody.

Crop Management

Application of NPK at 50 : 50 : 50 g/plant at bimonthly intervals starting from 4th month of planting recorded highest fruit yield of 110 fruits weighing 202 kg (in 20 months duration) in Co 6 papaya. The papain yield was also highest with 6.3 g papain/fruit.

SAPOTA

Crop Management

In PKM 1 sapota, soaking the seed in IAA at 100 ppm for 24 hours hastened the germination.

ACID LIME

Crop Management

In acid lime seeds, the application of *Glamis mossae* fungi at 2.5 cm below the soil level produced vigorous seedlings at 7 month time with 61.4% VAM colonisation.

GRAPES

Crop Protection

Application of either phorate 10G at 20 g/vine or carbofuran 3 G at 50 g/vine at the time of pruning was effective in reducing the nematode infestation by 53.6 and 40.4 per cent respectively with consequent increase in yield by 30 per cent.

GUAVA

Crop Management

A combination spray containing zinc sulphate, magnesium sulphate and manganese sulphate (0.5%) and also copper sulphate and iron sulphate (0.25%) sprayed at four stages (new flesh, one month after, flowering and fruit set) controlled the bronsing leaf malady and the yield has increased to 50 per cent. The cost benefit ratio was 1.0 : 1.8.

CHERIMOYER

Crop Management

Application of 375 : 200 : 375 g NPK/tree registered highest mean yield of 14.88 kg numbering 33 fruits per tree.

Spraying GA at 100 and 50 ppm concentration resulted in maximum retention and good sized fruits.

JACK

Crop Management

The jack seed viability could be retained at 25% upto 60 days by treating the seeds with charcoal @ 1 : 1 ratio (w/w) and storing at 5°C.

BER

Crop Management

Pruning during February 1st fortnight recorded the highest yield (20.2 kg/tree) followed by February 11nd fortnight and March 1st fortnight.

TAMARIND

Crop Management

The approach grafting recorded the highest success of 80 - 93 per cent followed by air layering (60 - 75 per cent) and soft wood grafting (50 - 62 per cent). The success was high during August to November.

SWEET ORANGE

Crop Management

The little leaf with interveinal chlorosis can be effectively corrected by soil application of 75 g each of ZnSO₄ and MnSO₄ + 5 kg FYM/tree along with three foliar sprays of micronutrient at the concentration of 0.5% ZnSO₄ + 0.5 MnSO₄ and 0.1% urea as a substrate at the interval of 20 days. The cost of treatment was Rs. 7.50/tree. The additional income by this treatment was Rs. 32.50 per tree.

MANDARIN ORANGE

Crop Management

Foliar spray of 0.5 per cent KNO₃ at flowering and fruiting stages increased the fruit number, fruit diameter, fruit density and ascorbic acid content. It has also decreased the titratable acidity of fruit juice to 0.6 per cent. The net profit of Rs. 7930/ha/year was obtained in the treatment.

Crop Protection

Spraying fenthion at 0.5%, or monocrotophos at 0.036 per cent or methyl parathion at 0.05 per cent or phosphomidon at 0.03 per cent gave 100 per cent control against aphids.

PEAR

Crop Management

For bearing pear tree a combination of 800 - 400 - 600 g N, P, K tree year is highly beneficial under upper Pulney conditions.

The top working of country pear using Tail Pear varieties viz. William and Keiffer recorded about 88.9 to 91.8 per cent success.

PLUM

Liming @ 75 g tree/year and application of P at 450 g/tree year were highly beneficial in terms of increased fruit yield upto 15 per cent in plum variety Hale.

FIG

Crop Improvement

Variety Released

Yercaud Timla Fig : It is an introduction. It is drought tolerant. Fruits are borne in bunches throughout the year except during winter months. The fruits are reddish purple in colour and are rich source of Vitamin C (500 mg/100 g). The yield gets stabilised in 5 years after planting. It gives an average yield of 2000 - 3000 fruits/tree. It is suitable to grow in June - July season in plains and hills upto 1500 M elevation.

OLERICULTURE

TOMATO

Crop Improvement

Promising culture

The indeterminate hybrid COTH. 2 has been observed to perform better with high yield of 69.8 t/ha. The average fruit weight is 150 g with a T.S.S. of 3.4 brix. This hybrid is under ART.

Crop Management

For direct sown tomato crop (cv. Co 3 and PKM. 1) the fertilizer schedule of 200, 100 and 50 kg NPK/ha gave the maximum yield both by number and weight.

Crop Protection

Application of carbofuran 3 G @ 1 kg a.i ha in nursery bed at sowing and second application 10 days after transplanting and three sprayings with endosulfan

0.05% at 25, 40 and 55 DAT reduced the TSWV disease incidence by 50 per cent and increased the yield.

BRINJAL

Crop Improvement

Promising cultures

Five accessions EP. 9, EP. 21, EP. 123, EP. 157 and EP. 170 and Annamalai exhibited 100 per cent ratooning ability with high yield.

Crop Management

Irrigating brinjal at 0.8 IW/CPE ratio with application of 150 kg N/ha gave the highest yield of 12.6 t/ha consuming 625 mm of water. Spraying of KCl at 1% concentration during stress condition increased the yield by 38 per cent.

CHILLI

Crop Improvement

Variety Released

PMK 1 : PMK 1 gundu chilli is a hybrid derivative of cross Co 2xlocal. It is suitable for semi dry conditions and yields on an average 2.4 t of dry pod/ha which accounted to 29.43 per cent increase over Co. 2 and 53.24 per cent over local. The fruits contain 0.36 per cent capsaicin.

Crop Management

In local gundu chilli, application of azospirillum in combination with 56 kg N/ha in split doses recorded highest yield.

Chilli with bhendi as inter crop under normal row system recorded the highest gross income of Rs. 29,660/ha.

Crop Protection

Raising two rows of barrier crop of sorghum for every 5 M of chilli crop against wind direction reduced the incidence of chilli mosaic virus.

BHENDI

Crop Management

Raising amaranthus cultivar Co. 1 as mixed crop in bhendi was found to effectively suppress weed growth during first 25 days of bhendi crop. A quantity

of 6053 kg of tender greens was harvested in addition to an increase of 694 kg of bhendi pods per hectare in the mixed cropping.

VEGETABLE LAB LAB

Variety released

Co 1 : It is an early duration variety with a crop duration of 165 days. The crop yields 10.56 to 20.88 tonnes of green pods per hectare with a mean of 17.6 t/ha. Suitable for growing in entire Tamil Nadu during June August season. The pods are dark green in colour, crescent shaped, tender and fleshy.

ONION (Aggregatum)

Crop Management

The seed set at different locations revealed that 79.9 per cent seed set near the sea shore.

BELLARY ONION

Crop Management

The treatments 200:150 and 75 kg NPK/ha recorded the highest mean yield of 16, 241 kg/ha.

CASSAVA

Crop Improvement

Variety Released

Co 3 : It is a clonal selection and yields on an average 42.6 tonnes under irrigated and 27.3 tonnes/ha under rainfed conditions. The variety has a duration of eight months. Tubers contain 35.6% starch and they taste sweet with low HCN content. It possesses field tolerance to Cassava Mosaic Virus. Suitable for growing in entire Tamil Nadu.

Crop Management

In cassava 75 x 75 cm spacing and 75:25:75 kg of NPK/ha were found to be optimum for high yield in short duration varieties.

SEED MORINGA

Crop Improvement

About 30 crosses and 58 open pollinated progenies of PKM 1 moringa were under evaluation. The selections were made for dwarf plant character and long pod (80-90 cm) and high yield (150-200 fruit/tree).

FRENCH BEAN

Promising Culture

The selection PV 88 recorded 45.2% increase in yield over Premier and it is suitable for rainfed cultivation.

POTATO

Crop Protection

Spraying of chlorothalont at 0.75 kg ai/ha thrice at 15 days interval after first appearance of the pest effectively controlled the leaf blight and increased the yield.

GOURDS

Crop Management

The pre-germinated seeds of ash gourd and ribbed gourd have recorded maximum germination and seedling vigour.

WATER MELON

Crop Improvement

Variety Released

PKM 1: It is a high yielder. The fruits are oblong, green with light strips with attractive pink colour flesh. Fruits weigh 3-4 kg. This variety gives an average yield of 38 t/ha which is 39.0% higher over local varieties. It is early in flowering by 10-15 days with favourable flower sex ratio of 1 male : 16 females. It has a duration of 120-135 days. It is suitable to grow in June-October and December-April seasons in the entire Tamil Nadu.

FLORICULTURE

GLADIOLUS

Crop Improvement

Variety Released

KKL 1: It is an improved selection. It yields about 21.1 spike /Sq m. The harvesting can be made 90 days after planting. It out yielded its parents by

18.74 per cent. It has high spike length (16.2 cm) and good keeping quality with a vase life of 12 days. Flowers have attractive red purple colour with white flush in the centre. Suitable for growing during February-March in hill regions with an altitude of 1200-1800 m. Its duration is 145-155 days.

CHRYSANTHEMUM

Crop Improvement

Promising Culture

One accession viz. Red Gold has been forwarded for multilocation trial. It is a high yielder with attractive colour.

ROSE

Crop Improvement

Pre-emergence spray of diuron at 2.5 kg a.i./ha was found to be effective for weed control in rose.

TUBE ROSE

Crop Management

Tube rose can tolerate the salt content upto 8000 ppm of NaCl or 6000 ppm of Ca Cl₂ without much reduction in yield.

CARNATION

Crop Management

The cuttings treated with 500 ppm NAA and 0.025% bavistin gave ideal rooting and establishment.

SPICES, PLANTATION CROPS, MEDICINAL PLANTS AND AROMATIC PLANTS

TURMERIC

Crop Improvement

Promising culture

T.C. 2 (5303-3-3) has given the highest mean yield of 36.5 t/ha. This mutant possesses a curing per cent of 19.2 and a high curcumin content of 4.48%.

PEPPER

Crop Management

Application of N 150, P 50 and K 200 along with Mg So₄ at 25 g per plant increased the yield upto 6.0%.

FENUGREEK

Crop Management

Combined application of rhizobium and azospirillum along with inorganic fertilizers gave good yield and profit. The net profit on account of this treatment worked out to Rs. 2122 / ha.

PALMYRAH

Crop Management

Application of dried leaf mulch @ 30 kg / palm showed high padaneer yield of 76.00 l / palm in 45 days.

BETEL VINE

Spraying of zinc sulphate 0.05% thrice at weekly intervals starting from 10th day after the leaf split resulted in 6.95 per cent increased yield.

HOME SCIENCE

Studies on the formulation of snack foods (cookies and puffed soya) using soybean, their acceptability and nutritive value

Biscuits were prepared with full fat (Co 1) soyflour at 10%, 20%, 30% and 40% levels and it was observed that as the level of soyflour (Co 1) was increased, the crispness of the biscuits increased. Upto 30% level of incorporation, biscuits were found to be acceptable. However, the taste score was found to decrease and a slight beany flavour was observed at 40% level and to mask the beany odour, omum at a concentration of 4%, ginger and mint at a concentration of 20% level were added which produced acceptable biscuits. Storage studies conducted revealed that the biscuits could be stored in rigid plastic containers upto 3 months but the crispness was reduced.

Studies on the formulation of noodles (sevai and idiappam) fortified with soyflour and evaluation of their physicochemical characteristics

Full fat soyflour was used for the preparation of noodles. Noodles were prepared using rice flour, wheat flour and maida flour incorporating with soyflour at 10%, 20%, 30%, 40% and 50% levels. It was observed that incorporation of

soyflour upto 30% level produced acceptable noodles. The optimum conditions are (a) mixing maida flour wheat flour/rice flour with 30% roasted soyflour (120 °C for 1 min) and 2% salt (b) steaming the mixed flour for 5 minutes (c) adding water to make a soft dough (d) pressing the prepared dough with a hand extruder and drying in a cabinet drier for 6 hr at 60 °C. Organoleptic evaluation revealed that maida flour and soyflour combination was better than the rice flour or wheat flour combination from the baking point of view. The noodles prepared with maida flour contained 7.9% moisture and provided 19.25% protein, 2.40% ash and flatus compounds were 3.5 ml of gas/4 ml of broth. Cooking studies of the noodles revealed that 2.0 min of cooking time was sufficient to cook maida/soya noodles.

Studies on the storage stability of defatted and full fat soyflour

An investigation was undertaken to study the keeping quality of both the defatted and whole soyflour during storage in commonly used storage containers like laminated film pouch (LF), rigid plastic containers (PC) and tin containers (TC). The flours were stored in the containers at room temperature conditions (29 °C to 36 °C and R.H 45 to 75%) for a period of four months. There were not much changes in the protein, fat and ash content of the samples at the end of 4 month storage. There was a decrease in the free amino acid, nitrogen and soluble non protein nitrogen content. The trypsin inhibitor activity was very high in full fat soyflour and it was low in defatted soyflour. After 4 months of storage, the trypsin inhibitor activity values did not change much. The flatus values of defatted soyflour and full fat soyflour were initially 1.00 and 4 ml of gas produced per 4 ml of broth. After 4 months of storage the flatus values did not vary very much in defatted soyflour, while in full fat soyflour, the value increased to between 5 and 7 ml of gas. In both the defatted and full fat soyflours, there was a slight decrease in the Protein Dispersibility Index values at the end of 4 months. There was a slight increase in foaming capacity, foam stability, emulsifying capacity and emulsion stability values in both the flours. There was no rancidity development in the defatted flour upto 105 days and in full fat soyflour upto 75 days of storage. The flavour quality of the flours was found acceptable upto 75 days of storage.

Preservation and pickling of coconut

Both the pieces and scrappings of coconut kernels could be preserved as pickle with the addition of salt (10.0 per cent) and acid (2.0 per cent acetic acid). The organoleptic characteristics of the pickle showed higher consumer acceptability after 30 days of storage. The brined coconut kernels could be resalted (from 639.5 to 234.64 mg percent) as well as reacidified (from 0.09 to 0.429 g per cent) by soaking in hot water at 70 °C for 10 minutes. The freshened coconut kernels could be used in the preparation of coconut chutney throughout the storage period of 90 days. There is no change in the organoleptic characteristics like appearance, colour, flavour, taste and overall acceptability. The chutney prepared from coconut kernels soaked in salt and acid solution with and without

antioxidant treatments were both found to be acceptable. Coconut kernel and scrappings could also be preserved as pickles in 10% brines containing 2% acetic acid along with spices (roasted and powdered mustard, funugreek, turmeric and chilli). This could be used directly as pickles.

Drying and dehydration of cucurbits

Bitter gourd and Mithikangai could be dehydrated. Dehydrated bitter gourd samples were rehydrated and bitter gourd poriyal was prepared and organoleptically evaluated. Dehydrated Mithikangai samples were fried in oil and organoleptically evaluated. The results revealed that blanching and sulphiting combination was the best treatment for drying. The rehydration ratio was more in blanched and sulphited sample followed by blanched, sulphited and control samples. Organoleptic evaluation of bitter gourd poriyal showed highly acceptable score and mithikangai vathal showed only acceptable score. Storage studies revealed that control samples of both sun and cabinet drying methods were heavily affected by insect attack at the end of 60 days of storage. The insect identified was drug store beetle.

FORESTRY

SILVICULTURE

Integrated nutrient management in silk cotton nursery

Silk cotton (*Ceiba pentandra*) is gaining popularity as a cash generating tree in the districts of Coimbatore, Dindigul and Madurai. To maximise the quality of seedlings used for outplanting, different inorganic fertilizers and biofertilizers were applied severally and conjointly. Plant height recorded five months after planting the seedlings in the containers brought into focus NPK (both 9:18:9 and 18:36:18) and combined application of NPK (9:18:9) plus biofertilizers to maximise seedling growth. But supplemental biofertilizer application yielded no additional benefit. From an economic standpoint it was found that application of NPK alone at a rate of 9:18:9 kg ha⁻¹ gave the desired results.

Integrated nutrient management in plantations of *Eucalyptus cameldulensis*

The yield of *Eucalyptus* plantation under the Tamil Nadu Forest Plantation corporation during the past decade and a half, came down from 36 t/ha⁻¹ to 22 t ha⁻¹. Since soil was considered as one of the contributing factors to this yield reduction, an experiment was initiated to optimise the nutrient management in the species. Various levels of inorganic fertilizers with or without biofertilizers and N₂ - fixing plants were evaluated. One year growth of *E. cameldulensis* indicated that an input of N 100 : P 50 kg/ha is optimal. Supplementation of bio-fertilizers failed to evoke any additional response.

AGROFORESTRY

Effect of intercropping on growth of a few multipurpose trees

Though the effect of trees on arables raised as intercrops is extensively reported, the reciprocal effect of the intercrops on the perennials is a little investigated area. The effect of sorghum and groundnut raised as intercrops on the height growth of four multipurpose trees viz. *Tectona grandis*, *Casuarina equisetifolia*, *Ceiba pentandra* and *Ailanthus excelsa* was therefore assessed two years after planting.

Intercropping had an augmentative effect on the growth of *T. grandis* and *A. excelsa*. Other two species, however were uninfluenced by the the intercrops. The study thus underscores the variable response of multipurpose trees to intercrops raised in their inter-row spaces.

Effect of different planting regimes on fibre yield and quality in *Agave sisalana*

Agave sisalana is an important species yielding hard fibre, a minor forest produce. The species is an ideal plant for wasteland reclamation. But information on its management practices is meagre. Different planting regimes and geometries were therefore evaluated to optimise the same. The leaves were harvested three years after planting and evaluated for yield and quality. Barring yield per unit area, no other character investigated was influenced by planting density or architecture. A planting geometry of (2+1) x 1 m (6600 plants ha⁻¹) recorded the maximum fibre yield and is therefore recommended for the species.

FOREST BIOLOGY

Effect of different rhizobial strains on growth of a few multipurpose trees

The positive effect of biofertilizers in forest trees is increasingly being realised emphasising the need for identifying suitable strains for each tree species. Eight rhizobial strains for *Acacia nilotica* and nine for *A. leucophloea* and *A. planifrons* were evaluated for their suitability. Growth was assessed after three years of planting in *A. nilotica* and *A. leucophloea* but one year after in *A. planifrons*. The results indicated that for *A. nilotica* and *A. planifrons*, the rhizobial strain AMFM 17 was the best. For *A. leucophloea* however, SSM 22 (*Sesbania sesban* from Mettupalayam) proved best.

Effect of inoculation with different *Frankia* strains on the growth of *Casuarina equisetifolia*

The efficacy of 3 different *Frankia* strains was compared with a local source (crushed nodules) on growth of *C. equisetifolia* 16 weeks after inoculation. Compared to the uninoculated control, growth of seedlings was decidedly better under all the inoculated strains. However the magnitude of growth increase was the highest with the strain ORS 021001 from *C. junghuniana*.

Nodulation of mycorrhizal status of *C. equisetifolia* plantation in Tamil Nadu

Plantations aged between 3 and 4 years in 10 different locations in Tamil Nadu were assessed for their nodulation and mycorrhizal status. Marked variation in these attributes was evident among the locations. It is not known whether the levels of nodulation associated with locations like Kattupakkam, Ennore, Tambaram and Madras were the outcome of initial infection of seedlings by populations of *Frankia* that have built up in nurseries over a period of time or from local populations in the area *per se*.

Influence of soil type on oil content in neem

To assess the influence of soil types on oil content in neem, kernels collected from black, red, alluvial, coastal alluvial and lateritic soil types were assayed for oil content. Black soil was characterised by low oil (34.4%). Maximum oil was evident under coastal alluvium (40.0%).

AGRICULTURAL ENGINEERING

Field trials conducted at Coimbatore and Aliyarnagar with ADT 36 paddy seeds exposed between north and south pole of the magnet at 200 gauss for 7 hours indicated that the magnetic treated seeds have enhanced the yield from 5000 to 5229 kg/ha in Coimbatore and from 4500 to 4766 kg/ha in Aliyarnagar.

Studies on drying and preservation of Co 1 oyster mushroom was conducted by sun drying, thin layer drying and fluidised bed drying. The pre-treatments given were (a) blanching and (b) soaking in 0.5, 1.0 and 1.5% potassium metabisulphite (KMS). The temperature of drying was from 40 to 50°C. The average moisture content of fresh mushroom was 91.4% (wb) and dried to 11.0%. By sun drying it took about 9 hours to attain this moisture content whereas it was only 110-120 minutes in thin layer drying and 80-120 minutes in fluidised bed drying. The drying rate was found to be 0.36 to 0.46 g/min, 6.00 to 6.75 g/min and 7.25 to 8.00 g/min in sun drying, thin layer drying and fluidised bed drying respectively. The nutritional qualities such as protein content, carbohydrate, free amino acid and browning index were assessed immediately after one month of storage in polythene bags. No variation was noticed in the protein and carbohydrate contents during storage in all the treatments.

An increase in the free amino acid content was observed which was not significant. But discolouration increased in all the samples irrespective of the treatments and method of drying. The microbial quality of the dried mushroom was assessed from the mass of bacteria, fungi and yeast. The population of all the organisms was high in the case of sun drying. The population of yeast was very much less in fluidised bed drying. Further, drying with pre treatment with KMS had considerably reduced all the organisms. The population of the fungi was not much reduced in the dried samples. Drying of mushroom at 50°C for 80-120 minutes in

fluidised bed drying resulted in a lower browning index. Treatments with KMS and blanching improved the colour in drying except sun drying.

Tractor drawn broad bed former cum seeder was evaluated in black soils in Aruppukottai region for moisture conservation and sowing efficiency. Its performance was compared with four types of conventional sowing methods namely sowing behind country plough, dibbling, broad casting and gorru sowing. Trials were conducted for two years using cotton (LRA 5166) with blackgram (TMV 1) as intercrop. A plant population of 8.3 plants/m² in cotton and 12.8 plants/m² in blackgram had been recorded in fields which were sown using broad bed former cum seeder whereas wide variation in plant population was observed in other methods. The effect of moisture conservation had been studied indirectly through yield data which showed that tractor drawn broad bed former cum seeder was found to be more useful in black soil regions for moisture conservation and high yields.

Field experiment conducted with cumbu to compare the bullock and tractor power revealed that grain yield was not influenced by tillage treatments. In case of input energy, tillage using bullock power recorded less energy consumption compared to tillage with tractor power.

To study the effect of plastic mulching on soil moisture conservation, field experiment was conducted with bhendi which revealed irrigation at IW/CPE ratio of 0.6 and 0.8 recorded significantly higher yield over 0.4 (depth of irrigation, 5 cm). The black LLDPE mulched plot recorded significantly high yield of 10492 kg/ha, which was 45.8% higher than no mulch plot. Interaction effect showed that irrigating bhendi with 0.8 IW/CPE ratio with LLDPE mulch recorded highest yield (12540 kg/ha).

The following farm machineries / gadgets were developed and released for the benefit of the farming community.

Power Tiller Operated Auger Digger

A power tiller operated auger digger has been developed in the Department of Farm Machinery, Tamil Nadu Agricultural University for use in tree saplings plantation programme. The digger unit is a standard equipment which can be mounted to a power tiller with slight modifications in hitching.

Salient features

Easy to transport and simple to operate with two operators. It can dig holes of 75 cm diameter upto a depth of 45 cm. 35-40 holes can be dug in one hour. Cost of auger attachment is Rs. 5000/-.

Biogas Baloon

A biogas baloon has been designed and developed in the department of Bio-energy, Tamil Nadu Agricultural University in collaboration with S.R.F., Trichirappalli to utilize excess gas productivity.

Salient features

Storage capacity is 2 m³. It can be used to run 5 H.P. engine for an hour with the diesel saving up to 80%. Cost is Rs. 4,500 /unit.

Adhesive from tamarind kernel powder

The isolated protein in the tamarind kernel has been suggested as an adhesive. Therefore production of adhesives from the tamarind kernel powder is formulated by Tamil Nadu Agricultural University, Coimbatore.

Procedure

Tamarind seeds are cleaned, dried, roasted (110 C for 15 mts) and allowed for shelling to remove testa from the kernel. The roasted kernels are powdered, sieved (180 mesh) and made as porridge. Then it is mixed with hot water 200%, Glucose 5%, Formalin 5% and Sodium Carbonate 12% by weight to get tamarind kernel powder adhesive.

Special qualities

The adhesive prepared by the above said process has good strength qualities as that of available commercial product. The cost of production of adhesive is only Rs. 20/kg.

Stored Grain Insect Trap

The trap made of plastic material consists of three important parts namely main tube, insect trapping tube and a detachable cone at the bottom of the main tube. In the main tube, there are equispaced perforations of 2 mm diameter at the top 6 cm length. The insect collection tube is blended with a funnel arrangement at the top to facilitate trapping of insect and prevent their escape. In order to collect the insect trapped, a small plastic cork is provided in the trapping tube at the bottom. To facilitate insertion of the trap into the grain a removable cone is provided at the bottom of the main tube.

The insects which can be successfully trapped using this trap are rice weevil, red flour beetle, lesser grain borer, saw toothed beetle and flat grain beetle.

AGRICULTURAL AND RURAL DEVELOPMENT STUDIES

Economic feasibility of soybean cultivation in Coimbatore and Periyar Districts

In Thookkanaickenpalayam block of Periyar District soybean is raised mostly under gardenland conditions as pure and mixed crop. As a pure crop soybean was found to compete with maize, blackgram, greengram, cowpea and onion. The cost of cultivation of soybean per hectare was found to be higher than that of blackgram, greengram and cowpea but lower than that of maize and onion. Net return was the highest in maize (Rs. 15627) followed by onion (Rs. 9654), blackgram, greengram, cowpea and soybean giving a net return of Rs. 5291, Rs. 3368, Rs. 3308 and Rs. 2464 respectively. Soybean was found to be the best intercrop in sugarcane, yielding a net profit of Rs. 9778 taking into consideration the increased cane yield in ratoon crop. But soybean could not replace onion in turmeric since it yielded only a net revenue of Rs. 2239 compared to Rs. 6121 through onion.

In soybean, 36.37% of yield gap was found to account for lag in transfer of technology and 10.36% for deficiency in adoption of technology emphasising the need for strengthening extension efforts. Support price policy appeared to have favoured groundnut in preference to soybean. Export potential and farm factory interaction could promote the area expansion under soybean.

Farm size, productivity and allocation efficiency in Tamil Nadu Agriculture

In Tamil Nadu, the principal crops like rice, sugarcane and groundnut were adequately represented only in six zones. Hence, 230 samples were selected with varying sizes and cropping viz., 145 in rice, 60 in groundnut and 25 in sugarcane. Distribution pattern of operational holdings revealed the existence of skewed distribution of land in the state. About 57.82 per cent of the sample farms were operated with above 2 ha size and 42.18 per cent operate with less than 2 ha size. The average size of the farm under each category of Group I, II and III were 0.46 ha, 1.34 ha and 10.62 ha respectively. The percentage area of grain crops decreased (45%-36%) as the farm size increased.

Labour employed showed a declining trend in rice farms and increasing trend in sugarcane and groundnut farms. Crop yields and returns realised in cropwise and sizewise revealed an inverse relationship of size of holding with the crop yields.

The gross productivity was found to be Rs. 15,535, Rs. 11,613, and Rs. 4,454 for rice, sugarcane and groundnut in respect of land resource; Rs. 110, Rs. 131 and Rs. 71 for rice, sugarcane and groundnut in respect of labour resource; and Rs. 2.60, Rs. 2.79 and Rs. 1.62 for rice, sugarcane and groundnut in respect of capital resource. Inequality in land distribution can be reduced by effective enforcement of land ceiling act, which could reduce the disparity in the distribution of land for equity and productivity. Cropping intensity can be increased by providing the input supply through effective distribution system by identifying the right person at right time along with extension support.

Capital requirement for modernising Indian agriculture

A study on the capital requirement for modernising Indian Agriculture to assess the capital structure of the farm business across farm size and agro-climatic zones revealed that land is the major asset in the farm household with 56 per cent of total value of assets, buildings and non-farm assets each contributing more than 13 per cent whereas machineries / irrigation structures, and livestock showed less than 10 percent. Farm size in the State as well in different zones indicated that fragmentation increased with farm size. Land is the prime asset in farm business. The per hectare value of land was Rs. 75375 for the the State as a whole and value was high in small (Rs. 78042), medium (Rs. 75420) and large farms (Rs. 72662). Among different zones, the land value was high in North Eastern Zone (Rs. 85501) when compared to other zones. Availability of irrigation and nearness to State capital would have attributed for the same. The value of buildings ranks number one among the non-land assets. At the State level, the value of buildings per farm was Rs. 50590 and still high in big farms. The value of irrigation structures was Rs. 31856. Next comes the livestock and machineries and implements whose per farm values are Rs. 12456 and Rs. 12056 respectively. The non-farm assets also appeared to be significant and the value is Rs. 55742 per household. Marked variability exists across zones in investment on building and it was highest in western zone with Rs. 61904. Same was true with machineries and implements. Southern zone ranks first in investment on irrigation structures and livestock. Livestock assets per farm is Rs. 16237. Draught animals form the major component. It is more in southern dry zone (Rs. 3540) than in the other zones. Within milch animals, cows accounted for more than 50 per cent. The share of crossbreeds is more in medium size farms than in the other size groups. Investment on sheep and goat was high in southern dry zone compared to other zones. The poultry population was high in western zone. The number and value of machineries, implements and tools were considerable in big farm holdings compared to other farm groups. Among them investment on electric motors was sizable (55%). Investment on bullock cart is more when compared to other implements.

Decision making in rainfed regions

A study on the decision making involving risk in rainfed regions of Chidambaranar District revealed that in dry land areas, coriander was found to have less risk and hence financial assistance as crop loan may be extended to encourage the poor farmers. Cotton and chillies have not attracted small and marginal farmers because of price and yield risk. Hence insurance coverage may be extended to these crops in drought prone areas. Optimum plan developed for a small farm having 1.7 ha showed that crop mix comprised of sorghum 0.26 ha, cumbu 0.42 ha, cotton 0.43 ha, chillies 0.34 ha, blackgram 0.13 ha and sunflower 0.12 ha will give higher income than the existing condition. In addition maintaining two dairy animals would yield continuous additional income.

Economic analysis of conjunctive use of water in tankfed areas

A study on the economic analysis of conjunctive use of water in a tankfed area - Keelapavoor tank, Tirunelveli - Kattabomman District revealed that the percentage of area under commercial crops was more in farms with conjunctive water sources and hence the water use efficiency was found to be higher in those farms. Among the different crops the water use efficiency was highest in groundnut with Rs. 792 per ha cm followed by cholam with Rs. 564/ha cm. It was lowest in rice with Rs. 60 per ha cm. By optimum allocation of area under different crops i.e. by increasing area under groundnut and vegetables the gross income and water use efficiency could be increased by 8 and 15 per cent, respectively.

Economics of rice production in Tambirabarani Basin

The study on the economics of rice production in Tambirabarani Basin revealed that the gap between potential yield of rice and actual yield at farm level was 2747 kg and 2331 kg per hectare in Kar and Pishanam seasons in the head region whereas in the same season 1606 kg and 1076 kg respectively in tail end area. The reasons for this gap are low adoption of technologies and application of sub-normal doses of the inputs. The cost of production per quintal of rice was Rs. 230/- and Rs. 234/- for Kar and Pishanam rice in head reach whereas it was Rs. 259 and Rs. 273 in tail region. The high cost of production in the tail region is due to low productivity and problem soils.

Social forestry education through awareness campaign, video teaching and direct training to farm women and youth

The pilot project was undertaken by TNAU with the sponsorship and financial assistance of SIDA in Salem and Dindigul Anna districts during 1990-91 and 1991-92. A total of 347 respondents (180 in Salem and 167 in Anna) in both the districts were contacted and data were collected. The salient features are; Majority of respondents involved were young or middle-aged. They had primary or high level education and were small landholders with less social participation. About half of them had contacts with development agencies. Campaigns had created widespread awareness (83%), satisfactory level of knowledge and skill (48%), conviction (76%) and motivate adoption (61%). These campaigns also helped the rural people to have proper perception and understanding of the advantages of growing trees in homesteads, farms and village porambokes ranging from 53 to 78%. The overall results revealed that about one-fifth of respondents have proposed to raise trees either in bunds / fences (19%) or on an area of upto one acre (18%). This was followed by about one-seventh (14%) of them who wanted to raise in about 1.0 to 2.0 acres.

The preferences of tree species as expressed by the respondents are coconuts (29%) followed by Eucalyptus (23%), Ailanthus (23%), Neem (23%), Mango (10%), Lime (19%), Casuarina (14%), Tamarind (14%) etc., in that order.

Campaign had yielded good dividends in respect of understandability (86%), informative nature (80%) and usefulness (74%).

Integrated pest management in rice-achievements and opportunities

The study taken up in Budalur and Thiruvaidaimarudur blocks (Thanjavur and Kumbakonam divisions respectively) of Thanjavur district with one hundred IPM farmers and non-IPM farmers. The data were collected through structured interview schedule and the findings are: Altogether 120 technological units were identified under general and specific IPM technology for selected pests. The IPM and non-IPM farmers were distinctly different in their characteristics. IPM farmers acquired greater awareness on IPM technologies as compared to non-IPM farmers. There was variation in the awareness on cultural, chemical and specific IPM practices for selected pests between IPM and non-IPM farmers.

The IPM farmers had greater information source and utilisation as compared to non-IPM farmers. The IPM farmers identified the pests and predators to a greater extent and possessed better knowledge on IPM technology as compared to non-IPM farmers.

Effectiveness of farm magazines - A component analysis

The findings stress the need for conducting readership survey at regular intervals to obtain first hand data on the readers' needs, interests, preferences and reactions so as to formulate appropriate communication strategy. The contents of the magazines have to be decided based on the readership needs and national policy on agriculture and development. It emphasises the farm magazines to publish balanced coverage of contents which are of informative, readable, season specific, concerned with location specific problems and having high utility value in a palatable manner supported with artistic cover pages of attractive colours and action pictures. The results also hints the need for improvement in the format characteristics of farm magazines besides inclusion of adequate number of attractive, colourful illustrations along with the content to enhance the effectiveness of farm magazines. The various components of farm magazines, if tailored to suit the needs and preferences of the readers, would certainly improve the effectiveness of farm magazines and as a result would stimulate peoples mind and spur them into action.

Farmers' participation in tree cropping

A study conducted in tree cropping revealed that the farmers and farm women did not differ significantly in their perception on the importance of social forestry. The farm youth differed significantly with farmers as well as farm women thus indicating the need for laying much emphasis on the interested farm youth in all the social forestry efforts. The perception was of the following order; for increased amount of rainfall (90%), for leaf manure (80%), for fodder,

shade and economic returns (75% each), for a better eco-system maintenance (65%), for shelter materials (60%), for fuel (50%), for oil, oil cake, seed purpose and making ploughs (40% each) and for home consumption (10%).

The general constraints in adopting social forestry programmes included: high labour cost for digging pits (50%), lack of supplemental irrigation facilities at critical periods (50%), lack of protection for the young seedlings (45%), less subsidies for tree growing (41%), long waiting period to derive income from tree cropping (30%), fear of theft of trees / produce (18%), lack of labour for planting trees (13%), non availability of appropriate tree seedlings in time (8%) etc. The suggestions comprised: availability of labour saving implements for digging pits (50%), provision of credit facilities for improving the supplemental irrigation facilities (50%), creating large scale awareness on the importance of tree cropping further (45%), implementing tree patta scheme (15%), provision of appropriate tree seedlings in time (8%) etc.

First line demonstrations

First line demonstration on oilseeds (groundnut and sunflower) and pulses (greengram) was conducted during Rabi 1991-92 and Kharif 1992-93 at Krishi Vigyan Kendra, Madurai. The results are:

Groundnut: The first line demonstration on irrigated groundnut conducted in 15 ha of land in three locations viz., Melakkal, Pannigundu and Kuppanampatti of Madurai district indicated that the groundnut pod yield was higher in demonstration plots over local check in all locations. This is due to the use of improved high yielding varieties (TMV 7, Co 2 and VRI 2), good quality seeds, seed treatment with biocontrol agent (Trichoderma), rhizobium treatment, maintaining optimum plant density per unit area, nutrient spray and need based plant protection.

Sunflower: The first line demonstration on irrigated sunflower conducted in ten hectare of land in two locations viz., Pannigundu and Kuppanampatti of Madurai district indicated that the demonstration plots recorded higher yield compared to local check in both the locations. This was due to the use of high yielding varieties (Co 2) and hybrids (MANYCO 8 and AH 3425), good quality seeds, seed treatment with Azospirillum, balanced use of fertilizers, maintaining optimum plant density per unit area and need based plant protection.

Greengram: The first line demonstration on green gram conducted in 5 ha of land in Chinnamanur village of Madurai district indicated that greengram yield was increased over local check due to the use of improved variety (KM 2 green gram), seed treatment with biocontrol agent and rhizobium, maintaining optimum plant population, DAP spray during flowering period and need based plant protection.

WATER TECHNOLOGY CENTRE

The experiment to develop suitable agro-techniques for direct seeded lowland rice conducted at Madurai revealed that initial ploughing with Melur plough followed by puddling with tractor mounted cagewheel saved 3.5 cm of water for initial land preparation compared to power tiller puddling. The results also indicated that three hand weeding at 15, 30 and 45 DAS or application of butachlor as pre-emergence spray @ 1.25 kg a.i. ha⁻¹ followed by two hand weeding at 20 and 40 DAS should be adopted for effective weed control.

A study on transplanted lowland rice at Madurai indicated that (i) One summer ploughing followed by puddling may be adopted to reduce the water requirement for initial preparation of the land to the tune of 7.8 cm over no summer ploughing and (ii) Summer ploughing, pre emergence application of butachlor @ 1.25 kg a.i. ha⁻¹ plus hand weeding at 30 DAT and irrigation of 5 cm depth one day after the disappearance of ponded water registered the highest grain yield of 7320 kg ha⁻¹.

Water stress management study on rice at Madurai revealed the beneficial effect of seed hardening with 1% KCl or seed hardening with 500 ppm CCC + foliar spraying with CCC 1000 ppm at active tillering and flowering. The combination of all the three was found to be very effective with irrigation given once in 7 days during kharif season. The irrigation at 7 days ADPW with no chemical gave poor yield of 3390 kg ha⁻¹, whereas all the combination of chemical and irrigation one day ADPW gave the highest yield of 6768 kg ha⁻¹ of grain.

The effect of indigenous inhibitors like neem products and gypsum blended urea was compared with prilled urea on rice under the turn system of irrigation in the delta at Thanjavur. It was found that neem leaf powder blending (1.25 t ha⁻¹) with the basal dose of urea with 5 cm ponding once in 6 days (3 days turn) gave the highest yield of 8078 kg ha⁻¹ with the irrigation water of 80.4 cm. The additional net return was Rs. 896 ha⁻¹.

On farm research trial conducted at Thanjavur on the effect of different degree of water stress on rice in the soils of Vertic-Ustrorepts of Adanur series to find out the package of practices to resist drought indicated that seed soaking in 1% KCl and 3% kaoline spray at 45th, 55th & 65th DAT was effective and recorded highest grain yield of 5520 kg ha⁻¹ which was 22 per cent more than the farmers practice.

An experiment on stress management conducted during late Samba season at Coimbatore with ASD 18 rice revealed that irrigating one day after the disappearance of ponded water gave the highest grain yield of 6150 kg ha⁻¹ in planted as well as direct sown crop. The yield was reduced wherever the duration between two irrigations was extended by more than two and three days. The KCl 1% spray during the stress period mitigated the ill effects of stress.

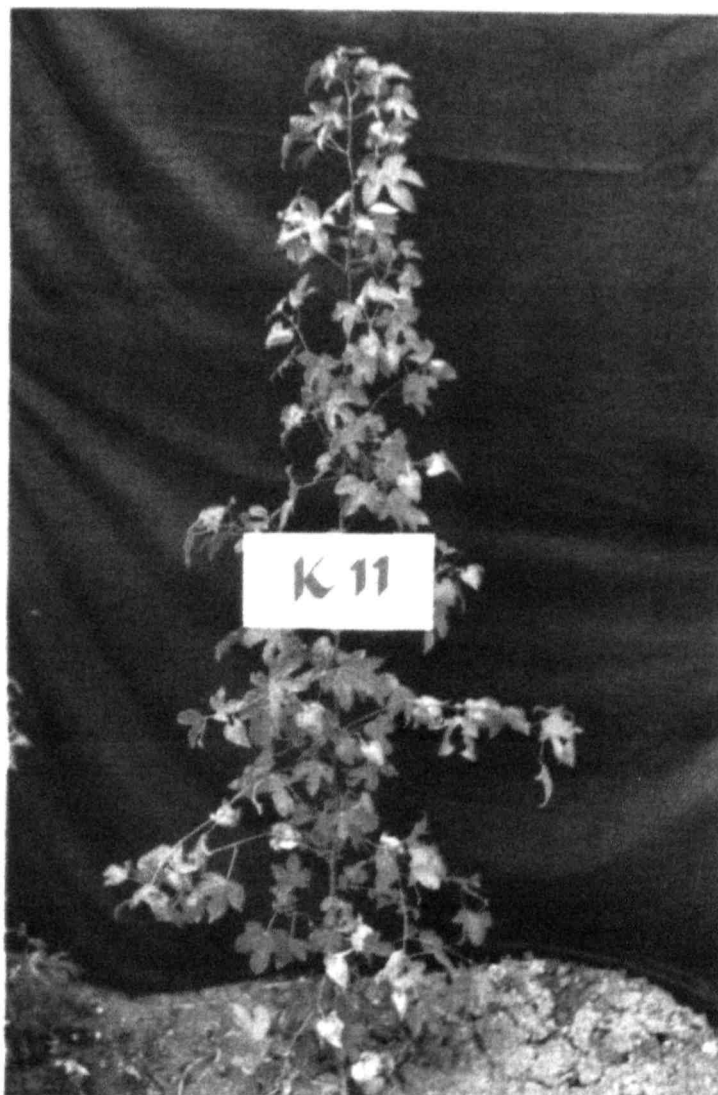


Rice - JJ 92 (ADT 41)



Co 1 DOLICHOS BEAN
கோ 1 பந்தல் சிவரை

Dolichos Bean - Co 1



Cotton - K 11



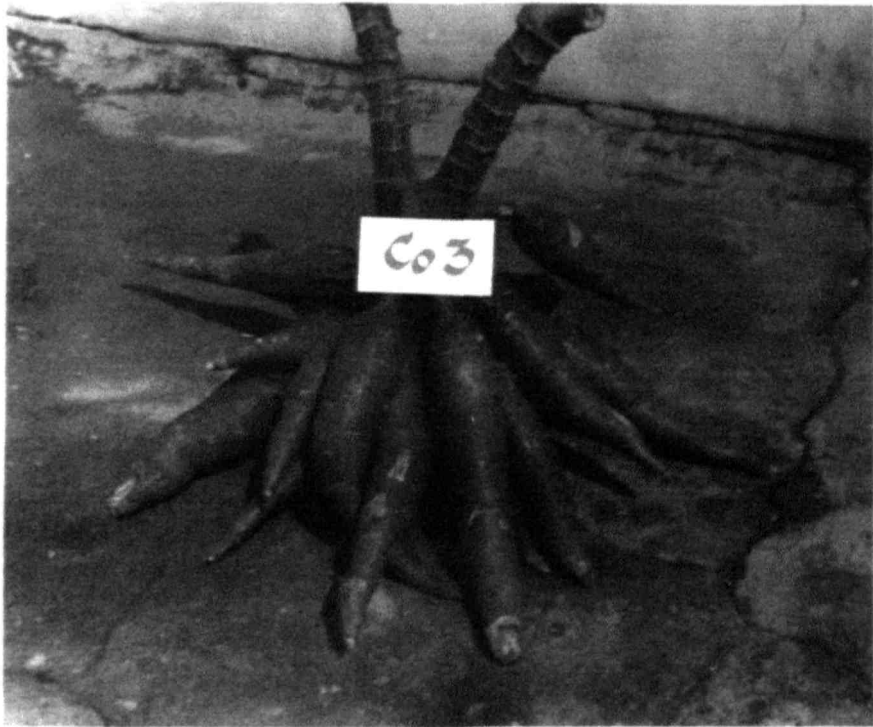
Sugarcane - CoG 93076



Fig - Yercaud Timla Fig



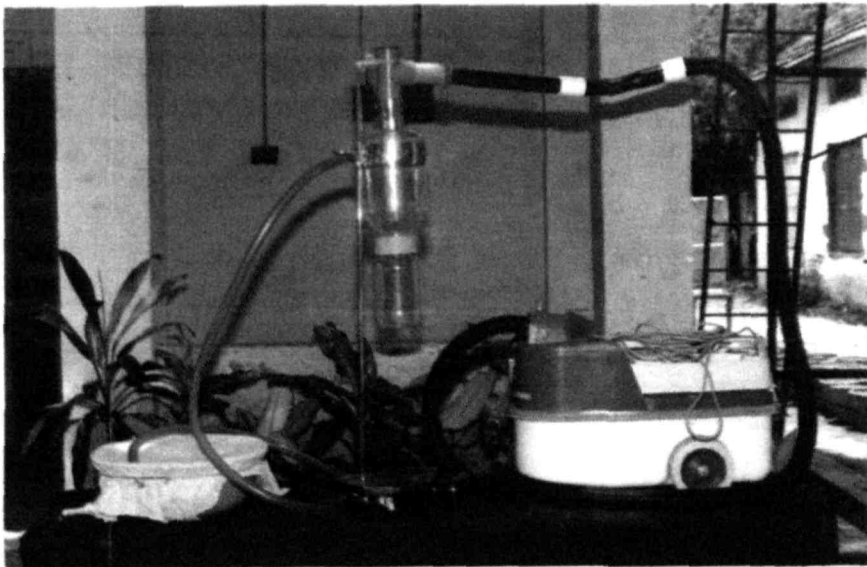
Chilli - PMK 1



Таріока - Co 3



Mass production of biocontrol agents. Dept. of Agri. Entomology
AC and RI, Coimbatore



Corcyra moth collection aspirator



Iron chlorosis in sugarcane - Field inspection
by URC scientists, Namakkal



Goat rearing - a component of integrated farming



Turmeric (BSR 1) as intercrop in coconut.
C.R.S, Veppankulam

The performance of short duration rice varieties as contingency programming for *Samba* season (Oct-Jan) in the PVC area was assessed at Madurai. Four short duration rice varieties namely ADT 36, ADT 37, ASD 18 and TNAU 88013 were compared with IR 20 with four levels of irrigation namely irrigation to 5 cm depth, in 1, 3, 5 and 7 days after DPW. It was found that ADT 36 could be successfully grown instead of IR 20 (medium duration). IR 20 required 105 cm of water to produce a yield of 5491 kg ha⁻¹ whereas ADT 36 gave a yield of 4408 kg ha⁻¹ for 85 cm of water for the treatment of irrigation to 5 cm one day after DPW.

Similar experiment conducted at Bhavanisagar with the short duration rice varieties like ADT 36, ADT 37, ASD 18 and TNAU 88013 compared with ADT 38 (medium duration) showed that among the varieties tested ADT 37 and ADT 38 registered the highest yield of 5195 and 5377 kg ha⁻¹ under the delayed water release condition of the LBP command area and were superior to other varieties.

A study on irrigation requirement in turmeric based cropping system conducted at Bhavanisagar with different irrigation levels and different crops grown with turmeric revealed that 1.05 IW / CPE ratio gave the highest rhizome yield of 16.0 t ha⁻¹ and was on par with the other levels of irrigation except 0.75 IW / CPE ratio. The B/C ratio was highest under 1.05 IW / CPE ratio. Among the several intercrops, onion was found to be more profitable recording a water use efficiency of 10.72 kg ha⁻¹ mm⁻¹ and B-C ratio of 3.15. Other intercrops viz., maize and soybean reduced the turmeric yield appreciably.

5. EXTENSION EDUCATION

The Directorate of Extension Education and the various extension education centres of TNAU are engaged in the transfer of technology emerging from the research programmes of the University. The details regarding the extension education activities of the Directorate of Extension Education are furnished in this chapter.

Krisshi Vigyan Kendras

The five Krisshi Vigyan Kendras at Coimbatore, Madurai, Trichy, Vridhachalam and Kattupakkam conducted on-campus and off-campus training programmes on agriculture and allied activities. About 865 training programmes were conducted and the beneficiaries included 17939 farmers, 6977 farm women, 3094 extension workers, 808 youths and 1807 other categories of personnel. In addition these centres carried out 338 method demonstrations, 15 compact block demonstrations, 94 group / village meetings, 45 farm / field days, 5 farmers' days, 1143 farm advisory services and answered 3430 farmers' queries. Besides these, 93 articles were published in dailies and farm magazines, 90 radio programmes / announcements were broadcast over All India Radio and 15 TV programmes were screened for the benefit of farming community. For reference 55 Extension Literature/Publications were brought out. Slide shows numbering 92 were screened and 62 exhibitions and 50 campaigns were organised as part of their mass media utilisation activity.

Plant Clinic Centres

The scientists of the five plant clinic centres at Vellore, Namakkal, Tirur, Killikulam and Srivilliputhur periodically visited the farmers' holdings, identified pests and diseases problems and suggested suitable remedial measures. These clinics also organised programmes for on-farm testing of pre-release cultures of various crops, management practices and plant protection methods besides undertaking surveillance work for the purpose of forecasting the outbreak of pests and diseases. Evolving prediction formulae for important pests and diseases and conducting case studies were the other activities of the plant clinic centres. The Plant Clinic Centres carried out 91 trainings on integrated pest management and the beneficiaries were 1059 farmers, 190 farm women, 944 extension workers, 84 youths and 5 others. Besides individual and group contacts, 64 skill demonstrations, 69 group/village meetings, 7 farm/field days and 2 farmers' days were conducted. These centres also organised 490 farm advisory services, answered 535

farmers' queries, published 12 articles in dailies and farm magazines, broadcast 35 radio programmes, released 24 publications and organised 19 slide/film shows, 10 exhibitions and 4 campaigns.

Communication Centre

The Communication Centre at Tamil Nadu Agricultural University main campus, Coimbatore disseminated the innovations of the University by various methods. They are in the form of answering 2283 farmers' queries, writing 10 articles in dailies/farm magazines, 31 radio programmes, 109 TV programmes, 15 slide/film shows and 5 exhibitions. Nearly 2000 people visited the central museum and central exhibition and they were benefited. The communication centre also conducted distant learning programmes like farm school on All India Radio and correspondence courses.

Distant Learning Programmes

1. Farm School on All India Radio

During the period under report courses on agriculture and its allied activities, benefited farmers in agricultural economy, environment maintenance oriented agricultural technologies and turmeric cultivation were held. Nearly 568 registered farmers and thousands of other farmers were benefited. One day contact programme was conducted for the courses to give practical training on the subjects concerned by organising skill demonstration, exhibition, group discussion etc.

2. Correspondence Courses

Correspondence courses on sericulture, flower, cotton and pulses cultivation were organised from April to June, 1992. From July to September, 1992 courses on paddy, turmeric, minor millets and seed production were organised. Vegetable cultivation, tractor maintenance, banana cultivation and forage crops were offered during October-December, 1992. Nearly 187 farmers were enrolled and they were benefited. The registered participants were given certificates during the two day contact programmes.

Cassette lessons

Audio cassette lessons on azolla, sathugudi, mango and banana cultivation and kitchen garden were prepared during the period under report. Eighty nine recorded cassettes on coconut cultivation, tapioca, paddy, sericulture, fruits (parts I, II & III), forage crops, turmeric, mushroom, cardamom, pepper and sugarcane cultivation were distributed to the farming community.

Video Production Unit

The Video Production Unit involved in the production of video programmes on agriculture and allied activities in addition to the programmes for telecast

through Doordarshan Kendra, Madras. During the period under report 109 programmes were covered. About 141 video lessons were duplicated and sold. Fifteen video shows were arranged. Further, video coverage was arranged during the important functions of the University.

Training Unit

The training unit of the Directorate of Extension Education conducted 44 training programmes benefiting 761 participants. The participants were extension personnel from State Department of Agriculture, NDDB, Sericulture, bank officials, administrators, defence personnel, scientists of TNAU and housewives.

Periodicals

1. TNAU Newsletter

This is a monthly journal published by the Directorate of Extension Education. Through this the latest research findings and various extension activities were highlighted regularly and sent to all the Agricultural Universities, selected research organisations, development departments and scientists in India and abroad. At present 350 copies are printed and distributed.

2. Valarum Velanmai

This is a Tamil monthly journal of the Directorate of Extension Education having 10,000 subscribers. Efforts are taken to increase the circulation of Valarum Velanmai by enrolling some more life subscribers. During the period under report nearly 1000 life subscribers were enrolled. Special issues on pests of plants, horticulture, sugarcane and forestry were brought out. It published 134, articles covering all aspects of agricultural science.

3. TNAU Seithi Madal

This is a Tamil Monthly Newsletter disseminating the technologies in agriculture and allied subjects relevant to the season, variety and crops among the farming community and other officials of the development departments of the State. This Seithi Madal also carries important aspects such as seasonal and location specific recommendations, new findings, forecasting of pests and diseases, climatic changes and their impact etc. and functions as an effective tool in the transfer of technology. At present 1700 copies are printed and distributed to the Convenors of the Farmers Discussion Groups of Krishi Vigyan Kendras, Farmers' Training Centres and officials of the development departments of the State.

Agricultural Information Service

The regular flow of information is ensured to the extension workers and farmers through the Agricultural Information Service which is functioning at the

main campus. On all Wednesdays timely and need based messages were processed with the help of scientists and disseminated through all mass media. Besides this, this centre also issues daily press notes highlighting the ongoing activities of the University. During the period under report 7000 visitors received information from Agricultural Information Service. Every Wednesday has been identified as the contact day for farmers. Proper/regular counseling was given to the farmers with the help of Heads of Departments and the Directors.

The message processed and sent to various media during the period under report are as follows :

Departments

1. Agronomy	28
2. Soil Science	2
3. Agrl. Entomology	4
4. Plant Pathology	2
5. School of Genetics	1
6. Nematology	3
7. Seed Technology	26
8. Agrl. Engineering	2
9. Information Service	1
10. Forage Crops	1
11. Agrl. Economics	1
12. Sericulture	2
	73

Other activities

Press Notes	120
Engagement column	171
Farmers' queries (in person) answered	2677
Wednesday meetings	34
Replies sent to farmers queries	24

First Line Demonstration

The First line demonstrations on oil seeds and pulses were started in 1990-91 with the grant of ICAR, New Delhi. The objective of the scheme is to establish the potential of improved technology in increasing the productivity of oilseeds and pulses through profitable input management, timely operation, reducing harvesting and post harvesting losses and human drudgery in agricultural operation. The demonstration will be carried out for a period of two years with the same farmers. The demonstrations were organised for the oilseed crops like groundnut,

sesamum, sunflower and soybean and pulses like greengram and blackgram in a block of 5 ha area.

Other Activities

Women in Agriculture Day

Women in Agriculture Day was celebrated by the Krishi Vigyan Kendras of this Directorate. Nearly 850 farm women were benefited. Demonstrations on seed treatment, mushroom cultivation, coconut planting, farm implements, animal husbandry, activated clay treatment, detergent making and pickle making were organised exclusively for farm women.

World Food Day

World Food Day was celebrated on 16.10.1992 by all TOT Centres of this Directorate. Campaigns, seminars, skill demonstrations and group discussions in latest technologies were conducted and also the ways and means for food production were emphasised.

Table I Number of Trainings conducted

Sl. No.	Centre	No of trainings	Beneficiaries (Number)				
			Farmers	Farm women	Extn. workers	Youths	Others
1.	KVK, Coimbatore	263	3309	1105	50	82	125
2.	KVK, Madurai	88	3100	823	467	—	—
3.	KVK, Trichy	96	2964	1261	969	—	418
4.	KVK, Vridhachalam	229	6141	2078	1258	115	219
5.	KVK, Kattupakkam	189	2425	1710	350	611	1045
6.	PCC, Vellore	3	—	—	3	—	—
7.	PCC, Namakkal	20	197	73	60	—	—
8.	PCC, Tirur	7	70	40	439	25	—
9.	PCC, Killikulam	41	245	50	376	—	—
10.	PCC, Srivilliputhur	30	547	27	63	59	5

Table II. Individual : Group contact

Sl. No.	Centre	Demonstrations						Queries answered
		Method	Compact block	Village meetings	Farm / field days	Farmers Day	Farm Advisory services	
1.	KVK., Coimbatore	128	—	30	25	1	62	2320
2.	KVK., Madurai	40	—	23	3	1	60	130
3.	KVK., Trichy	36	1	32	7	1	49	302
4.	KVK., Vrīdhachalam	30	1	9	6	1	588	554
5.	KVK., Kattupakkam	104	13	—	4	1	34	74
6.	PCC., Vellore	2	—	2	—	—	52	33
7.	PCC., Namakkal	24	—	19	1	—	140	53
8.	PCC., Tirur	11	—	16	—	—	152	35
9.	PCC., Killikulam	37	—	21	4	1	114	210
10.	PCC., Srivilliputhur	—	—	11	2	1	32	204
11.	Communication Centre	—	—	—	—	—	—	2283

Table III. Mass Media Utilisation Programme

Sl. No.	Centre	Writing to Dailies & Farm Magazines	Radio pro- grammes	TV pro- grammes	Publications brought out	Slide / film shows	Exhibitions	Campaign / Seminars
1.	KVK., Coimbatore	15	18	12	12	40	10	12
2.	KVK., Madurai	12	5	—	9	13	7	5
3.	KVK., Trichy	11	25	—	1	—	8	13
4.	KVK., Vridhachalam	14	12	1	23	32	17	5
5.	KVK., Kattupakkam	31	30	2	10	7	20	15
6.	PCC., Vellore	—	2	—	1	—	1	—
7.	PCC., Namakkal	3	8	—	3	2	—	3
8.	PCC., Tirur	8	3	4	6	3	—	—
9.	PCC., Killikulam	1	12	—	2	12	7	1
10.	PCC., Srivilliputhur	—	10	—	12	2	2	—
11.	Communication Centre, Coimbatore	10	31	109	31	15	5	—



Release of new crop varieties by Hon'ble Minister for Agriculture Thiru Ku. Pa. Krishnan



Farmers' Day at SWMR, Tirunelveli.



Field Day at TRRI, Aduthurai.



Farmers' Training Camp - K.V.K., Vridhachalam



National Frontline Demonstration on Gingelly.
A.P.C. Koulbatti

APPENDIX - 1
IMPORTANT CIVIL WORKS COMPLETED
1992 - 93

1. Cattle shed-cum-cattle feed room, Killikulam
2. Associate Professor / Professor Quarters, Kodaikanal
3. Recreation Hall, Kumulur
4. Cattle shed, Calf pen, Kumulur
5. Students Hostel, Mettupalayam
6. Seed Godown, Paiyur
7. Vehicle shed, Palur
8. Pump room with RCC slab roof, Periyakulam
9. Vehicle shed, Periyakulam
10. Seed Godown-cum-seed processing shed, Periyakulam
11. Lecture hall room over PH 7 Lab., Periyakulam
12. Students Hostel (B. Sc. Hort.), Kitchen-cum-dining hall, Periyakulam
13. Thrashing floor, Periyakulam
14. Ground level water tank, Srivilliputhur
15. Glass House, Tindivanam
16. Associate Professor Quarters. Veppankulam
17. Laboratory Building, Veppankulam
18. Professor Quarters, Veppankulam
19. Cattle shed, Vridhachalam

20. Associate Professor Quarters, Ambasamudram
21. Office-cum-meeting hall, Ambasamudram
22. Bio-control Lab, Coimbatore
23. Academic Block, Killikulam
24. Ladies Hostel, Killikulam
25. Staff Quarters, Killikulam
26. Kitchen-cum-Dining Hall, Killikulam
27. Farmers Hostel over KVK Building, Killikulam
28. Staff Quarters, Lab and Store shed, Vamban
29. Lab-cum-Office building, Melalathur

APPENDIX - II

LIST OF SCHEMES

University Research Schemes - Plan

	1992-93 Revised Estimate (Rs. in Lakhs)
1. Scheme for starting post-graduate diploma in Plant Protection, Coimbatore	3.97
2. Scheme for the establishment of an advance centre for soil and crop management studies, Coimbatore	2.41
3. Scheme for strengthening of training division in the Directorate of Extension Education, Coimbatore	1.05
4. Scheme for strengthening of Estate Office, Coimbatore	3.09
5. Scheme for starting of M.E. (Ag) in Post-harvest Technology, Coimbatore	0.20
6. Scheme for strengthening of Radiation Research, Coimbatore	2.02
7. Scheme for strengthening the Directorate of Research, Coimbatore	4.07
8. Micro-propagation of horticultural crops, Coimbatore	0.85
9. Development of suitable strains of Azospirillum for commercial crops, Coimbatore	1.31
10. Creation of new Department of Bio-Technology, Coimbatore	2.79
11. Exploitation of hybrid vigour and development of superior hybrids in redgram, Coimbatore	1.28
12. Biological control of soil borne plant pathogens, Coimbatore	0.84
13. Studies on the role of VA-Mycorrhizal fungus in the establishment of P-Nutrition of Agricultural and Plantation Crops, Coimbatore	0.30
14. Establishment of Video-Library, Coimbatore	1.21
15. Water Technology Centre, Coimbatore	18.10
16. Starting of post-graduate programme leading to M. B. M., Coimbatore	3.36
17. Mitochondrial DNA and proteins in cytoplasmic male steriles in Sorghum, Coimbatore	0.87

18. Development of monoclonal antibodies for RTV in rice and CMV and BTV in banana, Coimbatore	1.48
19. Scheme for the selection of grape cultivars for drought and salt tolerance and standardisation of agro-technique, Coimbatore	0.08
20. Scheme for the establishment of a Centre for Sericulture, Coimbatore	3.60
21. Scheme for strengthening post-graduate teaching and research in agricultural marketing management, Coimbatore	1.97
22. Scheme for establishment of an Advance Centre for Studies on Plant Protection, Coimbatore	3.44
23. Management of virus diseases of horticultural crops, Coimbatore	1.14
24. Remote Sensing Unit-Agricultural Applications, Coimbatore	4.19
25. Faculty of Forestry, Coimbatore	5.86
26. Strengthening foliar diagnosis research to alleviate nutritional and physiological disorders in crop plants, Periyakulam	1.80
27. Studies on the improvement and management of sweet oranges, Periyakulam	0.80
28. Studies on the decline in the yield of grape, banana, tomato and brinjal due to nematode and fungus complex, Periyakulam	2.54
29. Horticultural College and Research Institute, Periyakulam	
30. Agricultural College and Research Institute, Kumulur	64.05
31. Survey and management of pests of forests and forage trees, Mettupalayam	0.96
32. Tissue culture technique for forest trees, Mettupalayam	1.55
33. Forest College and Research Institute, Mettupalayam	0.50
34. Agricultural College and Research Institute, Killikulam	1.89
35. Research on dry land horticultural crops in red soil tract, Killikulam	1.89
36. Establishment of Seed Technology Unit, Killikulam	2.75
37. Scheme for strengthening and coordinating rice virus disease and mycoplasma diseases, Madurai	2.33
38. Scheme for development of Seed Technology Unit, Madurai	2.45
39. Establishment of Centre for Nematode Pests of Crop Plants, Madurai	1.89
40. Scheme for improvement of minor tuber crops, Madurai	0.50
41. Studies on processing technology for soya based foods, Madurai	1.01
42. Teaching science and technology to farm women through video cassettes, Madurai	1.10
43. Scheme for strengthening and coordinating rice entomological research, Madurai	3.30

44. Scheme for strengthening of research on chemistry of submerged soils, Aduthurai	1.04
45. Scheme for the production of breeder seed in paddy, Aduthurai	3.12
46. Scheme for commercial exploitation of heterosis in rice, Aduthurai	1.09
47. Evaluation of scented and non-scented rices, Aduthurai	0.84
48. Scheme for the establishment of Regional Research Station, Aruppukottai	9.48
49. Scheme for upgradation of Tamil Nadu Rice Research Institute and Reorganisation of the set up of Directorate of Research, Aduthurai	3.01
50. Studies on seed crop management practices under dryland conditions, Aruppukottai	0.73
51. Scheme for breeder seed increase, Bhavanisagar	4.64
52. Establishment of a seed complex including seed health testing and training, Bhavanisagar, Mettupalayam	2.26
53. Scheme for upgrading the Sugarcane Research Station, Cuddalore	4.46
54. Technology development of wasteland reclamation in coastal area, Cuddalore	3.18
55. Evolving new varieties and technology for higher productivity in Casuarina, Cuddalore	1.55
56. Establishment of laboratory for survey and research on Golden Nematodes of Potatoes, Vijayanagaram, Uthagamandalam	3.30
57. Scheme for investigation on the management of pests and diseases of hill fruit and vegetable crops of the Nilgiris, Uthagamandalam	2.04
58. Studies on drought climatology, Trichirapalli	0.79
59. Sub-project for strengthening the Horticultural Research Station, Thadiyankudisai	7.87
60. Scheme for improvement of groundnut suitable for rainfed areas, Bhavanisagar	1.21
61. Operational research on pests and diseases management in rice, Kattuthottam, Thanjavur	1.59
62. Bio-fertilizer research on forest system in Western Ghats, Kodaikanal	0.94
63. Scheme for evaluation of medium staple cotton for black soil rainfed areas of southern districts, Kovilpatti	1.09
64. Scheme for development of breeder seeds in millets, Kovilpatti	2.36
65. Scheme for vegetable seed production, Palur	2.33
66. Scheme for improvement of brinjal varieties for North and Western Regions of Tamilnadu, Palur	1.23

67.	Scheme for the improvement of chillies in southern districts of Tamil Nadu, Paramakudi	2.99
68.	Mass production and quality control of bio-fertilizers, Paiyur	0.63
69.	Scheme for formulation of improved agro-techniques in grapes suitable for Dharmapuri, Paiyur	1.39
70.	Sub-project for strengthening the Regional Research Station, Paiyur	7.54
71.	Scheme for strengthening of seed production programme, Pattukottai	0.75
72.	NARP Sub-project at Thirupathisaram	1.65
73.	Banana Research Station, Virinjipuram, Vellore	5.24
74.	Scheme for the establishment of Agricultural Research Station, Vellore	4.28
75.	Development of sorghum varieties for various industrial purposes, Vellore	1.59
76.	Causes for button shedding, nut shrinking and ill filling in coconut, Veppankulam	0.92
77.	Scheme for strengthening of coconut research in Thanjavur district, Veppankulam	3.09
78.	National Pulses Research Centre, Vamban	5.48
79.	Scheme for breeder seed production in groundnut, Vamban	1.63
80.	Scheme for strengthening of breeding work in pulses, Pudukottai (Vamban)	1.36
81.	Scheme for research on temperate vegetables at Vijayanagaram, Kodaikanal and Thadiankudisai	2.50
82.	Scheme for strengthening Plant Clinic Centres at Vellore, Tirur, Killikulam, Srivilliputhur and Namakkal	8.58
83.	Scheme for research on improvement of cultivation of Palmyrah Palm, Srivilliputhur and Killikulam	4.31
84.	Scheme for research on intensification of medium staple cotton, Srivilliputhur, Kovilpatti and Aduthurai	4.52
85.	Scheme for research on introduction of new tree species, Coimbatore, Mettupalayam, Vamban and Tirunelveli	2.11
86.	Scheme for popularisation of agricultural implements through Krishi Vigyan Kendras, Coimbatore and Madurai	1.84
87.	Scheme for improvement of forage grasses and legumes and pasture development, Aruppukottai and Paiyur	2.67
88.	Scheme for seed production and seed storage studies on sub-tropical and temperate crops, Periyakulam (Kodaikanal and Thadiyankudisai sub-centres)	1.74

89. Scheme for strengthening of breeder seed programme at Vridhachalam, Tindivanam and Kattupakkam	7.09
90. Scheme for multiplication and distribution of pulses, Vamban, Tindivanam, Coimbatore	7.79
91. National Agricultural Research Project, Cauvery Delta Zone, Aduthurai and Trichirapalli	11.26
92. Sub-project for strengthening Regional Research Station, Vridhachalam, Cuddalore, Tindivanam and Kattupakkam	7.00
93. Sub-project for strengthening Regional Research Station, Aruppukottai, Srivilliputhur and Pudukottai	17.42
94. Scheme for Establishment of Regional Laboratory at Trichirapalli, Paiyur and Yercaud	6.59
95. Krishi Vigyan Kendras, Coimbatore and Madurai	12.86
96. Scheme for starting bio-fertilizer production and quality control unit, Coimbatore and Madurai	2.68
97. Scheme for the development of sugarcane at Madurai (Sirugamani) and Melalathur	1.62
98. Development of extra early rice variety, Aduthurai	0.63
99. Evolving chilli varieties resistant to mosaic and thrips, Killikualam	0.70
100. Programming for diversified production activities for dryland and wasteland, Pudukottai	0.70
101. Creation of a new department of bio-energy, Coimbatore	3.13
102. Molecular diagnosis kit for early detection of bunchytop of banana, Thadiyankudisai	1.25
103. Evaluation of greengram and redgram genotypes for table purpose, Vamban	0.50
104. Setting up a pilot plant for fruits and vegetable based processing industry, Periyakulam	1.80
105. Management practices for bamboo under irrigated conditions, Mettupalayam	0.65
106. Tree improvement in exotic species for wood based industries, Mettupalayam	1.60
107. Rice technology development, management and utilisation - A farming system approach, Aduthurai	2.20
108. Development of varieties resistant to rice blast, sheath rot and ragi blast using tissue culture, Coimbatore	1.51
109. Development of pheromones for major pests of rice and cotton, Coimbatore	1.20

110. Season specific seed production technology for the development of seed districts in generating quality seed for yield maximisation, Aduthurai	1 60
111. Scheme for exploitation of male sterile lines for developing hybrid cotton, Coimbatore	0.48
112. Agro - forestry system for sloppy lands, Uthagamandalam	0.75
113. On - farm trials on improved technologies developed for the crops grown in Salem and Dharmapuri districts	2 20
114. Variety Release Award - Creation of an Endowment	1.00
115. Development of wastelands of Pasumpon Muthuramalingam and Ramanathapmram Districts through Crop Husbandry, Agro Forestry and Horticultural Crops, Ramanathapuram	4.09
116. Identification of efficient strains of micro organisms and development of processes in bio conversion of farm wastes, and urban wastes, Cuddalore	1.20
117. Physiological studies on salt tolerance and development of rice varieties tolerant to coastal and inland salinity at RRS, Tirur	2.01
118. Scheme on Strengthening Research on Medicinal and Herbal Plant in the Plains (Killikulam) and Hills (Yercaud)	2.70
119. Setting of agro based industry for processing vegetables, jack, sugarcane and coconut, Horticultural College and Research Institute, Periyakulam	2.00
120. Pollution due to Tannery, Cement factory, Paper Industry, and Sugar factory and development of technology to over come the problems, AC & RI, Killikulam	2.4
121. Scheme for maximising yield of rainfed crops in red soils of Dharmapuri district at Regional Research Station, Paiyur, Dharmapuri District	1.00
122. Scheme for delineation of pollutants in Uyyakondan River and identification of crop varieties and technologies to over come the pollutants in Tiruchi	1.85
123. Standardisation of vegetative propagation techniques in tree spices at ARS, Thadiyankudisai	
124. Establishment of field lab, Improvement of irrigation facilities, construction of screen house in various centres	6.00
Non Plan Schemes	
1. Scheme for improvement of sunflower in Tamilnadu, Kovilpatti	2 85
2. Scheme for coordinated agronomic experiments on sugarcane, Cuddalore	4.98

3.	Scheme for research on nematode parasites of sugarcane crop, Cuddalore	
4.	Scheme for biological testing of pesticides laboratory, Vamban, Kovilpatti, Aduthurai and Tindivanam	6.10
5.	Scheme for improvement of groundnut through induction of mutation, Coimbatore	1.28
6.	Scheme for surveillance of pest and diseases, Vellore	2.93
7.	Scheme for studies on the residues of pesticides in plant and soil, Coimbatore	3.31
8.	Scheme for research on citrus - dieback, Killikulam and Coimbatore	1.53
9.	Scheme for improvement of redgram and soybean, Vamban	2.85
10.	Scheme for evolution of cumbu resistant to green ear and ergot diseases, Vamban, Kovilpatti	4.06
11.	Scheme for intensification of pulses research, Vamban	1.44
12.	Scheme for maximisation of pulses production, Vamban	
13.	Scheme for improvement of millets for grain and fodder, Kovilpatti	2.64
14.	Scheme for improvement of wetland pulses, Aduthurai	3.62
15.	Scheme for Coordinated Agronomic Experiments on Sugarcane, Trichy	5.30

ICAR Coordinated Research Schemes (Partly Financed)

1.	All India Coordinated Research Project on Agronomic Research, Coimbatore, Tanjore, Periyakulam, Ramanathapuram, Vellore	11.48
2.	All India Coordinated Research Project on Water Management, Bhavanisagar, Madurai	13.04
3.	All India Coordinated Research Project on Dryland Agriculture, Kovilpatti	5.55
4.	All India Coordinated Research Project on Agro-Meteorology, Kovilpatti	1.74
5.	All India Coordinated Research Project on under utilised, under exploited plants, Mettupalayam	2.21
6.	All India Coordinated Research Project on Sugarcane, Cuddalore	0.84
7.	All India Coordinated Research Project on Improvement of soil physical conditions to increase agricultural production of problematic areas, Coimbatore	3.51
8.	All India Coordinated Research Project on micro and secondary nutrient and pollutant elements in soil and plants, Coimbatore	3.89
9.	All India Coordinated Research Project on longterm fertilizer experiment, Coimbatore	1.07

10.	All India Coordinated Research Project on investigation on correlation of soil test with crop response, Coimbatore	3.24
11.	All India Coordinated Research Project on Oilseeds, Coimbatore, Vridhachalam, Aliyarnagar, Tindivanam and Bhavenisagar	17.51
12.	All India Coordinated Research Project on Jute and Allied Fibres, Coimbatore	1.39
13.	All India Coordinated Research Project on Rice Improvement, Coimbatore, Aduthurai and Madurai	10.44
14.	All India Coordinated Research Project on Sorghum, Coimbatore	6.60
15.	All India Coordinated Research Project on Forage crops, Coimbatore	5.23
16.	All India Coordinated Research Project on Cotton, Coimbatore, Kovilpatti and Srivilliputhur	12.93
17.	All India Coordinated Research Project on Intensification of Research on the Improvement of Pulses, Coimbatore, Vamban	11.86
18.	All India Coordinated Research Project on Palm, Aliyarnagar, Aduthurai	4.08
19.	All India Coordinated Research Project on Maize, Coimbatore	1.92
20.	All India Coordinated Research Project on Small Millets, Coimbatore	4.79
21.	All India Coordinated Research Project on Acarology, Coimbatore	1.34
22.	All India Coordinated Research Project on Pesticides, Coimbatore	3.19
23.	All India Coordinated Research Project on Plant parasitic nematodes with integrated approach for their control, Coimbatore	2.54
24.	All India Coordinated Research Project on biological control of crop pests and weeds, Coimbatore	1.59
25.	All India Coordinated Research Project on seed borne diseases, Coimbatore	1.19
26.	All India Coordinated Research Project on Mushrooms, Coimbatore	2.16
27.	All India Coordinated Research Project on Betelvine wilt disease, Sirugamani	2.09
28.	All India Coordinated Research Project on Weed control, Coimbatore	3.61
29.	All India Coordinated Research Project on Spices and Plantation Crops, Coimbatore, Yercaud	4.56
30.	All India Coordinated Research Project on Palm (Coconut), Veppankulam	5.74
31.	All India Coordinated Research Project on vegetables including chillies, Coimbatore	3.51
32.	All India Coordinated Research Project on Cashew, Vridhachalam	2.78

33. All India Coordinated Research Project on post-harvest technology in horticultural crops, Periyakulam	3.41
34. All India Coordinated Research Project on Floriculture, Coimbatore	2.30
35. All India Coordinated Research Project on Tuber Crops other than potatoes, Coimbatore	2.73
36. All India Coordinated Research Project on Tropical fruits, Periyakulam, Coimbatore	8.91
37. All India Coordinated Research Project on arid fruits, Aruppukottai	2.80
38. All India Coordinated Research Project on renewable energy sources, Coimbatore	8.67
39. All India Coordinated Research Project on farm implements and machinery, Coimbatore	13.96
40. All India Coordinated Research Project on energy requirement in agricultural sector, Coimbatore	6.07
41. All India Coordinated Research Project on intensive testing of power tiller and research and development of new machine to make them versatile, Coimbatore	2.81
42. All India Coordinated Research Project on post harvest technology, Coimbatore	4.48
43. All India Coordinated Research Project on biological nitrogen fixation, Coimbatore	2.04
44. All India Coordinated Research Project on Agro-forestry, Mettupalayam	2.34
45. All India Coordinated Research Project on Soybean, Coimbatore	1.33

ICAR - Fully Financed Schemes

1. All India Coordinated Research Project on National Demonstration on major food crops, Namakkal	1.54
2. Krishi Vigyan Kendra, Pondicherry, Kattupakkam, Vridhachalam and Trichi	23.30
3. Lab to Land Programme - Programme for Transfer of Technology to families, Coimbatore, Madurai, Pondicherry, Trichirapalli, Kattupakkam and Vridhachalam	1.77
4. All India Coordinated Research Project on rapid improvement of agricultural technology directed at socio-economic upliftment, Periyakulam	2.35
5. National Seed Project - Breeder Seed Production, Bhavanisagar and Periyakulam	6.84

6.	All India Coordinated Research Project on Pearl Millet Improvement, Coimbatore	1.98
7.	Studying the impact of modernisation in agriculture in farm women with reference to rice farming in the country, Coimbatore	
8.	Capital requirement for modernisation of Indian Agriculture, Coimbatore	0.90
9.	Isolation and identification of antiviral principle in plant extracts and preparation of effective antiviral formulation, Coimbatore	0.48
10.	Scheme for investigation on host-plant resistance and cultural methods of control (potato cyst nematodes scheme), Uthagamandalam	1.98
11.	Development of homozygous dihaploid lines from Indica x Japonica hybrids through androgenesis in rice, Coimbatore	0.52
12.	Evaluation of high yielding fodder type in small millets, Coimbatore	0.46
13.	Project for breeder seeds of Annual Oil seeds Crops, Bhavanisagar and Vridhachaiam	9.18
14.	Studies on the selection of saline and acid tolerant blue green algae and nitrogen fixation in rice soil eco-system, Coimbatore	0.46
15.	Scheme for development of methods for management of virus diseases of greengram and blackgram, Coimbatore	1.19
16.	Isolation and characterization of microbial products involved in stable soil aggregation, Coimbatore	0.66
17.	Adaptive Research on Sugarcane, Cuddalore	11.48
18.	Diversification of male sterile lines in pearl millet, Coimbatore	1.23
19.	Frontline Demonstration in Oilseeds, Coimbatore, Bhavanisagar Aliyarnagar, Vridhachalam and Tindivanam	
20.	Scheme for the promotion of research and development efforts on hybrids in selected crops, Coimbatore, Bhavanisagar and Tindivanam	31.00
21.	Agro-techniques for maximising yield in chewing tobacco in Western Zone of Tamil Nadu, Bhavanisagar	1.02
22.	Biological control of a few major insect pests associated with sugarcane, coconut, banana and mango crops by using entomophilic nematodes, Madurai	0.53
23.	Alternative model for T & V System, Coimbatore	1.68
24.	Methodology for early detection of Thanjavur wilt of coconut, Veppankulam	0.99
25.	In vitro culture studies for the improvement of banana clones, Periyakulam	0.46

26	First line demonstrations on oil seeds crops (Kharif, summer and Rabi) through Krishi Vigyan Kendras at Coimbatore, Madurai, Tiruchirapalli, Kattupakkam and Vridhachalam	6.00
27.	Scheme for production of breeder seeds of annual Kharif Rabi oil seeds crops, Bhavanisagar and Vridhachalam	0.83
28.	All India Coordinated Rice Improvement Project, Pondicherry	2.32
29.	Studies on seed collection, processing and standardisation of storage practices in silvicultural crops of economic importance, Mettupalayam	1.14
30.	Land to Lab programme, Coimbatore	0.50
31.	First line demonstration on pulses, Rabi - Summer crop- Blackgram and Greengram, Vamban and Thanjavur	1.14
32	Front line demonstration on oilseeds component D-Demonstrations on efficiency of Rhizobium inoculation on oilseeds under the All India Coordinated Research Project on BNF, Coimbatore	0.31
33.	Front line demonstrations on oilseeds, sub - component - D - Demonstration of improved package of practices for oil seeds with emphasis on balanced fertilisation through soil testing, Coimbatore	0.18
34.	Scheme for multilocation trial in sunflower (oilseeds), Coimbatore	0.05
35.	Front line demonstration for oilseeds, sunflower hybrids, Bhavanisagar	
36.	Scheme for demonstration and popularisation of improved implements and machinery through Krishi Vigyan Kendra, Pondicherry	3.01
37.	Front line demonstrations on Production Potentials of Oil seeds Crops-Soybean, Coimbatore	0.82
38.	Front line demonstrations on oilseeds, sub-component D Demonstrations of inter-cropping / sequence cropping systems involving oilseed crops under rainfed conditions, Kovilpatti	0.24
39.	Front line demonstration on oilseeds, sub-component cropping systems research, demonstration on production potential at ECF Centres, Periyakulam and Vellore	
40.	Front line demonstration in sunflower (Oilseeds), Coimbatore	0.36
41.	Stand Alone Fuel Cell Power Plants for Rural Electrification in India, College of Agri. Engineering, Coimbatore	0.18
42.	Front line demonstrations on pulses under National Pulses Development Project (NPDP), Coimbatore and Vamban	0.84
43.	Front line Demonstrations on Oilseeds, Popularisation of Oilseeds Implements and Machinery, Coimbatore	2.51

44. Studies on the genetic manipulation of algal symbiont <i>Anabaena azollae</i> and induction of sporulation process in Azolla	2.26
45. Development of osmoregulatory and salt resistant strains in <i>Azospirillum</i> for use in problem soils at AC and RI, Madurai	2.01
46. VA - Micorrhizae as a dynamic microsymbiont in association with horticultural crops at Horticultural Research Station, Yercaud and Regional Research Station, Paiyur	0.44
47. Use of biotechnology for disease management in rice, Coimbatore	0.54
48. Exploiting the genetic potential of the Rhizobium nodulating <i>Sesbania rostrata</i> and <i>Aescaynomena indica</i> , Coimbatore.	
49. Genetic improvement of <i>Rhizobium</i> Sp (Cowpea spp), Coimbatore	0.93
50. Creation of revolving fund for production of breeder seed of oilseeds, Vridhachalam	1.00
51. Strengthening research capabilities for varietal improvement, testing and un-interrupted basic and breeder seed production	26.42
52. Domestication studies on <i>Gymnema sylvestra</i> Schult, Coimbatore	2.50
53. Utilization of Frankia and its symbiosis with <i>Alnus</i> for Nilgiris, Uthagamandalam	0.63
54. Oilseed production programme - Augmentation of irrigation facilities for breeder seed production of groundnut, RRS, Vridhachalam and ORS, Tindivanam	1.00
55. NARP - ICAR - Strengthening of research capabilities - Basic research - Sub project on resource characterisation of rainfed farming system in peninsular India, ARS, Kovilpatti	26.42

NARP Phase II Sub - Projects

I. North Eastern Zone

1. Vellore	61.58
2. Kattupakkam	17.32

II. North Western Zone

3. Paiyur	19.38
4. Pottaneri	23.44
5. Namakkal	28.33

III. Cauvery Delta Zone	
6. Aduthurai	22.13
7. Trichy	2.48
8. Kattuthottam	25.68
9. Sirugamani	36.20
IV. Western Zone	
10. Bhavanisagar	24.64
11. Mettupalayam	55.35
V. Southern Zone	
12. Periyakulam	45.32
13. Aruppukottai	19.50
14. Pudukkottai	18.96
15. Srivilliputhur	7.90
16. Killikulam	7.94
VI. Hilly and Tribal Zone	
17. Yercaud	43.42
18. Vijayanagaram	23.02
19. Sandynallah	4.24
VII. High Rainfall Zone	
20. Pechiparai	66.74
21. Thirupathisaram	21.21

Government of India Schemes

1. Regional biogas training and development centre, Coimbatore	6.42
2. Scheme for establishment of regional centre for fuel efficient stove technology (Technical backup support unit of National Programme on improved Chulas), Coimbatore	3.30

5. To test rice genotypes under low fertility conditions in different rice growing conditions of South and South East Asia, Coimbatore	0.70
6. Project on botanical pest control, Phase-II, Coimbatore, Aduthurai and Madurai	3.00
7. Collaborative project on constraints to higher rice yield in different rice production environments and prioritisation of rice research in Southern India, Coimbatore	4.50
8. Net work collaborative research on green manure development and utilisation for rice based cropping systems, Coimbatore	1.50
9. Research project in collaboration with IFPRI-Transfer of agricultural technology and dynamics of information flows within the technology sector, Coimbatore	0.01
10. Rural infrastructure and agricultural growth, Coimbatore	0.44
11. Response of major surface irrigation system to drought, Coimbatore	1.00
12. Modelling in irrigation investment, Coimbatore	1.00
13. Management of small scale irrigation systems and ground water under constraints, Coimbatore	1.13
14. Development and use of indigenous microbial pathogens for the control of <i>Heliothis armigera</i> and <i>Spodoptera litura</i> in different cropping systems in South India, Coimbatore	7.00
15. Studies on the utilisation of domestic and urban sewage and sludge and industrial waste for increasing crop production, Coimbatore	3.23
16. Project for standardisation of seed production, processing and storage technology for tree crops, Coimbatore	14.99
17. Constraints to higher rice yield in different rice growing regions in Tamil Nadu, Coimbatore	10.25
18. Search for rice sheath blight resistance, Coimbatore	3.35
19. Rice biotechnology programme consisting four sub projects, Coimbatore	15.03
20. Communication net work on scarce water management, Coimbatore	0.35
21. Collaborative research project on improvement and utilisation of <i>Casuarina frankia</i> mycorrhizal symbiosis for afforestation and agro-forestry in India in the field of Science and Technology, Mettupalayam	8.37
22. Studies on the effect of climate changes on Rice Production in the Indian Sub-continent, Aduthurai	
23. Measuring sustainability in long term experiments, Coimbatore	0.73
24. Establishment of University Soil reference Centre, Coimbatore	2.19

Private Agency Schemes

1. Scheme for strengthening coffee teaching and training for the undergraduate and postgraduate degree courses in Horticulture, Yercaud	1.53
2. Scheme for institution of professorial chair in Agricultural Marketing, Department of Agricultural Economics, Coimbatore	1.30
3. Scheme on utilisation of coir-pith as manure in agricultural farms- Madurai	1.85
4. Establishment of a Chair of Professor of Agronomy for Research on Fertiliser use and Management, Coimbatore	0.89
5. Research projects for maximisation of yield in rice, Coimbatore	0.75
6. Establishment of a Chair of a Professor of Agricultural Entomology, Pesticide Toxicology, Coimbatore	1 10
7. Studies on the multi-residues of pesticides in spices, Coimbatore and Uthagamandalam	0.59
8. Investigation on soil and water resources for maximising sugarcane production in Sivaganga unit area of Sakthi Sugars Ltd., Madurai	1.32
9. Studies on the effect of alcohol distillery effluent on soil fertility status, yield of crop produce, Coimbatore	1.91
10. Time bound project in rural development - Participation of Rural Women in Development and Economics of small scale fishing development activities, Madurai	1.66
11. Seed fortification and mid storage treatment for prolonging shelf life of crop, Coimbatore	0.69
12. Social forestry education through awareness compaigns - Video Teaching and Direct Training to farm women and youth, Coimbatore	2.09
13. Extension of Agro-climatic Regional Exercise to district level in Tamil Nadu, Coimbatore	1.55
14. Transfer of bio-fertilizer technology of tree crop of social forestry programme for waste land improvement in certain selected areas of Tamil Nadu, Mettupalayam and Paiyur	2.50
15. Developing Azospirillum and Azotobactor bio-fertilizer for mulberry, Paiyur	2.2U
16. Investigation on the quantitative and qualitative increase in the yield of mulberry through mycorrhizal inoculation, Paiyur	2.92
17. Research proposal on investigation on the Polyhedrosis virus diseases in <i>Bombyx mori</i> and their management, Coimbatore	1.56

18.	Studies on foliar application of micronutrients to mulberry and its effect on economic characters of silkworm <i>Bombyx mori</i> , Coimbatore	1.56
19.	Collaborative research project on tapioca, Palur	0.76
20.	Ecobehavioural studies on the white fly, <i>Bemisia tabaci</i> G. in polycrop ecosystem, Coimbatore	9.52
21.	SPIC Chair Endowment - Professor (Soil Science and Agricultural Chemistry), Coimbatore	1.20
22.	Environmental risk assessment of pesticides used in a hill area, The Nilgiris - Ooty	0.86
23.	Medicinal plant based horti-sylviculture, Periyakulam	0.72
24.	Establishment of a pilot plant for commercial production of biological control agents, Madurai and Coimbatore	81.00
25.	Investigations on the Bacterial Insecticides Bacillus (B.T.K.) and its efficacy in the the control of certain important crop pests, Coimbatore	0.27
26.	Evaluation of biopesticide B. T. formulations for its safety to silkworm (<i>Bombyx mori</i>), Coimbatore	0.27
27.	Seed technological evaluation for quality in cotton, Coimbatore	0.35
28.	Monitoring and surveillance of food contaminants hazards in India, Coimbatore	0.28
29.	Scheme on investigation on the microbiology of certain fruit crop and developing suitable bio-fertilizers, Madurai	1.30
30.	Studies on continuous use of Mussorie Rock Phosphate (MRP) on normal/alkaline soils and its effect on soil crop environment, Coimbatore	0.32
31.	Evaluation of revenue oriented soil conservation and water harvesting technologies at Natrampalayam mini water shed of Dharmapuri District, Coimbatore	0.42
32.	Studies on the assessment of the problems of sea water intrusion and reclamation of the east coast in Radhapuram Taluk of Tirunelveli Kattabomman District	1.25
33.	Development, performance and evaluation of package of tractor and power tiller oriented implements for mechanisation of mulberry farm, Coimbatore	1.32
34.	Evaluation of anilofos (50% EC) residues in transplanted rice, Coimbatore	0.44
35.	Studies on anaerobic treatments of Pharma waste waters, Coimbatore	0.92
36.	Biological evaluation and determination of residues of Ekalux 20 EW, Coimbatore	0.37

37. Endowment for research on biocontrol agents, Coimbatore	0.63
38. Application of small portable engines in farm machines suitable to Indian conditions, Coimbatore	1.08

State Government Schemes

1. On farm water management studies, Bhavanisagar	3.68
2. Use of microbial processes for restoration of shola forests in Nilgiris, Uthagamandalam	2.00
3. Strengthening of State Land Use Board in Tamil Nadu Agricultural University, Nucleus Cell, Coimbatore	1.75
4. Production and distribution of vegetative hedge, fodder crops and fruit seedlings and providing training, Aruppukkottai	1.00
5. Training programme on improved Chulhas, Coimbatore	0.58
6. Optimization of crop pattern for Periyar-Vaigai Project-Preparation of Linear Programme Models, Madurai	0.32
7. Scheme for undertaking the study on maximising the use of water in crop production, Coimbatore	5.25
8. Agricultural Development Project - Tamil Nadu (TNADP) - Seed Production by Tamil Nadu Agricultural University, Kumulur, Killikulam, Vamban and Palur	49.23
9. Agricultural Development Project - Tamil Nadu (TNADP) - Integrated Watershed Development Component, Velioore and Athur	5.75
10. Fodder research component under - TNADP - implementation with world bank assistance - Department of Forage Crops, Coimbatore	1.00

APPENDIX III

LIST OF BOOKS - BOOKLETS PUBLISHED

English

1. Biochemical methods for agricultural sciences
2. Chilli cultivation
3. Statistical methods for computer programming language
4. Farm machinery and power
5. Renewable energy sources in agriculture
6. Principles of plant pathology
7. Genetic engineering, molecular biology and tissue culture for crop pest and disease management
8. Redgram germplasm information system
9. Yellowing in rice - causes and remedies
10. Sustainable agriculture
11. Agrophysical stresses and plant growth
12. Scarcity management for crop production
13. Crop diseases - Innovative techniques and management
14. TCHB 213 - A new high yielding interspecific hybrid cotton for Tamil Nadu
15. Conserve our soil
16. Soil health maintenance
17. Deenabandu Biogas Plant
18. Practical analytical chemistry
19. The principles and practices of analytical chemistry

20. Introduction to soil analysis
21. Micronutrient fertilization to rice
22. Micronutrient research in Tamil Nadu
23. Pedology and resource management of soils in agriculture research stations
24. Gerbera
25. Design elements of landscape gardening
26. Pesticides information
27. Pesticides - Proper use and handling
28. Banana nematode
29. Agricultural technologies for wasteland development
30. A case study on the pedology and resources of Scholavandan basin of Periyar - Vaigai command area
31. New hybrid cotton: - TCHB 213
32. Palmyrah cultivation

Tamil

1. இயற்கை சார்ந்த வேளாண்மை
2. குருவை நெல்லுக்கு நீர் நிர்வாகம்
3. பசுந்தாள் உரங்களும் அவற்றின் பயன்களும்
4. கரும்பு சாகுபடி நுட்பங்கள்
5. வேளாண்மை பொருளாதாரத்தில் மாணாவாரி உழவர்கள்
6. மாணாவாரி கரிசலில் எண்ணெய் வித்துப் பயிர்கள்
7. பாம்பு ரோசா புல் - ஒரு புதிய பணப் பயிர்
8. தமிழ்நாட்டுக்கு ஏற்ற உயர் விளைச்சல் நெல் இரகங்கள்
9. டி. டி. எஸ். 3 நெல்
10. மருத்துவத்தில் காய்களிகள்

11. வேம்பு ஒரு அருட் கொடை.
12. சாண எரிவாயு உபயோகங்களும் நிர்வாகங்களும்
13. பயறு வகைகளுக்கு ஊட்டமேற்றிய தொழுஉரம்
14. உயிர் உரமும் உணர்த்து மகரூலும்
15. பயறுவகை உற்பத்தியில் பண்ணை நிர்வாகம்
16. மானாவாசியில் பயறு மகரூலை எப்படிப் பெருக்குவது?
17. பதிர்ப் பாதுகாப்பில், வேம்புப் பொருட்கள்
18. வெள்ளம் பாதித்த பகுதிகளுக்கு ஏற்ற சாகுபடி துட்பங்கள்
19. மலலிகை
20. நிலக்கடலை இலை உண்ணும் புழு
21. பனை சாகுபடி
22. மலர் சாகுபடி
23. மருத்துவப் பயிர்கள்
24. அன்னாசிப்பழச் சாகுபடி
25. காளான் சாகுபடி
26. வாழை நூற்புழுக்களை கட்டுப்படுத்தும் முறைகள்
27. டி. பி. எஸ். 3 நெல்
28. டி. சி. எச். எம். 213 - ஒரு புதிய உயர் விளைச்சல் வீரிய ஒட்டு இரகப் பருத்தி
29. தென்னை பயிர் பாதுகாப்பு

APPENDIX IV

List of Research Papers Published

AGRICULTURE

Biochemistry

1. Balasubramanian, G., S. Krishnaveni and S. Kannaiyan. 1992. Effect of *Sesbania* species seed leachates on the growth of Azorhizobium and Rhizobium. *Indian J. Microbiol.*, 32: 217-219.
2. Balasubramanian, G., S. Krishnaveni and S. Kannaiyan. 1992. Studies on biochemical constituents of seed leachates on growth of Azorhizobium and Rhizobium. *World J. Microbiol and Biotechnol.*, 8: 542-543
3. Kasthuri, R., M. Jayapragasam and S. R. Sree Rangaswamy. 1992. Effect of sulphur nutrition on seed protein and yield in blackgram (*Vigna mungo*). *Legume research*, 15: 15 - 18.
4. Manickam, A., R. Dhandapani and S. R. Sree Rangaswamy. 1992. Molecular cloning of 2S albumin from mungbean. International conference of Agricultural Biotechnology and Forestry.
5. Varadharaju, N., M. Balasubramanian and K. Parvathy. 1992. Studies on the mechanical roasting of sago. *J. Food Sci. Technol.*, 29: 177-178
6. Velazhagan, R., S. Krishnaveni, V. Mariappan and R. Jeyarajan, 1992. Rhizopus head rot infection at different stages of sunflower and its influence on oil content. *Oil Crops Newsletter*, 9: 52-53.

Agricultural Botany

1. Amirthadevarathinam, A. 1990. Genetic variability, interrelationship and path analysis of yield characters in early maturing *indica* and *japonica* rice genotypes. *Madras Agric. J.* 77(9-12).
2. Amirthadevarathinam, A. and R. Sankara Pandian. 1990. Quantitative variability in thin and thick sown fodder sorghum (*Sorghum dochna*). *Madras Agric. J.*, 77 (9-12): 506-509.

3. Amirthadevarathinam, A., R. Sankara Pandian and M. Natarajan. 1990. Phenotypic stability for grain yield in certain breeding lines and varieties of grain cum fodder sorghum. *Madras Agric. J.*, 77(9-12): 368-371.
4. Amirthadevarathinam, A., R. Sankarapandian and M. Natarajan. 1990. Estimates of genetic parameters and correlation coefficients in fodder sorghum. *Madras Agric. J.*, 77(9-12): 462-463.
5. Amirthadevarathinam, A., S. Sevagaperumal and G. Soundarapandian. 1990. Induced polygenic variability in rice. *Madras Agric. J.* 77(9-12): 525-527.
6. Abdul Kareem, A., S. Giridharan, K. Paramasivam and S. Palanisamy. 1992. Rice fallow cotton in Cauvery delta. An overview. p 73 AICCIP Silver Jubilee Symposium. 1992
7. Arumugachamy, S., P. Vivekanandan and M. Subramanian. 1992. Combining ability of some rice genotypes for ratooning in diallel mating system. *IRRN*, 17(3) : 5.
8. Arumugachamy, S., S. Vairavan, P. Vivekanandan and S. Palanisamy. 1992. Aromatic and quality rice improvement in Tamil Nadu. *IRRN*, 17(6) : 11-12.
9. Banumathy, S. and M. N. Prasad. 1991. Studies on combining ability for development of new hybrids in rice. *Oryza*, 28 : 439-442.
10. Chandrashekar, M., S. Balasubramanian, M. Subash Chandra Bose and V. Murugappan. 1991. Selenium nutrition of fodder sorghum. *Forage Res.*, 17(2): 166-172.
11. Chidambaram, S., and N. Sundaresan. 1990. Correlation between yield and yield components in sunflower. *Madras Agric. J.*, 77(9-12): 406-407.
12. Chidambaram, S. and N. Sundaresan. 1990. Studies on combining ability in sunflower. *Madras Agric. J.*, 77(9-12): 408-411.
13. Chidambaram, S., and N. Sundaresan. 1990. Heterosis in varietal crosses of sunflower. *Madras Agric. J.* 77(9-12): 517-520.
14. Gomathinayagam, P., S. Natarajan and M. Subramanian. 1990. Genetic variability in drought tolerant genotypes of rice. *Oryza*, 27: 328-330.
15. Geetha, S., and M. Subramanian. 1992. Correlation studies in sesamum. *Crop Res.*, 5(3): 583-585.
16. Geetha, S., and M. Subramanian. 1992. Analysis of combining ability effects in sesamum. *Crop Res.*, 5(3): 586-589.

17. Govindarasu, R., M. Natarajan and B. Subbalakshmi. 1992. Cotton - As non-traditional oilseed crop. *Land Bank Journal* Vol. XXX (1).
18. Govindarasu, R., M. Rathinam and P. Sivasubramanian. 1990. Genetic variability in sesame (*Sesamum indicum* L.). *Madras Agric J.*, 79(9-12):450-452.
19. Giridharan, S., K. Paramasivam, A. P. M. Kirubaharan Soundararaj and A. Abdul Kareem. 1992. Stability analysis for yield of hirsutum genotypes tested in rice fallow situation. p 21. AICCIP Silver Jubilee Symposium.
20. Ibrahim, S. M., A. Ramalingam and M. Subramaniam. 1992. Multivariate analysis of genetic divergence over different environment in upland rice. *Oryza.*, 29(2): 137-138.
21. Jebaraj, S. and N. Mohamed Sheriff, 1992. A new phyllody tolerant sesame variety, SVPR 1. *Sesame and Safflower Newsletter*, 7.
22. Kandasamy, G., N. Ramamoorthy and V. Monoharan. 1990. Genetic variability in kodo millet (*Paspalum scrobiculatum* L.). *Madras Agric J.*, 77(9-12): 426-427
23. Krishnaiah Setty, B. V., and R. Appadurai. 1990. Heterosis and recombination potential in *Pennisetum americanum* (L) Leeke *Madras Agric. J.*, 77(9-12): 428-431.
24. Kadambavanasundaram, M., V. Mylswami and D. Krishnadoss. 1992. New hybrid cotton TCHB 213 for Tamil Nadu. *ISCJ*, J., 17(1): 6-8.
25. Krishnadoss, D., V. Mylswami, G. Nallathambi and M. Kadambavanasundaram. 1990. Combining ability and heterosis in *Gossypium barbadense*. *Madras Agric. J.*, 77(9-12); 389-392.
26. Mannuel, W. W., T. B. Ranganathan, S. Monomohan lal and S. R. Sree Rangaswamy. 1990. TNAU 801793. A multiple resistant high yielding early rice culture. *Madras agric. J.*, 77(9-12): 561.
27. Marimuthu, R., S. Rajasekaran and G. Soundrapandian. 1992. Association of yield and its components in rice. *Madras agric. J.*, 77 (9-12): 432-435.
28. Marimuthu, R., S. Rajasekaran and G. Soundrapandian. 1992. Variability, heritability and genetic advance in rice. *Madras agric. J.*, 77(9-12): 443-446.
29. Marimuthu, R., S. Rajasekaran and V. Sivasubramanian. 1992. Pattern of segregation in the F₁ progenies of rice. *Madras agric. J.*, 77(9-12): 496-503.

30. Mohamed sheriff, M. and M. N. Prasad. 1990. Heterosis in sorghum under different environments. *Madras Agric. J.*, 77(9-12) : 421-425.
31. Mohan, L., S. Chidambaram, S. Palanisamy and R. Jeyarajan. 1991. Reaction of sorghum inbreds against downy mildew *Perenosderospora sorghi*. *Madras Agric. J.*, 78(1-4) : 150-151.
32. Manoharan, V., and R. Sethupathi Ramalingam. 1990. Oil content and its association with seed size and yield in virginia groundnuts. *Madras Agric. J.*, 77 : 562-564.
33. Manoharan, V., S. Kalaimani, R. Sethupathi Ramalingam and M. R. Sivaraman. 1990. Variability studies in the F2 population of an interspecific cross in groundnut. *Madras Agric. J.*, 77 : 582-585.
34. Manoharan, V., P. Vindhiyavarman, R. Sethupathi Ramalingam and M. R. Sivaram. 1990. Heterosis in inter and intersubspecific crosses in groundnut, *Arachis hypogaea* L. *Madras Agric. J.*, 77 : 389-392.
35. Manoharan, V., R. Sethupathi Ramalingam and S. Kalaimani. 1990. Genetic advance and path analysis in the F2 generation of an intersubspecific cross in groundnut. *Indian J. Genet.*, 50 : 231-235.
36. Manoharan, V. and S. Thangavelu. 1990. Gamma ray induced bold seeded early maturity groundnut selection. *Mutation Breeding Newsletter*, 36 : 7-8.
37. Manoharan, V. and S. Thangavelu. 1991. Heterosis in intervarietal crosses of groundnut. In : Proc. Second International workshop on groundnut held at ICRISAT during 25-29 Nov.
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52	4	1	honour was presented	honour presented
69	3	1	useful	usefu
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71	3	3	mean yield	mean and yield
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105	4	2	borne	brone
113	1	2 & 3	investigated	invesgated
117	1	4	soybean	sopbean
120	4	9	hint	hints
