

9. AGRICULTURAL EDUCATION, RESEARCH AND EXTENSION

Food and Agriculture Organisation (FAO) has projected the food consumption levels in India from current average level of about 2,400 kilocalories per capita per day that will increase to about 3,000 kilocalories per day in 2050. By then, the population may stabilize at 1.5 billion. As is typical of countries with rising incomes, the share of calories derived from cereals is declining in India, and is projected to fall below 50 percent by 2050. Conversely the share of calories derived from higher-value foods like fruits and vegetables, vegetable oils and livestock products is projected to increase. In aggregate terms, projected demand for cereals (for direct human consumption) is projected to 243 million tonnes in 2050, an increase of 53 per cent, or 0.9 percent per year. This growth will help decline number of undernourished in the country. Similarly, the consumption of fruits and vegetables, eggs, chicken and milk is also projected to 208, 6, 10 and 146 million tonnes in the year 2030 and to 257, 9, 18 and 196 million tonnes in the year 2050.

The above projections could be a reality if we overcome the challenges of natural resource degradation and depletion, climate change, increasing input costs, demand for bio-fuels, on-farm – non-farm employment integration, market volatility, soil health deterioration, micro nutrient imbalance and fast receding water tables. As per the Food and Agriculture Organisation projections, the country must enhance its competitiveness for higher income to the farmers and for greater integration of Indian markets with the global market.

Hence, Tamil Nadu Agricultural University is focusing its activities in six major domains such as Agricultural Education, Agricultural Research, and Agricultural Extension, Agri business Development, Agricultural Marketing and Agricultural Policy support to meet the Global challenges of food production.

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

The recent developments in 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 farm gates of the needy farmers.

1.0. Agricultural Education

1.1. Honourable Chief Minister's Announcements

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. The second year is in progress.

1.2. Under graduate and Postgraduate courses offered

Tamil Nadu Agricultural University is currently offering 13 Under Graduate programmes, 38 Master and

27 Doctoral level programmes. In the year 2012-13, eight Masters programmes, four each in Home Science and Forestry were introduced. The number of students enrolled in Under Graduate programmes were 932. In seven Bachelor of Technology courses, 284 students got admitted under self supporting programme.

In the academic year 2012-13, a total of 380 students are undergoing Postgraduate studies and 174 in Doctoral programme.

1.3. Dual degree programmes offered with foreign collaboration

Dual degree programme on M.Tech Food processing and Marketing was started initially. Later Biotechnology, Business Management courses were offered for the benefit of the students. So far, 29 students have completed the dual degree programme successfully.

1.4. Newly introduced courses

Postgraduate 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. A postgraduate diploma programme on Plant health management in collaboration with National Institute of Plant Health Management, Hyderabad has been initiated. The Ph.D. course in Econometrics was re-introduced for in service candidates.

At Pudukkottai district, Kudumiyanmalai, a new Diploma in Agriculture programme was started during 2012-13. In the first year, out of the sanctioned strength

of 50 students, 48 students (23 girls and 25 boys) got admitted and are undergoing studies.

1.5. Directorate of Students Welfare

The Directorate of Students Welfare of the Tamil Nadu Agricultural University (TNAU), Coimbatore, organized 9 campus interviews and 3 Off-campus interviews during 2012-13 upto March 2013. In this placement process, 38 companies participated. Financial institutions, Farm machinery Sector, Seed Industry, Fertilizer Industries, Agro-based industries and Non Governmental Organisations (NGOs) took part in recruitment process. Indian Tobacco Company (ITC), Novozyme, Mahindra & Mahindra Ltd, Monsanto, Dupont, Coromandel International, Cadbury, Zuari, Godrej agrovet etc were some of the agro based companies and Union Bank and Bank of India were some of the participants from banking sector. In this recruitment, 79 candidates from various disciplines have got placed. Advance Digital Language Lab and modern Group Discussion Chamber in the Directorate of Students Welfare help to improve the soft skills and employability of the graduates. This directorate facilitated students by providing Graduate Record Examination (GRE), Test of English as Foreign Language (TOEFL) and International English Language Testing System (IELTS) coaching and guidance to pursue higher studies abroad.

1.6. Directorate of Open and Distance Learning

Tamil Nadu Agricultural University is offering many correspondence courses through the Directorate of Open and Distance Learning. At present, Diploma programme (1), Postgraduate Diploma Programmes (7), Postgraduate Degree Programmes (3), Certificate courses (16), B. F. Tech. (Bachelor of Farm Technology) for Farmers are being offered. In B.F. Tech., so far,

282 farmers have been admitted for the course. There is a subsidy of 50 percent fee from 2011-12 and it is enough to pay ₹3750 / semester.

2.0. Agricultural Research

During 2012-13, with the consent of the Government, a New Grape Research Station was established at Mallingapuram, Theni District.

2.1. Agricultural Research Findings 2012-13

Research activities are carried out in all the 11 colleges, 37 research stations and 14 Krishi Vigyan Kendras. The outcome of the research is manifested by the release of (a) Thirteen Varieties / Hybrids Viz., (1) TNAU Rice ADT 50, (2) TNAU Maize Hybrid CO 6, (3) TNAU Sugarcane Si 8, (4) TNAU Coconut ALR (CN) 3, (5) TNAU Papaya CO 8, (6) TNAU Coccinia CO 1, (7) TNAU Bottle Gourd Hybrid CO 1, (8) TNAU Ash Gourd Hybrid CO 1, (9) TNAU Mushroom CO (TG) 3, (10) TNAU Malai vembu MTP 1, (11) TNAU Niligris Kufri Potato 1 (Kufri Neelima), (12) TNAU Blackgram VBN 7 and (13) TNAU Coconut VPM 4 (Kera Keralam). (B) Five Agrl. Implements viz., (1) Arecanut harvester, (2) Tractor operated multipurpose hoist, (3) Improved coconut tree climber, (4) Pulse Line Marker and (5) Aerial access hoist for coconut harvesting and (c) Three Management technologies viz., (1) Subsurface drip fertigation system for sugarcane, (2) Biocolour from beetroot and (3) STCR based IPNS for agricultural and horticultural crops.

- Land Resource Inventory and GIS database at cadastre level for Farm level planning in selected 4 blocks of Tamilnadu viz., West Arani, Vazhapadi, Sarkarsamakulam and Sathankulam was created.
- In Noyyal river basin possessing the Electrolytic Conductivity (EC) level 11 dS m⁻¹, cotton variety

LRA 5166 was relatively tolerant to salinity with 20.7 percent yield reduction only. When sufficient organic manure application with integrated nutrient management practices are followed, the yield can be maximized. In Noyyal basin, well drained soils can be irrigated with polluted textile and dye industry well water for cotton and sunflower crops with integrated nutrient management practices for maximum yield. Considerable increase in Electrolytic Conductivity (EC) due to the irrigation of polluted water was noticed in soil at harvest stage. High salt accumulation was noticed in surface soils than subsurface. In this scenario, strategies like conjunctive use of polluted water with stagnation of good quality water and leaching of salts during rainy period and application of sufficient organic manures will maintain the soil health over a period.

- Under aerobic rice conditions, provision of sub-surface drip fertigation (at 10 cm soil depth) scheduled at 125 per cent Pan Evaporation (PE) for clay soil / 150 per cent PE for sandy soil along with fertigation of Azophosmet and seaweed extract each @ 500 ml ha⁻¹ during panicle initiation and flag leaf stages was recommended for higher grain yield (14.2 per cent more than the conventional irrigation) with the increased B : C ratio of 2.65.
- Agro Climate Research Centre (ACRC) in collaboration with India Meteorological Department, Tamil Nadu Agricultural University is operating weather based agro advisory scheme at district level. Farmers are advised based on weather forecast in carrying out critical weather sensitive farm operations like summer ploughing, date of sowing, fertilizer application, irrigation, pesticide application, harvesting and marketing so as to maximize advantages and minimizing the losses in

production. It was assessed that the yields of different crops have improved between 8-15 per cent due to weather based management.

- Under CLIMARICE II scheme, awareness has been created among the farming community and relevant stakeholders on climate change impacts on agriculture, adaptation techniques and mitigation measures to manage the ill effects of global warming.
- The findings on microbiology, exploring microbial resources for nutrient management and soil fertility – Production of biofertilizers for N, P & K solubilizers and P mobilizers, selection and development of microbial pigments and its applications in food and textile industries, bacteriophages as biocontrol agents for disease control in brinjal and application of bacteriophages for control of diseases during food packaging, production of antimicrobial compounds from lactic acid bacteria and its use in biopreservation and bioprospecting of microbial resources for biofuel production are being studied.

2.2 National Agricultural Development Programme

Tamil Nadu Agricultural University is implementing various projects funded through the National Agricultural Development Programme. As on March 2013, 57 projects have been implemented with an outlay of ₹9762.08lakhs. During 2012-13, the following projects are being implemented with an outlay of ₹2915.39 lakhs.

1. Enhancing the livelihood of Tapioca Growing Tribal Farmers of Salem District.
2. Vermicompost / Vermicasting production under Bamboo Plantations.
3. Documentation of Agricultural Technologies through video clipping (3GP) for cloud computing.

4. Creation of soil nutrient data base through ICP analysis and issue of soil health card.
5. Farmers participatory approach for maximizing the profit of hybrid cucurbit vegetable crops with coriander intercropping.
6. Empowering the farmers on the technology of sub-surface drip fertigation system in Southern Agro Climatic Zone of Tamil Nadu.
7. Popularization of Annatto (*Bixa orellana*) for natural edible dye in Tamil Nadu.
8. Techno-Economic feasibility of wood based agro forestry models in Tamil Nadu.
9. Design and development of urban forestry models to combat environmental pollution in Tamil Nadu.
10. Study on Commodity Potential in Tamil Nadu. Agriculture –Vision Tamil Nadu 2023.
11. Installation of Pre-processing and processing small units – Phase II.
12. Implementation of additional components under Special package for Cauvery Delta Districts.
13. Development of Agro advisory services using Automatic Weather Station data at block level in Tamil Nadu.
14. Establishment of back office at Tamil Nadu Agricultural University to interface with e-Resource division of agro marketing intelligence and business promotion centre, Trichy.
15. Empowerment of farmers through special programme on market led precision farming system.

The implementation of the project on tapioca would benefit tribal farmers. Project on video clipping is aimed to disseminate technology oriented messages for the benefit of the farmers. The project on soil nutrient analysis and wood based agro forestry would help to improve the overall income of the farmers. It is also expected that 3000 farmers would be directly benefited

through demonstrations and trainings by implementing the above projects.

2.3. Research Programmes for 2013-14

- 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.
- Qualitative crop improvement research on Fe/Zn fortified rice, High vitamin A rice, low phytate maize, enhanced oil quality in sunflower and virus resistance in Cassava and Banana are under 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, seed hardening and seed treatment, micronutrient application etc., These technologies can be implemented by imparting training to the dryland farmers. Technologies to sustain the crop productivity under global warming situation, to enhance the water holding capacity in rainfed lands and to mitigate the mid season drought are being developed. To

overcome the labour scarcity, mechanization is being promoted to reduce the cost of cultivation and increase the profit.

- Research on Soil Science and Agricultural Chemistry encompasses, carbon sequestration potential of rice ecosystem, demonstration of seed yield enhancement in maize and rice through nutrised Pack technique and designing prototype machineries for industrial production of nutrised 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 are under progress.
- Use of biofertilizer to supply of various nutrients to the crop, research on bioenergy is being taken up.
- Efficient strains of bio fertilizers are in the process of identification. Microbes will be utilised for value addition, vaccines for viral infections, crops suitable for bioenergy exploitation.
- Crop growth promoters such as Pulse wonder, Sugarcane Booster, Coconut tonic, Maize max, Cotton plus for pulses, sugarcane, coconut, maize and cotton respectively are being popularized on a large scale.
- Under the Environmental Sciences, the research is focussed on utilization of wastewater from paper mill, tanneries and distilleries for agriculture and other end users, utilization of solid wastes from agriculture and domestic origin for organic manure production. 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 are under study.

- Nano-based Agri inputs (seeds, fertilizers, herbicides and pesticides), Nano-food system (encapsulation and packaging), Early detection of pests, diseases and nutrient deficiencies and Nano-remediation of aquatic and soil pollutants are evaluated for their efficacy and interactions in soil-water-plant systems. Setting up of biosafety frame work for engineered nano-particles is being exploited in agricultural sciences
- Establishment of model seed production demonstration farm is taken up in identified districts. Seed production of pulses and oilseeds under farmers' participatory mode, trainings to enhance the efficiency and capacity building for seed entrepreneurs have been programmed.
- High yielding and pest resistant vegetables are being screened.
- Vegetable production technology and supply chain management knowhows to meet the vegetable demand of nearby cities are being provided to the vegetable growers on cluster approach.
- The University is facilitating the Government of India in fixing Minimum Support Prices for important crops by Studying the Cost of Cultivation of Principal Crops.
- The University has undertaken study on Commodity Report on Red gram, Black gram and oil seeds in Tamil Nadu, Economic analysis of trade performance of major spices in Tamil Nadu and assessed the feasibility of export of major agricultural commodities in Tamil Nadu.
- The research on Natural Resource Economics and Impact Assessment Studies focusing on diverse topics such as Land Use Planning, Organic and Bio-

inputs Usage in Agriculture, Sustainable Ground Water Management, Climate Change and Groundwater Dynamics, Common Property Resource Management, Environmental Implications of Pesticide Use in Agriculture, Evaluation of Watershed Development Programmes and Evaluation of Command Area Development Programme.

3.0. Extension

3.1. Production of Audio Visual Aids

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

So far, 1712 video clippings were produced on various agricultural technologies such as System of Rice Intensification, Samai, Pulses, Cotton, Tomato and Sunflower production technologies. This includes 191 Short films in 3 GP (Third Generation Protocol) format so that farmers can view them in their mobile phones.

3.2. Community Radio Station

Community Radio is an effective tool to disseminate the farm technologies to the farming community living around 18 km from the Radio Station. One such Community Radio Station was established in the University campus and this Radio is functioning as "Velaan Palkalaikkazhaga Vivasayee FM" at 107.4 MHz frequency. Daily broadcast of 3 hours containing the above information is made by which around 10,000 farm families residing in 22 villages

around Tamil Nadu Agricultural University campus are benefitted.

The instantaneous information on weather, market prices, forecast for sowing in relation to marketability etc., are being broadcast apart from the technical guidance by scientists, experiences of farmers form the broadcast content of every day.

Proposals have been sent to the Ministry of Information and Broadcasting, New Delhi to start 28 community radio stations.

3.3. Integrated remediation for improving and managing polluted soils / water 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 has been compiled. The survey and sampling of affected areas in Coimbatore District is being undertaken. Integrated remediation measures for their management is being recommended.

- In Tirupur, 6557 soil samples and 5742 water samples were collected from 13307 ha of lands in 35 villages.
- Due to the indiscriminate disposal of dye and textile effluent, 6842 ha of lands were found affected in Tirupur District.
- In Erode district, 4357 soil samples and 4563 water samples were collected from 22 villages.
- In Karur district, 10531 soil samples and 4921 water samples were collected from 29 villages.
- For reclamation of these soils with electrical conductivity (EC) more than 3 dSm⁻¹, leaching of soluble salts with good quality water and provision of sub-surface drainage was recommended.

- Application of farm yard manure (FYM) or compost at a rate of 5 t/ha 10 to 15 days before sowing or transplanting of crops and growing crops and varieties that are tolerant to salts were recommended.
- For soils with a pH more than 8.5, application of gypsum was recommended. After incorporating the gypsum, water should be impounded in the field for a week and leaching of soluble salts should be done by providing drainage.
- Application of green manure or green leaf manure at a rate of 5 t/ha, 10 to 15 days before sowing or transplanting of crops was recommended.

3.4. Krishi Vigyan Kendras' activities

Through Krishi Vigyan Kendras, 87 On Farm Testing (OFT) of newly released varieties and technologies, 182 Front Line Demonstrations were conducted and popularised, 3468 trainings were given to extension officers, rural youths and, self help groups. Farm advisory service provided was 11076.

3.5. Tamil Nadu Precision Farming Project

Tamil Nadu Precision Farming Project is a State sponsored mega demo project implemented through Turn Key mode has also spread over to 67,700 ha. Doubling of crop yield and farm output has created a revolution in vegetable cultivation. To revitalize the Precision Farming Programme in the best of the marketing context, the new scheme on "Market-led Precision Farming Project" was sanctioned in 2012 – 13 and being implemented in eight districts viz., Erode, Salem, Villupuram, Theni, Madurai, Tirunelveli, Dharmapuri and Krishnagiri districts. In each of these districts, first year 2000 ha @ 250 ha each district and second and third year 4000 ha each year (@

500 ha/district) with a total of 10000 ha area will be covered in three years period.

3.6. System of Rice Intensification (SRI)

System of Rice Intensification was implemented in 3383 ha. The overall average yield recorded under SRI was 7202 kg ha⁻¹ while under conventional practice it was only 5435 kg ha⁻¹. The increase in yield was 32.5% in SRI compared to the conventional method. Besides, 30 per cent water saving was also achieved.

3.7. Sustainable Sugarcane Initiative (SSI)

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 area covered under SSI was 100 ha. The yield increased from 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 on papaya, mulberry, tapioca, jatropha, vegetables, fruits, cotton, plantation crops, spices and flowers crops in different districts 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 NBAIL (National Bureau of Agriculturally Important Insects), ICAR, Bengaluru proved to be effective. About 2,00,000 parasitoids were mass multiplied by different centres of Tamil Nadu Agricultural University and released in farmers fields @ 100 parasitoids / field / village or block in more than 2000 locations covering Coimbatore, Erode, Tirupur, Salem, Dindigul, Karur, Madurai,

Dharmapuri, Trichy, Theni, Tirunelveli and Krishnagiri districts at free of cost. After the introduction of parasitoids, the mealybug was controlled not only in the released fields but also in neighbouring farmers fields.

3.9. Apiculture

Intensive studies are being undertaken on the colonisation of stingless bees and their usefulness as pollinators for increasing the agricultural production. A bee park has been established with four species of honeybees.

3.10. National Agricultural Innovation Project (NAIP)

3.10.1. NAIP on Development of Information and Communication Tools / Technologies

National Agricultural Innovation Project on Development of Information and Communication (ICT) tools / technology towards an interactive multimedia based agro advisory system is also being developed with partnership of Indian institute of Technology (IIT), Rural Technology Business Incubator (RTBI), Chennai and partners from Dharmapuri Precision farm agro service limited, Erode Precision farm producers company limited and National Agro foundation. Individual farm historian databases for 1200 farmers were created and put online. Mobile software for providing mobile based agro advisory service is also being developed and to be integrated with farm historian database for providing farm specific agro advisory service.

3.10.2. NAIP Mass Media for sharing agro information

Mass media for sharing agro information is also being implemented in this centre. Video modules on

Dutch Rose in open field cultivation, Ultra hi-density mango cultivation, Organic farming and turmeric processing technologies were developed. District and State level exhibition were also organized to showcase the Tamil Nadu Agricultural University technologies for the benefit of the farming community. Innovative technologies and successful technologies were also scouted and published in the leading newspapers with the help of reputed farm journalists.

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

3.11.1. Technology demonstrations

It is a Multidisciplinary Project funded by the World Bank. The project has been implemented in the 61 selected sub basins of Tamil Nadu to cover an *ayacut* area of 6.70 lakh ha. During 2012-13, demonstrations were carried out in System of Rice Intensification (SRI) in an area of 3383 ha and Improved Production Technologies were demonstrated in semi-dry rice (210 ha), pulses (4334 ha), groundnut (455 ha), chillies (122 ha) and cotton (25 ha). Besides, Precision Farming was demonstrated in 227 ha in crops such as sugarcane, vegetables and turmeric.

3.11.2. “e-Velanmai”

‘e-Velanmai’ was implemented in 26 sub basins of Tamil Nadu during 2012-2013 as a special scheme under Tamil Nadu Irrigated Agriculture Modernization and Water Bodies Restoration and Management Project. About 6700 farmers had enrolled as members in e-Velanmai and received more than 11279 scientific advices in agriculture from the expert team set up at

Tamil Nadu Agricultural University. Field Co-coordinators facilitated the technology transfer between scientists and farmers using Information and Communication (ICT) tools. The project details can be accessed from www.evelanmai.com. During 2013-14, sustainability of the e-Velanmai model of agricultural extension is proposed to be tested by involving the Block Technology Managers (BTM) and Subject Matter Specialist (SMS) of Agricultural Technology Management Agency (ATMA). This scheme will be jointly implemented by the Department of Agriculture and Tamil Nadu Agricultural University.

3.12. Seed Centre

Seed Centre is involved in production and distribution of quality seeds for all crop varieties of Tamil Nadu Agricultural University. Seed production is being taken up in 36 BSP centres for 165 varieties of various classes of improved varieties as breeder, foundation and truthfully labelled seed as per the indent and demand from Government of India, State and Private producers. While planning for seed production, the Seed Centre is duly considering the enhancement of seed replacement rate to 25 per cent in self pollinated crops and 35 per cent in cross pollinated crops as recommended by Central and State Government. Future seed plans are being charted out for various classes of seeds of principal crops to enhance SRR to 35 per cent in self pollinated crops and 50 per cent in cross pollinated crops before the terminal of 12th Five Year Plan and National Seed Mission. Priority will be given for pulses and oilseed crops.

3.13. Automatic Weather Stations (AWS)

Automatic Weather Stations were installed in 224 blocks in Tamil Nadu, one in each block. 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. The forecast will be made available through Tamil Nadu Agricultural University 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. Yield increase in different crops ranged between 8 - 15 % and farm income by 10-18 % by practicing weather based farming.

3.14. Food Processing

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

3.15. Trade and Intellectual Property

During the year 2013-14 under patenting, one invention of TNAU- Process for the production of ready to cook mix and food from pearl millet received patent (Patent No.250608) and 19 inventions were filed. Three Export Business Outreach Programmes were conducted in association with Federation of Indian Export Organizations. 24 products were identified for Geographical Indicator (GI) registration. In association

with Erode Turmeric Traders Association Technical Report was submitted to Geographical Indicator (GI) Registry for registration of Erode Turmeric under Geographical Indicator (GI).

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. 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.

3.18. Daily Market Intelligence

e-Extension centre of Tamil Nadu Agricultural University 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. 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.

3.19. Agri Market Intelligence and Business Promotion Centre

Tamil Nadu Agricultural University is associating in effective functioning of the **Agri Market Intelligence and Business Promotion Cell**, Tiruchirappalli for providing market information to farmers. For effective extension along with all the stakeholders, focused effort is being taken to have intensive contact with the farmers.

3.20. Agricultural Technology Information Centre (ATIC)

As a single window delivery system, it provides agricultural information, products and technologies developed by the University to the farmers. It is also rendering services to the visiting farmers through advisory services. In addition, farmers with plant clinic problems are also attended with suggestions on suitable management measures.

3.21. Kisan Call Centre (KCC)

With a view to bridge the gap between farmers, farm scientists and development functionaries, the Government of India has formulated a scheme called 'Kisan Call Centre'. Under this scheme, any farmer in the country can access by dialling the toll free number 1551 or 1800-180-1551. The farmers can also interact in their local language with experts. This centre functions on all working days between 7.00 A.M. and 10.00 P.M.

3.22. Uzhavarin Valarum Velanmai

'Uzhavarin Valarum Velanmai' a monthly Tamil Farm magazine of Tamil Nadu Agricultural University, Coimbatore is being published for the benefit of the farming community and other stake holders. The reader base until March, 2013 is 10061. Out of this, 5834 are the life subscribers and 4227 are the annual subscribers.

3.23. National Initiative on Climate Resilient Agriculture (NICRA) project

Directorate of Extension Education has entrusted the responsibility to provide technical support to all the 30 Krishi Vigyan Kendras in Tamil Nadu. In addition to the regular Krishi Vigyan Kendras' mandated activities, National Initiative on Climate Resilient Agriculture (NICRA) project has been sanctioned to four Krishi Vigyan Kendras in Tamil Nadu (Villupuram, Nagapattinam, Ramanathapuram and Namakkal) and the programme was also successfully launched in all four centres during this year to provide climate led extension strategies to stakeholders.