

9. AGRICULTURAL EDUCATION, RESEARCH AND EXTENSION

Food and nutrition are the two important aspects which warrant importance in the present day context. Amidst the challenges of shrinking resources and escalating cost of inputs, the productivity of food grains has to be doubled and the farmers' income tripled. Tamil Nadu Agricultural University is spearheading its triple major activities of Education, Research and Extension converged to work in synergy to bring forth **Second Green Revolution** in agriculture.

Nevertheless, a growth rate of 4% in Agriculture is essential to raise the GDP by 9% by the turn of the XII Five Year Plan period. All the research strategies are planned to achieve this target without any shortfall. Research on the development of new varieties and technologies are programmed to meet the present needs of the farmers.

All the state of the art technologies are used to propagate scientific technologies to farming community viz., village meetings, newspapers, radio, television, mass contact programmes, exhibitions and melas.

The latest communication facilities like internet and mobile phones are used for disseminating the knowledge to farmers through web portals and Short Message Services. Knowledge input on day to day market intelligence is updated for the benefit of the farming community. Location specific technology input imparted through trainings and on farm demonstrations by Krishi Vigyan Kendras enable knowledge penetration to reach the unreached.

1. Agricultural Education

For women empowerment, Hon'ble Chief Minister inaugurated the Horticultural College and Research Institute for women on 25.7.2011 at Navalur Kuttappattu, Srirangam taluk, Tiruchirappalli district exclusively for women for the first time in the country. During 2011-12 academic year, 39 students took admission and 37 are continuing their studies.

Tamil Nadu Agricultural University is currently offering 13 Under Graduate programmes, 30 Master and 27 Doctoral level programmes. In the year 2011-12, the number of students enrolled in Under Graduate programmes were 882 in Tamil Nadu Agricultural University colleges. In 7 Bachelor of Technology courses, 292 students got admitted under self supporting programme.

In this academic year (2011–12), 395 students are undergoing Postgraduate studies and 198 in Doctoral programme.

At the post graduate level, i) M. Tech Food Processing and Marketing at TNAU and Master of Professional Studies in Food Science and Technology by Cornell University, USA and ii) M. Tech Biotechnology and Business Management at TNAU and Master of Professional Studies in Plant Breeding by Cornell University, USA are being offered for the benefit of the students. So far, 24 students have completed the dual degree programme successfully.

PG Diploma in Capital and Commodity Markets and Organic Farming, M.Tech in Nanotechnology and M.Tech in Environmental Engineering and Ph.D in Agribusiness Management were also started during 2011-12. In the academic year 2011-12, a PG Diploma programme on Plant Health Management in collaboration with National Institute

of Plant Health Management, Hyderabad has been initiated. Education has become so popular that many foreign students from Iran, Egypt, Sudan, Nepal, and Ethiopia choose to undergo studies at this institute.

Memoranda of Understanding (MoU) have been signed with 23 Overseas Universities and 50 National Institutions to help Masters and Ph.D students to do extra mural research and to facilitate credit transfer.

Directorate of Students' Welfare (DSW) is the hub of the providing career counseling and job placement and has made stupendous achievement by placing over 500 graduates through campus interviews in nearly 45 organizations during the year 2010 alone. There is zero unemployment in B.Sc. (Ag) Graduates. The centre has opened an "**Overseas Employment Unit**" which facilitated graduates to get placement in organisations abroad. A state-of-the-art "**Communication Laboratory**" has been established to improve the soft skills and employability of the graduates. Besides placement, annually at the least 30 students from TNAU are getting opportunity in the western countries for pursuing their higher studies with scholarships and research assistantships.

It is worth mentioning that TNAU graduates bagged the most prestigious Commonwealth Scholarship consecutively for the past four years. TNAU records the highest recruitment number by Agricultural Scientists Recruitment Board (ASRB) among the 56 State Agricultural Universities of India.

TNAU is also offering many correspondence courses through the Directorate of Open and Distance Learning. At present, 21 certificate courses in tamil, 9 certificate courses in english, 3 PG diploma and 3 PG courses are being offered.

A new three years degree programme, “Bachelor of Farm Technology” in tamil medium was started in 2010 exclusively for the farmers, as the first of its kind in India. A total of 229 farmers have joined this programme during 2010. There is a subsidy of 50% fee from 2011-12 and it is enough to pay ₹3750/semester.

2. Agricultural Research

2.1. Research Findings 2011-12

Research activities are carried out in all the 11 colleges, 36 research stations and 14 Krishi Vigyan Kendras. The outcome of the research is manifested by the release of (a) Twelve Varieties / Hybrids Viz., TNAU Maize Hybrid CO 6, TNAU Sugarcane Si 8, TNAU Coconut ALR (CN) 3, TNAU Papaya CO 8, TNAU Coccinia CO 1, TNAU Bottle Gourd Hybrid CO 1, TNAU Ash Gourd Hybrid CO 1, TNAU Mushroom CO (TG) 3, TNAU Malai vembu MTP 1, Kufri Neelima potato, TNAU Blackgram VBN 7 and TNAU Coconut VPM 4. (b) Five Agricultural Implements namely, Arecanut harvester, Tractor operated multipurpose hoist, Improved coconut tree climber, Pulse Line Marker and Aerial access hoist for coconut harvesting and (c) Three Management technologies viz., Subsurface drip fertigation system, Biocolour from beetroot and STCR based IPNS for agricultural and horticultural crops.

2.2. Research Programmes for 2012-13

- ❖ High yielding, disease resistant varieties of rice, sorghum and cumbu varieties are being developed. 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.

- ❖ Integrated farming system is given the major thrust for increased income generation to the farmers. To enhance the crop productivity and to improve the livelihood of the dryland farmers, adoption of precision farming technologies viz., summer ploughing, compartmental bunding, broad bed furrow, sowing with the seed drill, intercultural operation, seed hardening and seed treatment, micronutrient etc., These technologies can be implemented by imparting training to the dryland farmers. 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 of 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.

- ❖ Crop growth promoters such as Pulse wonder, Sugarcane Booster, Coconut tonic, Maizemax, Cottonplus for pulses, sugarcane, coconut, maize and cotton respectively will be popularized on a large scale.
- ❖ Resource characterization of different category of farmers on farming system in Western and North western zone of Tamil Nadu, alternate cropping strategy as a contingent plan and agro techniques for various situations in field crops, good agricultural practices aiming for better resource use efficiency, Conservation agriculture in cropping systems will be optimized.
- ❖ Efficient strains of bio fertilizers will be identified. Microbes will be utilised for value addition, vaccines for viral infections, crops suitable for bioenergy exploitation.
- ❖ High yielding and pest resistant vegetables will be screened.
- ❖ Vegetable production technology and supply chain management knowhows to meet the vegetable demand of nearby cities is to be provided to the vegetable growers on cluster approach.
- ❖ Mechanization in rainfed farming will be given importance. Machines for land shaping, seed drills, plant protection equipments, harvesters 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.
- ❖ Qualitative crop improvement research will be taken on Fe/Zn fortified rice, High vitamin A rice, low phytate maize, Enhanced oil quality in sunflower and virus resistance in Cassava and Banana.
- ❖ Under the Environmental Sciences, the research focus will be on utilization of wastewater from paper mill, tanneries and distilleries for agriculture and other end users, utilization of solid wastes from agriculture, domestic and gelatin industries for organic manure production and utilizing it as organic inputs. Similarly, solid waste utilization from poultry litter towards organic farming, bioremediation of contaminated soils in different agro-ecological zones of Tamil Nadu, and developing remediation technologies for improving salt affected soils and Carbon sequestration and budgeting in plantations of fast growing trees will be taken.
- ❖ Research on Soil Science and Agricultural Chemistry encompasses, carbon sequestration potential of rice ecosystem, demonstration of seed yield enhancement in maize and rice through nutriseed Pack technique and designing prototype machineries for industrial production of nutriseed Packs, standardization of biochar derived from different sources of plant communities and influence of soil compaction on soil physical health in intensively mechanized farming as compared to conventional operation farming will be studied.

3. Extension

3.1. Production of Audio Visual Aids

Tamil Nadu Agricultural University has proposed to strengthen the Audio Visual Extension material for effective Farm Crop Management System (FCMS) for farmers and extension officials' use and other campaigns. Short films covering success stories, frontier technologies of various crops will be made available to the FCMS tools for use by field level functionaries.

3.2. Establishing community radio stations by TNAU in Tamil Nadu

Community Radio is an effective medium for transferring the location specific farm technologies to farmers on a larger scale. Tamil Nadu Agricultural University has proposed to set up Community Radio stations in 28 districts in a phased manner over a span of three years. The weather conditions, daily market prices of agricultural commodities, success stories of farmers, Scientists' advices on different cropping patterns will be covered apart from environmental protection, health, education etc.

3.3. Integrated remediation for improving and managing polluted soils/ water is in operation in Tirupur, Coimbatore, Erode, and Karur Districts. The physical and chemical characters of the affected lands of Tirupur and Erode district by problem soils and water are assessed and integrated remediation measures for their management will be recommended.

3.4. Krishi Vigyan Kendras' activities

Through Krishi Vigyan Kendras, 109 On Farm Testing (OFT) of newly released varieties and technologies, 200 Front Line Demonstrations were conducted and popularised, 3362 Trainings were given to extension officers, rural youths and, SHGs. Farm advisory service provided was 11076.

Four Buyers and sellers meets were organized at Coimbatore, Chennai, Viringipuram and Tirur to get the feed back from farmers, sellers on Market preference for perishable commodities.

3.5. The System of Rice Intensification (SRI) is a tremendous success with 36.8 per cent increase in yield. The overall average yield recorded under SRI was 7432 kg/ha while under conventional practice it was only 5482 kg/ha. Besides, 30 per cent water saving was also achieved.

3.6. Tamil Nadu Precision Farming Project is a State sponsored mega demo project implemented through Turn Key mode has also spread over to 53,885 ha. Doubling of crop yield and high quality of farm output has created a revolution in vegetable cultivation.

3.7. Sustainable Sugarcane Initiative improves the productivity of water, land and labour, all at the same time, while reducing the overall pressure on water resources. The technology package has been standardized. The yield increase is 60 to 90 tons per hectare.

3.8. Management of invasive Papaya mealy-bug through parasitoid: Outbreak of papaya mealy bug, *Paracoccus marginatus* was noticed during 2008 on papaya, mulberry, tapioca, jatropha, vegetables, fruits, cotton, plantation crops,

spices and flowers crops in different parts of Tamil Nadu causing extensive damage going up-to 90 per cent. Management of this pest through classical biological control by importing parasitoid viz., *Acerophagus papaya* from USA through NBAII (National Bureau of Agriculturally Important Insects), ICAR, Bengaluru proved to be effective.

So far, about 35 lakh parasitoids have been produced and released by TNAU in various parts of Tamil Nadu which effectively controlled the mealy bug. Through this practice, the agricultural produce saved due to pesticide avoidance was ₹435 crores as pesticides worth ₹265 crores was not used, besides protection of the environment by the release of parasitoid.

3.9. Drip fertigation in Red gram:

One of the ways of improving productivity of red gram is by growing it under controlled irrigation by using drip fertigation system. The technology has been standardized. The yield increase was from 1350 to 1850 kg per hectare.

3.10. National Agricultural Innovation Programme:

Tamil Nadu Agricultural University is the lead centre for five Consortium projects implemented in India, viz., developing e-resources for B.Sc.(Ag), establishment and networking for market intelligence, developing value chains for flowers, and industrial agro-forestry and agribusiness planning and development.

TNAU is also the co-operating centre for eight consortium projects viz., value chain in mango and guava, policy analysis and gender, mass media for agro-information, value chain in flowers, biomass based decentralized power generation, wild honey and milling industry, soil organic carbon dynamics and risk assessment

and insurance products. These projects are operated in consortium mode and farmers and agri-business participate.

3.11. Tamil Nadu Irrigated Agriculture Modernization and Water Bodies Restoration and Management Project:

It is a Multidisciplinary Project funded by the World Bank. The project has been implemented in the 63 selected sub basins of Tamil Nadu to cover an *ayacut* area of 6.83 lakh ha. Under this project, technology demonstrations have been taken up by TNAU for SRI technology of rice and for cultivation of low water requiring crops such as; garden land pulses, maize, groundnut, sunflower, sesame and cotton.

3.12. Food Processing:

The Post Harvest Technology Centre at TNAU is involved in developing food processing technologies and also providing training to rural men and women for working in processing units. The PHTC has trained 1780 people in the last four years.

3.13. Seed Centre:

The Seed Centre takes up production and distribution of quality seeds for all crop varieties of TNAU. Seed production is taken up in 32 centers for 175 varieties of different crops and has supplied breeder and certified seeds of various crops. The centre is producing Breeder seeds, Foundation seeds and certified seeds. It is sufficient to change the seeds once in three years. Hence, it is proposed to produce 33% of the certified seeds during 2012-13 and will be raised to 50% before the terminal year of 12th FYP. Priority will be given to pulses and oilseed crops.

3.14. Automatic Weather Stations (AWS):

Automatic Weather Stations were installed in 224 blocks in Tamil Nadu, one in each block. With the funds received from NADP second phase, 161 additional Automatic Weather Stations will be established so as to complete in all the 385 blocks in Tamil Nadu.

To take decision on farming, based on weather parameters, medium term forecasts (for the next 4 days) at block level are made using the data acquired on 10 parameters at hourly intervals from the Automatic Weather Stations. The forecast products will be made available through TNAU Agriportal <http://agritech.tnau.ac.in> and in the website <http://tawn.tnau.ac.in> for the use of all block level officers.

The block level officers will develop suitable weather based agro-advisories to the farmers of their block and pass on to the farmers through their field level functionaries as well as mass media. The university will impart three days training to all the block level officers in developing the weather based agro advisories.

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, and efficient labour usage. Yield increase in different crops ranged between 8 - 15 % and farm income by 10 – 18 % by practicing weather based farming.

3.15. Trade and Intellectual Property:

The Department of Trade and Intellectual Property was established on 1st April 2010. As on date, 7 inventions of TNAU have received patent, 21 inventions have been filed and more than 18 inventions have been identified for filing.

3.16. Agribusiness Development

Agribusiness Incubator has so far commercialized 12 technologies including Coconut Tonic, Panchagavya, Egg removing device, SRI power weeder, *Pseudomonas* and *Trichoderma*.

3.17. Market information and intelligence:

Tamil Nadu Agricultural University operates the Domestic and Export Market Intelligence (DEMIC) unit (www.tnagmark.tn.nic.in) and provides forecasts of prices of agricultural produces before sowing and also prior to harvest.

Daily Market Intelligence:

e-Extension centre of TNAU in Collaboration with Centre for Development of Advanced Computing (C-DAC) is providing Daily Market Information to the farmers in time through internet and mobile phone. It is being also published in Tamil and English in daily news papers. The news is broadcasted through radio and television. About two lakh farmers were benefitted. The predicted price has about 95% accuracy. The registered farmers receive daily market information through SMS over mobile apart from wholesale and retail prices of 160 commodities, details of 1,500 wholesalers with address and phone numbers.

Agri Market Intelligence & Business Promotion Cell:

TNAU will associate in effective functioning of the Agri market Intelligence & Business Promotion Cell, Trichirappalli for providing market information to farmers.

For effective extension along with all the stakeholders, focused effort will be taken to have intensive contact with the farmers.