Agricultural research and education are the cardinal elements in agricultural development. There is an imperative need to enhance agricultural and livestock productivity, profitability and sustainability coupled with quality to face the challenges of liberalisation. This requires a continuous flow of technology. The new research paradigm will revolve around sustainability of biophysical resources, conservation of bio-diversity, strengthening of infrastructure, development of novel products of international standard and perfect bio-security measures to curb economically important diseases. In this transformation process, the role of research institutions like the Tamil Nadu Agricultural University and the Tamil Nadu Veterinary and Animal Science University is very crucial.

I. Tamil Nadu Agricultural University

With the mandate of serving the farming community and the related sectors, the Tamil Nadu Agricultural University (TNAU) was established in the year 1971. It is a renowned autonomous public institution conducting research in Agricultural field. It offers educational programmes at the undergraduate, post-graduate and doctoral levels in the field of Agriculture, Agricultural Engineering, Horticulture, Forestry and Home Science and undertakes extension educational activities through various technology transfer programmes for the benefit of farmers. Provision of institutional and research support for the various developmental activities in the State is another important function of the University. Though the University was established on June 1, 1971, the genesis of scientific agricultural education in the State dates back to 1868 - in its earlier period, it was working as Agricultural College and Research Station (ACRI) which did yeomen service in releasing world known varieties, like GEB 24 paddy etc. It is number one State Agricultural University in the country as adjudged by the ICAR in the year 1999.

The plan programmes of the University (TNAU) are summarized as under:

01 Breeder Seeds

Tamil Nadu Agricultural University is engaged in the production of breeder seeds on scientific basis. The breeder seed production is being taken up in 26 centres of TNAU, 39 State Seed Farms and also in one Cooperative Farm (TANCOF, Tirunelveli). The Tamil Nadu Agricultural University is committed to supply the breeder seeds of all improved crop varieties and parental seeds of hybrid, which it evolves at its Research Stations and supplies to the State Agriculture / Horticulture department based on their annual indents. The varietal spectrum is too broad in Tamil Nadu with 163 varieties and hence as many as 26 centres produce them in isolation without any physical contamination. A total of 217.7 tonnes of breeder seeds of high yielding crop varieties was supplied so as to multiply further and supply to the ultimate users.
02 Agricultural Research

Various research schemes / projects funded by both Government and non-governmental agencies are being undertaken in the TNAU.

Research Projects in TNAU funded by various agencies 2002-03

<table>
<thead>
<tr>
<th>Agency</th>
<th>No. of schemes/project</th>
<th>Amount (Rs. In lakhs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GOI</td>
<td>38</td>
<td>450.11</td>
</tr>
<tr>
<td>ICAR</td>
<td>171</td>
<td>2269.71</td>
</tr>
<tr>
<td>Plan Schemes</td>
<td>105</td>
<td>1700.93</td>
</tr>
<tr>
<td>Private Agencies</td>
<td>31</td>
<td>233.05</td>
</tr>
<tr>
<td>International Services</td>
<td>26</td>
<td>595.47</td>
</tr>
<tr>
<td>Other Agencies</td>
<td>24</td>
<td>357.35</td>
</tr>
<tr>
<td>Total</td>
<td>395</td>
<td>5606.62</td>
</tr>
</tbody>
</table>

In regard to rice, so far 149 varieties have been released and 25 varieties have been introduced. Among them 80 varieties are short, 44 medium, and 50 long duration varieties, which include three hybrids also. The varieties like GEB 24, TKM 6, ADT 27 and ASD 17 developed by TNAU are being utilised in national and international breeding programmes. TNAU has released 3 hybrids viz: -CORH1, (MGR), CORH 2, and ADTRH 1. So far, 47 varieties including 4 hybrids under Sorghum, 25 varieties in Ragi were released.

Water management research, biotechnology research, horticulture crop research have been intensified. Research on economics of crop cultivation, inputs marketing, and product marketing and agribusiness management have also been intensified.

Medicinal plants parks have been established at Yercaud, Coimbatore and Periyakulam. Agro-forestry research has been fine-tuned in Forest College and Research Institute, Mettupalayam. The College of Agricultural Engineering and Research Institutes both at Coimbatore and Kumulur conduct research on developing farm equipments, implements and devices. So far, 109 machineries have been developed.

03. Education

Ten colleges are located in seven different campuses in Tamil Nadu. Two affiliated colleges at Karaikal, Pondicherry State and Vellore district and three institutions offering Diploma Course in Agriculture in Tamil Nadu are functioning under the control of TNAU. Under-graduate education is given in 8 faculties, besides Master’s degree programme in 22 disciplines. Ph.D programme in 20 disciplines are also being offered in the University. A total of 549 students in different UG programmes, 246 students in PG programmes and 148 students in Ph.D programmes were admitted during 2002-03 in which the girl students accounted for 46.44 percent. To expose the UG students to the real world of farming, they are placed in the villages for a period of 3
months under Rural Agricultural Works Experience (RAWE) programme. To acquaint themselves with the business environment, the students are also placed in groups of 4 or 5 each in different agro-industries and agri-business for 2 weeks under Agro-industries and for 2 weeks in agri-business under Agro-industrial tie up programme. With a view to imparting practical training in skill development, the 'commercial agriculture' course has been introduced in which the students will select one area of interest each and develop skill with the motto of "doing is believing" for one full semester. The revised syllabus is in vogue from the academic year 1999-2000.

04. Extension

The Directorate of Extension Education of the TNAU is vested with the responsibility of disseminating the latest technologies emerging from the research programmes to the farming community through Transfer of Technology Centres.

There are 8 Krishi Vigyan Kendras (Farm Science Centres) and 5 Plant Clinic Centres functioning. They organise various extension education activities to the farming community in close collaboration with the State Department of Agriculture and other line departments.

Under the Communication Centre, 21 video modules, one farm school on AIR and one correspondence course were carried out. A total of 630 training, 220 skill demonstrations, 198 village meetings, 1312 farm advisory services and 88 exhibitions were organized by KVK and PCC. Besides this, TNAU disseminated 315 messages through mass media, 143 radio/ television programmes and brought out 98 publications in the form of leaflets, folders and pamphlets.

Integrated Village Development Programme

One of the ways by which the linkage between the scientists of SAUs and the farmers can be strengthened, is for the scientists to adopt the villages and create an interactive mode between the scientists and the farmers, both of them working and toiling for increasing the agricultural production of the nation. With this aim, the Village Adoption Programme otherwise known as Integrated Village Development Programme was launched by TNAU during 2000. In this scheme all the 10 colleges, 31 research stations, 5 plant clinic centres and 8 Krishi Vigyan Kendras of the TNAU will be involved. Each college/ station/ centre/ kendra would adopt two villages. About 100 villages will be covered in IVDP in the State.

New Schemes for 2003-04

TNAU has proposed to undertake the following research programmes for which the cost during 2003-04 will be Rs. 50 lakhs:

1) Evaluation of high yielding Spanish/ Virginia bunch groundnut variety suitable for multipurpose foreign trade (Rs.4.55 lakhs)
2) Mass multiplication and popularization of Simarouba glauca for wasteland afforestation programme (Rs.8.78 lakhs)

3) Developing chilli (Capsicum annum) varieties and technologies suitable for Processing industries and export under dry land conditions of southern districts (Rs.4.15 lakhs)

4) Integrated farming system a boon to dry land farmers (Rs.1.72 lakhs)

5) Commercial production of grafts / budded plants of arid and semi arid fruit Crops (Rs.2.00 lakhs)

6) Development, evaluation and selection of superior pearl millet population for the drought prone rainfed vertisol region (Rs.2.80 lakhs)

7) Improvement of Jeeraga samba rice for high yield and profit (Rs.5.80 lakhs)

8) Development of two-line hybrid rice for high yield (Rs.9.80 lakhs)

9) Popularization of drip irrigation and fertigation system for tapioca (Rs.3.60 lakhs)

10) Integrated farming system for sustainable agriculture in dry land vertisols (Rs.3.63 lakhs)

11) Improving the productivity of vegetable crops under rainfed cropping in Ramanathapuram (Rs.3.17 lakhs)

**07. Outlay for TNAU**

An outlay of Rs.2,700 lakhs is provided for TNAU for implementation of various research schemes during the year 2003-04 as detailed below:

<table>
<thead>
<tr>
<th>Scheme details</th>
<th>Outlay 2003-04 (Rs. in lakhs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistance to TNAU</td>
<td>2700.00*</td>
</tr>
<tr>
<td>Assistance for new schemes</td>
<td>50.00</td>
</tr>
</tbody>
</table>

* Including new schemes.

**II. TAMIL NADU VETERINARY AND ANIMAL SCIENCES UNIVERSITY (TANUVAS)**

The Tamil Nadu Veterinary and Animal Sciences University, first of its kind in the country has been functioning since its inception in September 1989, with the following mandate:

- To impart education in different branches of Veterinary and Animal Sciences, Fisheries Sciences and Basic Sciences
- To further advancement of learning, prosecution of research in Veterinary and Animal Sciences and Fisheries
- To undertake the extension of such sciences to the rural people in cooperation with the Government departments and various agencies concerned
The University has a strong statewide infrastructure consisting of three Colleges viz., Madras Veterinary College (MVC), Chennai, Veterinary College and Research Institute (VC & RI), Namakkal and Fisheries College and Research Institute (FC&RI), Thoothukudi. Undergraduate and Post Graduate degree programmes and a Diploma on Business Management are offered in these three colleges. In addition, there are five Research Stations viz., Poultry Research Station, Nandanam, Chennai, Livestock Research Station, Kattupakkam, Kancheepuram district, Sheep Breeding Research Station, Sandynallah, The Nilgiris, Mecheri Sheep Research Station, Pottaneri, Salem district and University Research Farm, Madhavaram Milk Colony, Tiruvallur district. Apart from these research farms, the University has 16 Veterinary University Training and Research Centres, two Krishi Vigyan Kendras, three Farmers Training Centres, five Fisheries Research Centres, one Animal Feed Analytical and Quality Control Laboratory, one Animal Health Surveillance Unit, one Avian Disease laboratory, one Institute of Animal Nutrition and one Institute of Food and Dairy Technology. These centres cater to the needs of farmers by conducting training programmes and offering consultancy on livestock and fisheries development. The Research Stations are maintaining most of the species of livestock and poultry and conducting specific research programmes on fodder and forage development, research on Boer goats and their crosses, research on ostrich rearing, integrated duck cum fish culture, survey, evaluation and characterization, conservation of Mecheri sheep breed, conservation units of Toda buffalo and Nilgiris sheep. Strategies for better utilisation of tree fodder for small ruminants, development of Blue Tongue vaccine for sheep, surveillance of pesticide residue in milk, meat and eggs, etc. are also undertaken. The Institute of Food and Dairy Technology has been started at Koduvalli near Red hills with the aim of conducting training programmes for entrepreneurs and dairy farmers.

During 2002-03, 241 students under UG programme, 75 students under PG programme, and 14 students under Ph. D. were admitted. Under Extension Education, during the year 2002-03, a total of 31,278 farmers benefitted through on campus training and off-campus training, while 24,296 farmers were benefitted through advisory services. Correspondence course on Animal Welfare, Dairy Farming and Goat Farming were conducted. Apart from above, 50 radio programmes, 36 TV programme were also carried out. Under 7 Radio Farm School programmes, 2065 persons were benefited. 7 books and 3 audio Compact discs (CDs) were produced for the benefit of farmers.

New Schemes-2003-04

It is proposed undertake research at a total cost of Rs.16.07 lakhs for 2003-2004 on Microbiological approach to reduce calf mortality in Tamil Nadu (Rs.2.34 lakhs), Etiology and incidence of acute respiratory syndrome in buffaloes of Namakkal district (Rs.9.90 lakhs) and generation of self employment and enhancement of rural per capita income through freshwater ornamental fish culture technology (Rs.3.83 lakhs).
III. AGRICULTURE DEPARTMENT

1. Preparation and distribution of Micronutrient Mixture (Groundnut)

There are 14 Micronutrient Mixture grades notified in Tamil Nadu. Micronutrient Mixtures are applied to Paddy, Sugarcane, Cotton, Citrus, Groundnut, Vegetables, Banana, Chilies and Coconut etc. It is produced by the department at Kudumianmalai in Pudukkottai district and distributed by extension functionaries through 880 Agricultural Extension Centres. Annually 1250 MTs of Micronutrient Mixtures are distributed. During 2002-03, 1120 MTs of micronutrient mixtures have been produced and 1181.3 MT have been distributed.

The expenditure during 2002-2003 is anticipated to be Rs.202.11 lakhs and an amount of Rs. 203.33 lakhs is proposed for 2003-04.

2. Production and distribution of Blue Green Algae

The objective of this scheme is to popularise the application of Blue Green Algae, a self-supporting biological Nitrogen fixing source. Blue Green Algae, which fixes atmospheric nitrogen in the soil, are produced in 19 Blue Green Algae Centres in the State for further multiplication and distribution to the ryots. Hence it is proposed to produce 500 MTs of Blue Green Algae and distribute the same to the ryots during 2003-2004.

The expenditure anticipated during 2002-2003 is Rs. 16.23 lakhs. For 2003-2004, an amount of Rs.17.16 lakhs is proposed.

3. Remote sensing application Mission Project for Crop Acreage and Production Estimation in Tamil Nadu

Remote Sensing Crop Acreage and Production Estimation (CAPE) scheme estimates the acreage under samba rice, kharif groundnut and cotton using remote sensing technique. In this scheme, studies are undertaken to develop spectral response model to estimate the production potentials of crops. Microwave Remote Sensing using RADARSAT - SAR data analysis for the estimation of the samba rice and estimation of acreage is in progress. The advent of Remote Sensing Technology through satellite has resulted in a major break-through in natural resources studies, especially in agriculture. Remote Sensing Technology having capability of providing regular, synoptic,
Multi temporal, multi spectral coverage has demonstrated its immense potential in providing information on agricultural crops.

Crop Acreage and Production Estimation (CAPE) is one of the major applications of Remote Sensing in agriculture. The prime objective of CAPE project is to develop methodology for the estimation of crop acreage and production of major crops using Remotely Sensed Satellite Data. The crops data covered under the projects are rice, groundnut, and cotton. Besides, Pilot Projects for the estimation of miscellaneous and horticultural crops like coconut, tea, mango, and cashew were also undertaken.

The scheme is functioning with the technical and financial assistance of “Space Application Centre” (GOI) Ahmedabad and in collaboration with the Institute of Remote Sensing, Anna University. The Space Application Centre, Ahmedabad, is providing every year a financial assistance of Rs.4 lakhs.

The expenditure anticipated during 2002-2003 is Rs.7.93 lakhs and an amount of Rs.9.97 lakhs is proposed for the year 2003-04.

The provision is made towards the staff cost components and contingencies.

Plan Outlay - Agricultural Research And Education - Abstract

An amount of Rs. 4,619.53 lakh is proposed for the research and development programmes for the year 2003-04 as detailed below:

<table>
<thead>
<tr>
<th>Institution</th>
<th>Outlay (Rs. in Lakhs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. TNAU</td>
<td>2700.00</td>
</tr>
<tr>
<td>2. TANUVAS</td>
<td>1689.06</td>
</tr>
<tr>
<td>3. AGRICULTURE</td>
<td>230.47</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4619.53</strong></td>
</tr>
</tbody>
</table>