17. INNOVATION
Innovation is increasingly being seen as a language and currency of sound business investment and even as social processes. It is essential to accelerate growth and to make it more inclusive as well as environmentally sustainable. Innovation can happen in all types of organizations.

"Tamil Nadu will be known as the innovation hub and knowledge capital of India, on the strength of world class institutions in various fields and the best human talent."

Innovation is a successful intervention only when it is desirable and viable in the market or the benefits of its implementation flows to large number of people (Fig 17.1).

Innovations are not just about the products or processes of production. They are also important for designing Government programmes. The State has a backlog of unmet needs in education, health, water, urbanization, and in the provision of other public services. The sum of money required to meet these needs through conventional approaches is enormous and there are doubts about the ability of the existing programmes to deliver. Therefore, innovations are necessary in the approaches to these issues and in delivery mechanisms, along with innovations in products and services.

Fig.17.1: Innovation Eco-system
Making Tamil Nadu as an innovation Hub

At an International level India is placed reasonably well from an innovation perspective. Further the States which have grown rapidly in the past decade (including Tamil Nadu) have contributed heavily in the innovation sphere. Four main reasons for making Tamil Nadu as India’s knowledge capital and innovation hub as per the Vision 2023 document are:

1. Tamil Nadu’s demographic profile, when compared to the other States in India, has a lower proportion of population in the active working age group when compared to the other States. Tamil Nadu’s average wage rate is higher than those of many other States. Therefore, Tamil Nadu necessarily has to enhance productivity of the factors of production, if it is to compete with other destinations in India and East Asia to grow with respect to its investments, output and employment in manufacturing and service sectors. This enhanced productivity can be achieved only by making knowledge and innovation as the critical component of all organisations across services, manufacturing, agriculture, governance, and financing.

2. The Agriculture sector has to grow at a challenging rate of 5 percent CAGR, a rate which has not been achieved so far. Though with the increased development, the share of agriculture in the total GSDP would decline even at this growth rate. However, this growth rate has to be achieved without much increase in the net sown area and this requires an increased magnitude of innovation in agricultural practices and adoption of advanced cropping practices to suit local requirements. There is a need to create networks of scientific and research institutions focusing on areas such as biotechnology, high yielding varieties, tissue culture, etc. Simultaneously, a network of players focusing on development themes such as dry land agriculture, micro-irrigation etc needs to be developed and convergence between these two networks required so that research can be adapted and implemented at the field level.

3. In the manufacturing sector, Tamil Nadu already is a leading State in India in the Auto, Textile, Leather and Engineering goods sectors, all of which are accepted as growth engines for the economy. In these sectors to move ahead and compete with global leaders, innovation and access to latest knowledge and techniques are required. The other sectors identified as growth engines of manufacturing in India include Aerospace, Defence, Electronics, Chemicals, Pharmaceuticals and Telecommunications, where Tamil Nadu is not exactly a leader. Tamil Nadu in the coming years has to elevate its knowledge base and innovation ecosystem with respect to these industries to a level where it is able to attract investors and companies to set up base in Tamil Nadu so that the State’s share in the overall economic growth improves. For this to happen, the key factor is the ability to be innovative and act on a coherent strategy.

4. Similarly in Services, the strategy for Vision 2023 is for Tamil Nadu to deepen its offerings in select service sectors such as:
   - Information technology based back-office services to a range from Banking, Insurance, Accountancy, Data management, Telecommunication, Health care etc.
   - Research & development and Engineering design for technology, engineering and construction companies of the world
   - Health care
   - Tourism, including medical tourism
   - Creative design and post production support to the global media industry

Innovative Initiatives of the State in various sectors

Innovations in Agriculture Sector

The agriculture sector has seen
various innovations that resulted in improved production and productivity. In the scenario of dwindling natural resources, this innovation process has become inevitable. It has adopted innovative, cost-effective methods for various operations right from sowing to marketing. Introduction of **Micro Irrigation** resulted in increased water use efficiency. Breakthrough in seed technology for rice and other cereal crops have helped to increase the productivity. The **System of Rice Intensification (SRI)** has facilitated scientific planting and management of rice crop that has resulted in productivity enhancement. This technology has created a demand for skilled labour for square planting method. The services of SHGs who have been trained specifically in square planting are offering their services for planting SRI on call through mobile technology.

Technology and the knowledge gap are the major constraints which limits production and productivity. The Agriculture Department has successfully created an internet-based information network covering 81.13 lakh farm holdings in the State to effectively bridge these gaps. **Agriculture Information System Network (AGRISNET)** is a mission mode project funded by the Ministry of Agriculture, Government of India to develop a comprehensive online knowledge portal to disseminate relevant information to the farmers. Within one year of its launch, 33 percent of the farmers have utilized the services offered through AGRISNET portal. This initiative in Tamil Nadu is also remarkable because of G2G services are incorporated in the back-end network. The government uses this feature to generate customized reports to improve service delivery.

Self sufficiency in food has been achieved through the advent of modern technologies in agriculture; however, a long way to go in attaining nutritional security. To this end, the Twelfth Plan proposes for promotion of millets on a mission mode approach. Introduction of **Millet Mission** envisages adoption of system of millet intensification technology to raise the productivity on one hand and focused attention on processing and value addition on the other hand besides strategies for awareness creation.

Creation of new Milk Producers Cooperatives Societies (MPCS) in the uncovered areas and formation of new milk route are the novel approaches in promotion of milk production. The innovative scheme of distribution of milch cows at no cost has paved the way for increasing organized milk procurement in the State.

In the dairy sector, **green dairy initiatives** are proposed to be attempted during Twelfth Plan to harness solar energy to perform various operations like functioning of compressors, agitators, pumps and heaters besides lighting in the dairies and bulk milk cooling units. It has been proposed to install solar water heating system, solar power street lighting system in dairies to reduce electrical and furnace oil consumption. In addition solar powered cold storage units are also proposed to be put up in Regulated Markets.

In tune to the technology development, the Department of Agriculture has planned to provide an **online booking system of farm machinery** through the existing AGRISNET web portal. Presently, the farmer has to approach in person for booking the farm machinery in AED which is cumbersome and involves cost. With this system, the farmers can plan well ahead about the requirement of farm machinery and book it online and can make payment online through a payment gateway. This would help the farmers from time and money exhaustion.

With the advent of hybrid technology, the farmers are required to replenish seeds every season from external sources such as research institutions, public and private sector seed producers to harness hybrid vigour. In this back drop, the concept of ‘seed village’ which advocates village self-sufficiency in production and distribution...
of quality seeds, is fast gaining momentum. The establishment of **Village Seed Banks** not only ensures good quality seeds for enhancing productivity, but also helps in generating income for the community members resulting in improved livelihoods. It is proposed to form 7000 Commodity Interest Groups, 5000 village seed banks and to train 1.25 lakh farmers.

In the horticulture sector, an innovative component of E enabling peri **metro horticulture project** using mobile based agro advisory system has been proposed with an objective to link the farmers with the agricultural experts. This would ensure continuous supply of fresh vegetables to the burgeoning urban markets.

Radio plays a pivotal role in enriching the awareness level of farmers on farm technologies. Considering the benefits realized by the farmers it is proposed to establish more number of **Community Radio Stations** in Krishi Vigyan Kendras (KVK) so as to achieve the objective improving the productivity and income of the farmers.

Different insects from the different ecosystems of India will be curated and preserved for taxonomic study and it will be kept in a separate **insect museum**. It will serve ultimately as a digitalized data bank repository for all the known insects of India and fulfil the needs of public, researchers and students. The museum will also teach school students about the wonders of insect life and its role in the ecosystem.

**Innovations in the Health Sector**

Health sector has seen the maximum number of innovations in service delivery in the past few Plan periods. The universal nature of requirement of good quality care has prompted these innovations. The **upgradation of the PHCs as CEmONC centres** for dealing with emergency obstetric care at the block level has ensured reduction in the IMR and the MMR significantly.

Institutional deliveries is a pre-requisite for good maternal and child health outcome. It is important to reduce the apprehension of birth in a hospital and hence on selected days, pregnant women are invited to the PHC for Ante Natal Care to see the facilities including the labour-room and enjoy a free lunch as **Maternity Picnic**. Social functions such as Bangle Ceremony are sometimes organized for pregnant women according to local traditions. This helps to make the hospital a familiar place for mothers where they feel happy to visit at the time of delivery.

Continuous support of a female relative to a woman as a birth companion during childbirth under **Birth Companion Programme** gives pregnant woman a moral support and has proven beneficial to maternal and child health outcomes. During July 2004, a Government order was issued to scale up this programme to all Government hospitals in the State and doctors and staff nurse were made aware of this initiative taken by the Government. Benefits of this scheme includes shortened duration of labour, fewer procedures like medication, intravenous fluids, interventions such as forceps deliveries and caesarean sections and reduced informal payments. These innovations at the PHC level ensured the reduction of maternal and infant mortality rate.

The 108 – Ambulance service has helped in better care for the Trauma and
immediate care in the case of accidents. The **Neonatal ambulance services** have made health care accessible at the PHC level for immediate referral to secondary and tertiary care facilities.

Supply of drugs and diagnostic facilities like CT Scan and Ultrasound Scan have been made available at the district level at reasonable costs through the **Tamil Nadu Medical Service Corporation Ltd. (TNMSC)** and has enabled the poor to access the above services at affordable costs. Health care expenditure for poor patients accessing the private sector also came down with the universal access to these services. The HMIS reporting system and the system of verbal autopsy conducted on maternal deaths have been recognized as innovations that records and monitors even the inter-district variations in the vital indicators.

Under the **Cervical Cancer Early Detection Project**, detection of cervical cancer through visual inspection was conducted in the Chennai Corporation area. This innovative initiative was found to be less time-consuming, inexpensive and easy to execute. The Corporation of Chennai launched the programme to detect pre cancerous lesions in the cervix of women above 30 years of age. In order to encourage poor women to go for health check-up, ‘**Pengal Nalamudan**’ campaign has been launched, which encompasses collection of tests for diabetes, high blood pressure, anaemia, screening for Reproductive Tract Infections and Sexually Transmitted infections (RTI/STI).

A **special Polio drive** to cover 35,000 migrant children was conducted to ensure that the State is able to retain its polio free status. These migrant children miss their regular immunisation schedules and due to their incessant travel are vulnerable to infection attacks. This inclusive health initiative has placed Tamil Nadu as the first State to cover the migrant population in preventive health.

In the Twelfth Plan period, Multi-disciplinary speciality clinics would be opened at the PHC level. The increased incidence of life style diseases in the rural areas would be tackled by the **integration of the Indian System of Medicine (ISM) with regular clinics** where counselling and life style modifications would be discussed.

It is necessary to train the medical students in the simulators and mannequin before they go into actual clinical settings. The scheme of **establishing a skill lab for medical students** would improve the delivery of quality services. The students will be given pre-training and it will help them to develop confidence before handling real patients. By recreating real clinical cases, practical and decision making skills will be improved.

### Innovations in the Rural Development Sector

**Habitation based planning under THAI** scheme has brought a paradigm shift in approach to Planning for development. Under THAI scheme, complete mapping of the infrastructure facilities and resources at the habitation level is being collected and

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**Box 17.1: Online Solution for garbage disposal**

A group of enthusiastic educated youngsters joined together to render yeoman service to the society. They struck the idea of providing online solution for garbage disposal by opening an exclusive web portal. Now through their [kuppathotti.com](http://kuppathotti.com) a web site, these youngsters enable Chennaiites to dispose off their solid wastes by logging into the website. At prefixed time, the team arranges to collect the solid waste which includes any type of plastic, paper, metal & others wastes except degradable waste (which is recommended for composting) at their door step and also pays them adequately. Now garbage disposal is just a click away.
Twelfth Five Year Plan Tamil Nadu

computerized. These details would be made available in the public portal, which would serve as the base for planned development to provide adequate facilities by dovetailing and converging funds from various schemes. This would enable equitable distribution of facilities and ensure accelerated growth.

The **Chief Minister’s Solar Powered Green Housing Scheme** provides for the construction of houses for the rural poor. This is a Green Initiative of the State, which is very innovative and first in the country. Apart from getting housing facilities for convenient living, the families would be self-content for the energy needs. Each house is provided solar lighting with 5 Compact Fluorescent Lamps (CFLs). This would help the poor family to save energy costs, while motivating the neighbours to adopt the solar power system. It has been planned to provide 3.00 lakh houses during the Twelfth Plan period.

Rural local bodies are burdened with huge electricity bills. The cost incurred for Street lighting is a main item of expenditure. **Energising streetlights with solar power** is an innovative green initiative which would help the rural local bodies in reducing their energy bills. Installing new street lights energized by solar plant and conversion of existing streetlights into solar powered lights will go a long way in conservation of conventional energy and strengthening the financial viability of local bodies.

**Zero discharge bio-digester plant** is an innovative and effective method of waste management. Sanitary complexes have been built in all the Village Panchayats of the State. For a continued and better functioning of these complexes an uninterrupted adequate water supply and efficient waste handling system are essential prerequisites. Inadequate water supply and improper arrangement for waste disposal poses severe threat to the functioning of sanitary complexes. Installing of Zero discharge bio-digester plant will solve the above issues. During the Twelfth Plan it is proposed to pilot such plants and it will be scaled up based on successful implementation.

Availability of portable water supply in coastal areas has been a challenge due to salination. Providing **Hybrid Powered RO plants** would address drinking water needs. **RO plants** powered by Solar Energy would help to conserve the resources of the rural local bodies.

There are many farm and non-farm activities in rural areas which are carried on by more number of people either individually or collectively. In some villages many SHGs are involved in doing the similar type of activity like artificial jewellary, terracotta toys, jute products, foot mats, coir products, foot items etc. Clusters of similar groups within a village panchayat and across village panchayats would be identified and promoted under the ‘**One Village One Product concept**’ to provide sustainable employment opportunities to the non agricultural labourers and artisans during the Twelfth Five Year Plan period.

The Government of Tamil Nadu is the pioneer in the introduction of plastic road technology in rural and urban local bodies. The Rural Development and Panchayat Raj Department has taken up the initiative of **Laying Plastic Bituminous Road** using waste plastics collected in rural areas by SHGs. The Department has so far laid successfully roads over a length of 1031 km. using plastic Wastes collected by SHGs. Chennai Corporation and other Municipal areas are also taking up similar initiatives. As the performance of the plastic bituminous roads are reported to be better than the roads laid conventionally, it has been proposed to scale up the laying of plastic bitumen roads during the Twelfth Five Year Plan.

Tamil Nadu is the State with the highest rate of urbanization. Urbanisation increases the pressure on water along with sewerage disposal. **ECOSAN** is a system of waste disposal on environmentally
Innovation

sustainable basis. ECOSAN Urine Diversion Dehydration Toilet (UDDT) is a new approach for reusing human waste by separately collecting urine and human faeces and using it as manures for cultivation. While urine is used for improving food productivity, faeces is collected and dehydrated in the toilet itself, which becomes an excellent soil conditioner for farming. It also rejuvenates the soil wealth. IIT Madras in collaboration with an Ngo-SCOPE has also successfully extracted Struvite, the nutrient in urine in a powder form and this can be easily transported and applied to raise crops.

Innovations in Natural Resource Management

In the Twelfth plan, scientific tools and technologies would be utilized for wild life conservation and protection. Remote sensing equipment, communication devices and safety equipment would be deployed to ensure wild life safety and also to minimize man-animal conflicts that would arise due to infringement of their respective areas. It is also proposed to use GPS based positioning and tracking mechanisms for preservation of wild life.

As an innovative measure to protect and maintain the hillock area in Kotta Malai Reserved Forest and to check degradation from soil and moisture loss rock face afforestation has been proposed.

Innovations in Public Transport & Road Sector

Tamil Nadu Government has created a barrier free environment in public transport. The provision of Electric lift facilities in buses plying in selected routes for the differently abled people to access and to board State transport buses with the wheel chairs has paved the way for inclusive and barrier free development.

The Road Accident Management System (RADMS) deployed in all the police stations in the State is being extensively used by various departments involved in road safety. The district-wise data that is generated on an hourly, daily, monthly and yearly basis has been helping the Police, Transport and Highway authorities analyze the causes of road accidents, and enabling them to plan and implement remedial measures. Nearly 3,000 accident-prone spots have been identified. The implementation of appropriate road safety measures has brought down the number of road accident fatalities in Tamil Nadu. The RADMS system is constantly being improved. There are plans to provide a hand-held GPS enabled device to personnel at each police station for capturing the accident details on the spot itself. In addition, efforts are on to link the system with medical facilities for quick attention to accident victims.

The Chennai Unified Metropolitan Transport Authority (CUMTA) constituted for integrating and offering seamless connectivity among the different modes of traffic is yet another innovative initiative of the State.

Innovations in Urban Planning

Transparent Chennai seeks to create access to urban spaces for the marginalised sections of the urban population. It empowers citizens with online interactive information about their city, including critical public services. The website, www.transparentchennai.com, displays the status and nature of important public facilities. Locations of public toilets, flyovers, slums, and bus routes are examples of information published on the site. By providing spatial information regarding various aspects of city planning, Transparent Chennai is helping to chalk out areas that need greater attention.

Since conventional installation and rehabilitation method of open trench construction cause significant disruption of services it is proposed to adopt new technologies in urban areas for executing
underground sewerage schemes. Technologies such as trenchless technology, prefabricated inspection chambers and innovative piping materials would be adopted.

**Innovations in Public Distribution System (PDS)**

Tamil Nadu is one of the best State in implementation of Public Distribution System. The highest political commitment shown for implementation of universal PDS rather than targeted PDS has made Tamil Nadu PDS one among Lowest Leakage States and zero errors of exclusion. Comparison of key public services across India rates TNPDS as the best in terms of availability, accessibility and utilization.

To make it more transparent and accountable, the department has started the system of online ration card applications renewal from August 2009. It has also introduced the following e-governance initiatives:

- Automation of Billing in Fair Price Shops
- GPS tracking of lorries in 2 districts
- Online ration card database and printing
- Online FPS Stock monitoring, Kerosene movement monitoring, Price Monitoring System
- Online Feedback registration and Grievance Redressal Services at Taluk level

**Innovations in Social Welfare**

In an effort to address the adverse sex ratio in districts like Dharmapuri and Theni the use of mobile telephone brought better results on female infanticide and foeticide. In Dharmapuri, the district administration has taken an innovative initiative to address infanticide issue by targeting and mobilizing women through ICT. By opening up easy and efficient communication channels, the District Collector encouraged SHGs to report on events related to infanticide, foeticide etc., and based on the feedback received through letters, SMS etc., severe actions were initiated against offenders. This has brought tremendous awareness among the community and helped to fight against the evils of infanticide and foeticide.

Tamil Nadu for the first time in the Country has set up Transgender Welfare Board for protection and welfare of the transgenders. The Welfare Board has helped in identification, issue of identity cards and formation of SHGs and arrangement of economic assistance to those registered. The State has also initiated a pension scheme for Transgenders.

The innovative scheme of providing Video Conferencing facility in the Vigilance / Protective homes will serve the following objectives:
• Prevent the risk of transporting the inmates from the Home to different Courts at frequent intervals
• Save the huge costs spent in transportation and security arrangements
• Maintain confidentiality and privacy of the individuals involved in the case
• Prevent the threat of infringement due to media and other agents interfering while attending the court proceedings
• Save time & energy and also improve communication.

**Innovation in Tribal Development**

**Hydraulic Ram Pump (HRP)** technology, which utilizes the natural kinetic energy of falling water to lift part of the water to greater elevation helped to solve drinking water problem of tribal population. This technology is adopted for water supply to tribal habitations in Karantamalai hills and Valparai hills.

**Innovations in Education**

Low performance of the children in Government and Government Aided Schools is due to the high failure percentage in the subject of Mathematics. One of the best ways by which learning maths could be made easy is by providing **Maths Lab**. The Maths Lab would enhance the learning skills of the students by improving their basic understanding of different concepts and the children would be taught to 'learn by doing'. This model has been successfully introduced in select schools in corporation areas and it is proposed to scale up during Twelfth Plan.

To improve English language of rural students, Education Department has opened up English medium sections in 320 Government schools across the state. The department also proposed to **develop radio lessons in English language** for the benefit of students of Upper Primary Schools and preparation of English work sheets in order to provide the students enriched learning activities.

**Smart Classroom** is a class room equipped with multimedia devices designed to enhance instruction and learning. Smart classroom empowers institutions to cope with the challenges of the impact of the teaching-learning process by making a more meaningful experience for the students. It facilitates the integration of technology into the teaching-learning process. It equips institutions to offer Technology enabled teaching-learning that effectively disseminates knowledge in a manner that is easier and for more interesting to comprehend than those adopted by conventional institutional methodologies etc. It is proposed to introduce smart class rooms in higher education centres.

**Innovation in Science and Technology**

The scheme proposes to produce wind energy by train travelling at a speed of 45 KM for generating 5 KW of electricity. Generation of power from **wind energy using train movements** (the speed of train movement directly proportional to velocity of wind and the velocity of wind directly proportional to power generation is proposed by the Science City. For example, Chennai to Coimbatore train route would be suitable for implementing this pilot project which would pave way to
tap wind power from train movements. The pioneer and prototype engine for power generation with this technology has already been developed and tested.

**Innovation in Handicrafts**

The Panchaloga idol sculpture of Tamil Nadu is a unique art product that it is done through wax moulding. To train and develop the skilled artisans in this Panchaloga sculpture and to preserve the traditional method of Panchaloga idol sculpture, it is proposed to train young artisans who are conversant in this panchaloga sculpture by a skilled artisan on a **Gurukulam model**. This innovative approach would help to preserve the art & crafts which are peculiar to the State.

**Support Mechanism for Innovation**

There is a need to support and promote innovation, as innovation can play an important role in providing better alternatives, reducing costs, improving service levels and improving governance and justice delivery. In line with the objective of making cutting-edge levels of governance responsive to the felt needs and innovations, Thirteenth Finance Commission has recommended a grant of ₹31 crores for Tamil Nadu at the rate of ₹1 crore for a district, aimed at increasing the efficiency of capital assets already created and to provide immediate benefits. This grant is to be used to fill in vital gaps in public infrastructure already available in the district, which is not being fully **utilised for want** of a relatively small investment. It has been noted that projects with immediate welfare returns for comparatively low investment are best identified at the district level. There is also great scope to innovate at this level, and even a comparatively small investment can be effectively leveraged as a force multiplier.

In addition the State is promoting innovative schemes in all sectors under Part II (new) Schemes. Every year ₹150.00 crore is allotted under Part II and every sector is encouraged to identify innovative schemes pertaining to their sector.

The Twelfth Plan would bring to focus the criticality of Innovation as a key to achieving such ambitious growth rates and envisioning Tamil Nadu to become the “Knowledge Capital” and “Innovation Hub” of the country. The plan period would ensure creation and nurturing of an appropriate atmosphere that aids innovation and sustain the knowledge economy in the State.