



AGRICULTURE DEPARTMENT

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Minister for Agriculture

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GOVERNMENT OF TAMIL NADU

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9. AGRICULTURAL EDUCATION, RESEARCH AND EXTENSION

Tamil Nadu Agricultural University undertakes the triple major activities of Teaching, Research and Extension. In India, 40 per cent of the population is engaged in agriculture. The labour scarcity in agriculture, spiraling price, increase in the cost of inputs, unstable income to the farmers for their produce, less proportionate increase in farm gate price for important food commodities like rice, pulses and oilseeds, inspite of a steep rise in consumer prices have created problems and thrown challenges to famers.

Tamil Nadu Agricultural University is spearheading its research to evolve high yielding varieties and develop technologies for reducing the cost of cultivation. Additionally, new machineries and implements were developed to reduce the drudgery of labour and to cover more area within short span of time. The developed technologies were disseminated to the farmers through method demonstrations. Price forecast are also made to enable the farmers to get profitable price for their produce. Tamil Nadu Agricultural University is involved in educating and empowering the students and human resources involved in Agriculture on par with the developed nations by updating the syllabus in the academic curriculum.

1. Agricultural Education

Tamil Nadu Agricultural University has structured the agricultural education to suit to the changes taking into consideration the scientific developments. In the year 2010-2011, the number of students enrolled in Under Graduate programmes were 767 and 346 in Tamil Nadu Agricultural University colleges and affiliated colleges

respectively. During 2011-2012, it is proposed to admit 800 students under single window system. In seven Bachelor of Technology courses 290 students got admitted under self supporting programme.

In the academic year 2010–2011, 370 students are undergoing Postgraduate studies and 216 in Doctoral programme. Dual degree programmes are being offered in collaboration with Cornell University, USA and Integrated post graduate programme is taken up with Mc Gill University, Canada. As a part of the dual Degree programme 8 students were selected during 2010-2011 and are undergoing their studies at Nova Scotia Agricultural College, Canada.

During 2011-2012, Nano technology, Remote Sensing and GIS, Commerce and Intellectual Property Rights were included in the syllabus for Under Graduate programme. As per the Announcement of the Hon'ble Chief Minister, the new Horticultural College and Research Institute for Women has been established, in an area of 50 acres adjoined to the existing Agricultural College and Research Institute at Navalur Kuttapattu, Manikandam Block in Srirangam at Tirchirapalli District at an estimated cost of ` 40 crores. In this college, during the current academic year 2011-2012 itself 39 girl students have been joined in the above institution.

Two year diploma in agriculture is offered in six research stations of the university viz., Oilseeds Research Station, Tindivanam, Agricultural Research Station, Bhavanisagar, Horticultural Research Station, Pechiparai, Rice Research Station, Ambasamudram, Regional Research Station, Aruppukottai and Agricultural Research Station, Kovilpatti and in the five of the affiliated colleges

(Thanthai Rover Agriculture and Rural Development Institute, Perambalur, Ramakrishna Institute of Agriculture, Periyannayakkanpalayam (Coimbatore), Agriculture and Rural Development Institute, Thakkolam, Vanavarayar Agricultural College, Pollachi and Aathi parasakthi Agricultural College, Kalavai). In the academic year 2010-2011, 575 students were admitted for the Diploma in Agriculture. Two year Diploma in Horticulture with a strength of 75 students is offered at Thanthai Rover Agriculture and Rural Development Institute, Perambalur.

It is noteworthy to mention that seven alumni of Tamil Nadu Agricultural University got selected in Indian Administrative Service and six in Indian Forest Service during 2010-2011.

The Open and Distance Learning Directorate has introduced under graduate programme in B.Sc. (Farm Science & Technology) for the farmers, where 229 farmers have enrolled during 2010-2011. This directorate is also offering three Post Graduate degree programmes. Certificate courses of 6 months duration is offered in Tamil on 21 important topics in agriculture and allied sciences; and in English 9 topics exclusively for the benefit of the urban dwellers.

2. Agricultural Research

2.1. Research Findings 2010-2011

In Tamil Nadu Agricultural University, the research activities are carried out by the scientists in all the 11 colleges, 36 research stations and 14 Krishi Vigyan Kendras. The outcome of the research is manifested by the release of 13 new crop varieties namely TNAU Rice Co 50, TNAU Rice TRY 3, TNAU Wheat CoW 2, TNAU Sorghum Co 30, TNAU Blackgram Co 6, TNAU Groundnut Co 6, TNAU Hybrid Sunflower Co 2, TNAU Sugarcane Si 7,

TNAU Coconut ALR 2, TNAU Brinjal VRM 1, TNAU Hybrid Tomato Co 3, TNAU Hybrid Chilly Co 1, TNAU Celery OTY 1 and 2 farm implements namely, Needle type tray seeder for vegetable nursery, Trailer mounted steering for power tiller – trailer system and one Management technology on Sorghum composite biscuit making.

2.2 Research Programme for 2011-2012

- ❖ In plant breeding and genetics, evolving high yielding, disease resistant varieties of rice, sorghum and cumbu varieties are in progress. Evolution of nutritionally superior ragi varieties with high Calcium, Zinc and Iron content is under progress. Development of medium duration (130 – 135 days) and long duration (180 days) redgram hybrids based on cytoplasmic genetic male sterile lines; development of high yielding varieties of greengram and blackgram with synchronous maturity and resistance to mungbean yellow mosaic virus are in progress in pulses breeding. In oil seed crops, breeding for high oil and drought tolerant varieties in sunflower and groundnut are in progress.
- ❖ To reduce the cost of cultivation of crop and to increase the income, the agronomical technologies will be developed. Through integrated farming system the farm income will be increased. Technologies will be developed to sustain the crop productivity under global warming situation. Technologies to enhance the water holding capacity in rainfed lands and to mitigate the mid season drought will be identified. To overcome the labour scarcity, mechanization will be promoted to reduce the cost of cultivation and increase the profit. Use of biofertilizer to supply various nutrients to the crop, use of microbes in value addition, research on bioenergy will be taken up. Establishment of model seed production demonstration farm will be taken up in

identified districts. Seed production of pulses and oilseeds under farmers' participatory mode will be taken up. Trainings to enhance the efficiency and capacity building for seed entrepreneurs will be imparted.

- ❖ Efficient strains of bio fertilizers will be identified. Microbes will be utilised for value addition, vaccines for viral infections, crops suitable for bioenergy exploitation. The moringa strains with high seed oil content will be identified. High yielding and pest resistant vegetables will be screened.
- ❖ Mechanization in rainfed farming will be given importance. Machines for land shaping, seed drills, plant protection equipments, harvestors etc., will be popularized among the farmers.
- ❖ Development of papaya hybrids with improved fruit quality and resistance to Papaya Ring Spot Virus (PRSV) is in progress. Standardization of high density planting (HDP), Ultra High Density Planting (UHDP) and fertigation practices will continue to assume importance in mango, banana and papaya.
- ❖ In onion, integrated nutrient management, weed management are to be recommended to the farmers. In amaranthus, organic farming practices will be standardized. The seed production will be strengthened to produce quality seeds of major vegetable crops. Management of Yellow Vein Mosaic Virus (YVMV) disease in bhendi and Tomato spotted wilt (TOSPO) virus disease management in tomato by Integrated Pest Management (IPM) will be taken up.
- ❖ Effort to develop technologies for round the year production of jasmine through physiological interventions will be standardised. Developing export packaging technology with strategy to minimize fragrance loss of jasmine through Modified Atmospheric Packaging

(MAP), Controlled Atmospheric Storage (CAS) and Nanotechnology is to be standardised. Development of varieties with higher yield and concrete recovery in tuberoses will be taken up. Standardization of improved production technologies for under exploited loose flowers Nerium, Chrysanthimum, Hibiscus, *Tabernae montana*, Ixora, etc will be continued. Standardization of improved growing systems for achieving higher yield and quality in cut flowers like lilliums, carnation and specialty flowers viz., Heliconia, Bird of Paradise, Alpinia, Bromeliads, Alstroemeria will be done. Identification of ornamental plant species to adapt low water conditions (i.e.) Xeriscaping to have lesser demand for water and improved turf establishment and management techniques in the landscaping areas.

- ❖ Standardization of technology for rapid multiplication of turmeric seed rhizome will be taken up. Standardization of drip and fertigation technology for cocoa will be continued. Technology for decomposition of cocoa leaf and pod waste in coconut based cropping system, Identifying suitable ginger type for growing under coconut ecosystem, Standardization of nutrient requirement for leafy coriander production will be taken.
- ❖ Field evaluation of improved culture of Medicinal coleus and glory lily will be continued. Rapid multiplication techniques using micro tubers in glory lily will be intensified. Crop production techniques in cancer curing medicinal species viz., *Annona muricata* (soursop), *Mappia foetida* will be evolved. Standardization of techniques to grow high value new aromatic oil crops such as tea tree will be taken up.

3. Extension

3.1 Automatic Weather Stations

Automatic Weather Stations were installed in 224 blocks in Tamil Nadu, one in each block. With the funds received from NADP second phase, 73 additional Automatic Weather Stations will be established. In the third phase 88 additional Automatic Weather Stations will be established so as to complete all the 385 blocks in Tamil Nadu.

Training has been imparted to 766 agricultural extension officers. Weather forecasts are used in day-to-day planning and execution of farm operations, saving of inputs viz., fertilizer, plant protection chemicals, irrigation water, efficient labour usage. Yield increase in different crops ranged between 8 - 15 % and farm income by 10 – 18 % by practicing weather based farming. Monitoring extreme weather events such as droughts, floods and cyclones, assessing their impact and planning to manage in an efficient way using real time weather and weather forecast information.

3.2. Precision farming project

Precision farming was demonstrated in an area of 53,885 hectare where, each farmer was allotted a unit functional in one hectare area and 53,885 farm families got benefitted.

Under the World Bank funded, Tamil Nadu - Irrigated Agriculture Modernisation of Water bodies Restoration and Management (TN-IAMWARM) scheme, after seeing the success in Dharmapuri district, the project has been extended to 5000 ha spread over 19 river sub basins. The benefits derived out of the mega scheme include doubling of productivity per hectare in 45 crops and the proportion of marketable produce was more than 90%. Saving of 40 % water and 33 % electricity was recorded. Timely harvest of agricultural produce was done. Farmers developed skill on

the technologies such as community protrait nursery, chisel ploughing, crop selection, drip fertigation, sorting and grading.

Crop Gene Bank in the name "Ramaya Gene Bank" was established to store seeds without losing viability for 5-20 years.

In the Center for Plant Molecular Biology, research has been taken up in major crop varieties for biotic and abiotic stress tolerance and nutritional quality through marker assisted breeding and genetic transformation. Improvement of popular rice varieties of Tamil Nadu, namely, CO43, white Ponni and ADT 43 for salinity tolerance, submergence tolerance and drought tolerance through Marker Assisted Selection are being taken up. Evolving vitamin A and iron enriched rice varieties, micro nutrient rich maize are in the pipe line. In banana, papaya and cassava resistance to viral diseases is being tested under controlled conditions. Molecular diversity studies on major economically important insects are being carried out to devise population specific insect control measures.

The phosphorus deficiency was identified in Tamil Nadu as 40 percent, of which 6 districts was rated low and rest of the districts rated as medium. This deficiency can be overcome by applying 40% acidified rock phosphate application.

Using remote sensing, the changes in fertility status of Tamil Nadu soils mapped using remote sensing.

Nano fertilizers with high fertilizer use efficiency and nano weedicides for effective control of dry land weeds are being tested.

In seed production technology, the quality paddy seed production was carried out under system of rice

intensification. Halopriming of cucumber seeds for long term storage has been standardized. Biopriming of maize seeds has been taken for quality seeds and vigorous seedling production. The sunflower seeds was fortified for increasing the germination efficiency and seedlings vigor.

Split application of fertilizers by applying 100 per cent Recommended Dose of Fertiliser (RDF) (165:52.5:495 g Nitrogen (N) Phosphorus (P) Potassium (K) /plant) in banana cv. Grand Naine and for Neipoovan, RDF dose of 228 : 20 : 372 kg NPK/ha at four critical stages viz., 3rd, 5th, 7th and 9th month after planting to get higher bunch yield standardised. In onion, foliar spray of NPK (20:20:20) @ 0.5% on 30, 45 and 60 days after planting recorded the highest marketable yield of 29.07 t/ha. Organic cultivation of vegetables i.e., continuous application of Farm Yard Manure (FYM) @ 10 t/ha + vermicompost @ 2.5 t/ha was found to increase the yield of bhendi and tomato to the tune of 11.9 and 43.6 t/ha respectively.

Standardized Precision production technology i.e., for marigold (125 per cent RDF (RDF = 90: 90: 75 kg/ha of NPK) + 0.2% humic acid) recorded the highest flower yield (77.0 t/ha). Tuberose varieties viz., 'Prajwal' (single type) and 'Suvasini' (double type) were identified as suitable for cultivation in the flower growing areas of Tamil Nadu. Standardized Export packaging technology for jasmine which involved treating flower buds with 4% Boric acid and packing them in Corrugated fibre board boxes for short distance (Dubai) market and in thermocole boxes for long distance (USA) markets. Standardized fertigation schedule (150:100:300 kg NPK/ha) through water soluble fertilizers to get higher dry seed yield and tuber yield in glory lily (1177 kg/ha of seed and 2149 kg/ha of rhizome).

The invasive papaya mealybug, *Paracoccus marginatus* was a great challenge for the scientists. For the biological control of the papaya mealy bug, *Acerophagus papayae*, a parasitoid was imported, mass multiplied in all the seven college campuses, 36 research stations and 14 Krishi Vigyan Kendras(KVKs) and distributed free of cost to the infested field throughout the state for the field release. So far 6,65,000 parasitoids were produced and distributed. The estimated saving of crop loss due to the release of parasitoid amounts to ` 435 crores besides 122 crores by avoiding pesticide spray as indirect benefit. The nucleus cultures of the egg parasitoid, Trichogramma, *Chrysoperla* and Australian lady bird beetle, *Cryptolaemus montrouzieri* were produced and distributed. Blends of sex pheromone compounds for gram podborer, *Helicoverpa*, brinjal shoot and fruit borer, rice stemborer and leaf folder were formulated and evaluated for their efficacy. Biocontrol agents like *Trichoderma viride*, *Pseudomonas fluorescens* and *Beauveria* were produced and distributed to the farmers for the management of pests, diseases and nematodes of various crops. Mass production technology including bioefficacy and toxicology data of *T.viride* and *P.fluorescens* have been issued to 40 entrepreneurs this year.

Tamil Nadu Agricultural University has commercialized the production technology for *Pseudomonas*, *Trichoderma*, Panchakaviya, equipment to separate eggs of stored pests from grains, ready mix cumbu, herbal insect repellent, weeder for System of Rice Intensification, Solar tunnel drier, cry 2 A gene, beetle trap, preservation of banana pseudostem, parental lines for bhendi hybrid seed production.

3.3. Market intelligence for agricultural produces

The prevailing market price for 13 agricultural commodities, Cumbu, Maize, Cotton, Groundnut, Sunflower, Gingelly, Turmeric, Coriander, Chillies, Blackgram, Bengalgram, Potato and Small onion prior to sowing and during harvest are being disseminated through English and Tamil dailies, radio, television, web portals, hand outs, short message services through mobile phones to 2 lakh farmers. The price forecast made by this cell has achieved a reliability of 95 per cent for all forecasts.

3.4. Domestic and Export Market Intelligence Cell (DEMIC)

Market Intelligence information on real time price, price forecast are provided to enable the farmers to market their agricultural produces.

During the past five years, Domestic and Export Market Intelligence Cell (DEMIC) had 325 forecasts were disseminated through 7 English and 6 Tamil dailies. The information is published in fortnightly and monthly magazines viz., Uzhavarin Valarum Velanmai, Thozil Ulagam, Pasumai Vikatan and Valarum Vivasiya Tamizhagam. The price forecasts are disseminated through 21 Market Committees and their regulated markets. Domestic and Export Market Intelligence Cell (DEMIC) disseminates price intelligence to 12,000 farmers through Short Message Service (SMS). Besides this, forecast is sent through Voice Short Message Service to 2 lakh farmers in collaboration with Indian Farmers Fertiliser Co-operative Sanchar Ltd., and Dr.M.S.Swaminathan Research Foundation, Chennai. The price of different commodities collected from different markets of India are enlisted based on the categories, in Tamil and English, updated in web site

in www.tnagmark.tn.nic.in. and so far 60,000 farmers have viewed the web site.

3.5. e-Velanmai

Through 'e-Velanmai' - an innovative Information Communication Technology (ICT) based technology transfer model in agriculture had enrolled 1300 farmers as members. So far 3750 scientific advices were sent to the members within a short span of 1-3 hours. During 2011-2012, the 'e-Velanmai' model of technology transfer is expanded and implemented in 19 sub basins of Tamil Nadu. Field Co-coordinators facilitate interaction and technology transfer between the scientist and the farmers using Information Communication Technology tools. Farmers were trained in handling the ICT tools to frame digital photograph of crop status and send the same to the scientist of TNAU to receive technical advices.

3.6. Tamil Nadu Irrigated Agriculture Modernisation of Water bodies Restoration and Management (TN-IAMWARM) scheme

Under Tamil Nadu Irrigated Agriculture Modernisation of Water bodies Restoration and Management (TN-IAMWARM) scheme, rice cultivation under System of Rice Intensification (SRI) showed an increase in yield from 40 to 80 per cent compared to the conventional methods. High yield was recorded in pulses and Bellary onion in Varahanathi and Palar sub basins. Farmers were also trained in large number under this project.