

Chapter 14

SCIENCE AND TECHNOLOGY

Introduction

The pressure of rapid population growth, resource depletion, and ecological damage give urgency to the need to realize the potential benefits of science and technology. Technology allows developing countries to participate more fully in the global economy. The danger is that countries that fail to use technology to their advantage will fall further behind countries that do, widening the gap between richer and poorer nations. What is needed is better diffusion, adaptation, and use of the new technologies. This requires raising the awareness of leaders and population, strengthening global linkages, creating an environment receptive to technology, and adapting new technologies to local problems and conditions.

Role of Science and Technology

The people and the leaders must view the effective use of technological advances as the key to successful and sustainable development. Technological literacy has to be emphasized in the schools and encouraged throughout the population. The effective use of technology means *“matching solutions in search of problems to problems in search of solutions”* Research laboratories must focus on the specific needs of the country. In developing countries, this means emphasizing applied research and development while maintaining a core of basic researchers who can follow and participate in world advances. As in industrial countries, scientific, technological, and social specialists must work together, materials engineering needs to interact with biology, computer science with linguistics, medicine with sociology, and engineering with economics and the law.

The concept of matching local solutions to local problems also applies to education and training, where important human issues must be fully addressed to promote the successful transfer of technology. Prepackaged knowledge for the use of technology is of little use in developing countries. To be absorbed, new knowledge must be grounded in what is already understood with technological concepts linked to local culture and knowledge.

Technology is not, however, a package that can be bought off the shelf and become immediately productive: it is a cumulative process of learning. So, for developed and developing countries alike, the ability to realize knowledge-based productivity gains depends on a country's capacity to tap the global system of generation and transmission of knowledge, generate indigenous knowledge, diffuse and transfer information, and use knowledge in productive activity.

Acquiring new technologies requires a system receptive to innovation, with incentives and mechanisms for translating knowledge into action. The process of diffusion implementation is greatly strengthened if there is feedback from the users of technology to generators of knowledge.

The education system must therefore give students practice in understanding the systems, manipulating them, talking about them to one another, and envisioning the function from many viewpoints. The use of tools for managing information complexity needs to become part of schooling for an ever-increasing portion of the population. Preparing them to use technology requires a combination of skill-development, practice with complexity, and the development of adaptive problem-solving capabilities.

Review of the Ninth Five Year plan

With the objective of giving impetus to the Science and Technology (S & T), a sum of Rs. 20.00 crores was earmarked for the Ninth Five Year Plan period to the Institutions shown in Table. Apart from Rs. 20.00 crores provided in Science and Technology sector, financial assistance was also provided separately in other sectors, such as Agriculture, Industries, Social Services, Medical, Education etc., for Research and Development activities in the respective fields. Against the Ninth Five Year Plan outlay of Rs. 20 crores the total expenditure incurred is Rs. 13.74 crores. The break-up is as follows :

Expenditure during the Ninth Five Year Plan

(Rs. in crores)

Name of the Department	IX Plan Outlay	Expenditure/Anticipated Expenditure					Total
		1997-98	1998-99	1999-2000	2000-01	2001-02	
1. Tamil Nadu S&T Centres	6.00	1.21	1.66	1.16	0.84	0.98	5.85
2. Tamil Nadu Council for S & T	4.00	0.59	0.54	0.79	0.55	0.61	3.08
3. Anna University	4.00	0.53	0.45	0.61	0.46	0.46	2.51
4. Science City & Others	6.00	0.00	0.01	0.50	0.47	1.32	2.30
Total	20.00	2.33	2.66	3.06	2.32	3.37	13.74

Source: Plan Budget Link Documents.

Tenth Five Year Plan

The Government of Tamil Nadu has long recognized the critical role that knowledge, and in particular, science and technology (S&T) plays in promoting economic growth and social progress. The Government is also concerned about the social and economic consequences of the widening knowledge gap between the generators of technology and users. Hence,

Knowledge, Science and Technology for Development will be the focus of objectives of the Government.

Goals

1. Inter-disciplinary research, with concerns with respect to poverty alleviation, tribal welfare and women empowerment.
2. Establishment of Patent Facilities Advisory Centre.
3. Technology Incubation, Dissemination, Commercialization and Utilisation.
4. Promotion of Linkage with industry, National laboratories and R&D institutions.
5. Promotion of Clean Energy Technologies.
6. Promotion of Technologies with socio-economic implications.
7. Nurturing future technology and Nationally co-ordinated projects.
8. Preparation of current Status Report on Herbal Products
9. Popularisation of Science and Technology.

A country can become industrially, economically and socially developed only through scientific discoveries and technological innovations made in our country rather than adopting and borrowing the same from other countries.

Technological leapfrogging
(Chief Minister's 15 Point Programme)

Promotion of research and development in frontier areas of science and technology like biotechnology and information technology, co-ordination efforts between academic know how and field level do how. Launching a movement for fostering greater public understanding of science and promoting a new social contact between scientists and society; providing equal attention to connectivity and content in efforts to bridge the digital divide; including access to appropriate technologies in the basic minimum needs programme.

In Tamil Nadu different autonomous organisations have been functioning to adapt to the transformations driven by new technologies in industry, agriculture, health, environment, energy, education, and other sectors and create awareness among public, students and researchers. To achieve the above desired goals, funds will be provided to the following Institutions during the Tenth Five Year Plan.

1. Tamil Nadu State Council for Science and Technology
2. Science City
3. Tamil Nadu Science and Technology Centres.
4. Science and Technology Research Programs in Universities in Tamil Nadu.

Tenth Five Year Plan Programmes

I. Tamil Nadu State Council for Science and Technology

The Tamil Nadu State Council for Science and Technology was established as an apex body and has been registered as a society under the Registration of Societies Act 1975 with the objective to maintain liaison between Government of India and the State Government and to initiate, direct and co-ordinate research activities of Government Departments, Universities and other professional Bodies with a view to aid development of Scientific Research in the State.

1. Student Project Scheme

This scheme is meant for utilising the tremendous student talent and potential by providing financial and academic support to the final year students in professional and post-graduate science students of university departments and affiliated colleges in Tamil Nadu to carry out projects which are relevant to the Society. A grant upto a maximum of Rs. 10,000 will be provided for each project for a student/ group of students. Totally, 300 projects will be supported and 750 students will be benefitted every year ($300 \times 10000 = \text{Rs. } 30,00,000$). An amount of Rs. 5,00,000 will be required for the implementation of the scheme. Hence, a total amount of Rs. 35 lakhs per year with an ultimate cost of Rs. 1.75 crores is proposed for the Tenth Plan period.

2. Science & Technology Projects

The objective of the project will be co-ordination of fundamental and applied research programmes in Institutes in the State. The scheme envisages evaluation of research proposals received from the researchers, faculty members of Colleges, University departments etc., by experts. Based on the reports of the experts, research projects will be selected and after obtaining the approval of the Executive Committee of the State Council, funds will be released to the researchers and Institutions where the Principal Investigators are working. The outlay for the Tenth Plan for this project is Rs. 2 crores.

3. Development of Young Student Scientist Programme

This is a novel scheme meant for promoting the creative talents of children of rural areas. Under this scheme, it is proposed to initially select 50 students studying in eighth standard from a district in various schools and they will be designated as 'Student Scientists'. During the Tenth Plan, it is proposed to conduct this programme in all the educational districts with an outlay of Rs. 2.5 crores, of which Rs. 1.5 crores will be obtained from Ministry

of Human Resource Development, New Delhi. The Tenth Plan outlay proposed for the State is Rs. 1 crore.

4. Young Scientist Fellowship

The objective of the scheme is to encourage young scientists below 35 years of age to equip themselves with the knowledge of latest techniques and developments in their field of research/ specialisation. The fellowship awardees can go to higher level educational institutions for 3 to 6 months. Since this scheme is useful to the research community, it is proposed to continue the same through the Tenth Plan period with an outlay of Rs. 2 lakhs from the State per year and with a matching grant by DST, New Delhi. The outlay for the Tenth Plan period is Rs. 20 lakhs and the State commitment will be Rs. 10 lakhs.

5. Partial Financial Assistance for Seminar / Symposia / Workshop

Science and Technology (S&T) communication is very vital for development of new technologies and upgradation of existing ones so that the vast Science and Technology manpower and infrastructure available in the State can be effectively utilised. Hence the conduct of scientific seminars, symposia, workshops which will help to a major extent are contemplated under this project. About 40 to 50 programmes per year will be supported. An outlay of Rs. 50 lakhs is proposed for the Tenth Plan to organise scientific conferences.

6. Application of Science & Technology to Rural Areas

The scheme helps to uplift the economic status of the rural people by transfer of science and technology techniques and scientific findings to the rural areas. An amount of Rs. 1 lakh each for ten panchayats will be provided by the State for each year. Matching grant will be obtained. The outlay for the Tenth Plan is Rs. 50 lakhs.

7. Popularisation of Science and Technology among Rural Masses and Students

This scheme is to be implemented among rural masses and students to bring out the innovative ideas and talents that are inherent in the young minds and to make the public and the students understand the principles of Science & Technology. The Council proposes to arrange Science exhibitions, Competitions, Computer training, Seminars, Science awareness programmes, etc. An outlay of Rs. 15 lakhs is proposed for each year. Matching grant from NCSTC, DST, New Delhi will be obtained. The Tenth Plan State outlay for this scheme is Rs. 75 lakhs.

8. Travel Grant

This programme is to encourage young scientists in various institutions to get to know of the recent developments in frontier areas in Science & Technology by their contribution to research findings at national and international conferences/ seminars/ workshops with partial financial assistance for travel provided by the Council. A total of 20 to 25 scientists will

be provided with financial assistance every financial year with an ultimate cost of Rs. 50 lakhs for this programme.

9. Publication of Scientific Books in Tamil

The Government of Tamil Nadu has paved a way for the Professional colleges to start teaching professional courses viz., Engineering, Medical, Veterinary and Agricultural Sciences in Tamil from the academic year 1997-98 for better understanding of the subjects by the students. Anna University has decided to teach part-time B.E. Degree courses in Tamil and the faculty members in the technical Universities and in Colleges show interest in writing books in Tamil. This will be encouraged by provision of financial assistance. The outlay for the Tenth Plan is Rs. 25 lakhs.

10. Tamil Nadu Scientists Award

The objective of the scheme is to honour scientists and technologists who have carried out significant work. The awards are for the recognition of outstanding research work done by the individual or a team of scientists of Tamil Nadu, who have contributed for the development of Tamil Nadu in particular, and the country in general. Each scientist so chosen by a Committee will be given an award of Rs. 1 lakh cash and a citation. The outlay for the Tenth Plan is Rs. 50 lakhs.

11. Manufacturing Technology Options for Rural Livelihood and Sustainable Development

The programmes to be carried out under this scheme are 1) Popularisation of orchid floriculture through adoption of mycorrhizal fungal technology, 2) Ornamental fish culture and training and 3) Utilisation of medicinal plants - technological opportunities for cultivation. This programme will benefit about 5000 people in rural areas in backward districts. The beneficiaries will be trained in the use of Science and Technology inputs by the research institutions which develop the low cost technology. The intervention activities will be based on participatory methodology. The Tenth Plan outlay for this programme is Rs. 1 crore.

12. State Level Science Congress

This scheme aims to conduct a State-level Science Congress to advance and promote the course of science in Tamil Nadu and publish proceedings, journals, transactions, etc. The participants of the Congress will be eminent scientists, technologists, policy makers, industrial executives and social activists. Symposia, Special lecture, presentation of papers/ posters will be organised. The proposed outlay for the Tenth Plan is Rs. 50 lakhs.

13. State Level Children Science Congress

State Level Children's Science Congress will provide children all over the country from 10 to 17 years a unique opportunity to use their scientific temperament and knowledge to make their ideas come true. This scheme is open to both school going children and dropouts and the non school children

from the marginalised sections of the society. The outlay proposed for the Tenth Plan is Rs. 50 lakhs.

14. Training the P.G. Students for NET, lectureship by UGC & CSIR, GATE conducted by IITs for Rural students

This programme will create awareness among them about various research scholarships offered by Government of India and how to apply and prepare for the examinations conducted for the award of these scholarships. An outlay of Rs. 50 lakhs is proposed for this scheme.

15. Intellectual Property Right (IPR)

Tamil Nadu State Council for Science and Technology will create Intellectual Property Right Advisory cell where guidance and advice would be given to scientists coming out with new ideas. Advice on the method of registration for patent recognition under IPR Act may be given. The Tenth Plan outlay for this scheme is Rs. 25 lakhs.

16. Technology Incubation and Dissemination

Under this programme, the State Council instead of supporting basic research projects will identify a few projects in the final stages of research work and help the scientists in transferring them from the laboratory to the field or industry. An outlay of Rs. 50 lakhs is proposed for the Tenth Plan for this scheme.

17. Ongoing Expenditure

This provision is intended to cover expenses connected with the establishment of the Tamil Nadu State Council for Science and Technology such as pay and allowances of the ministerial staff (one typist, one driver, 3 office assistants, contingent staff), rent for office buildings and electricity charges, motor car maintenance, postage and telegrams, telephones, stationery & printing etc. The proposed Tenth Plan outlay is Rs. 75 lakhs.

18. Technological Leapfrogging

The Chief Minister has unveiled a plan to make the State the best developed State in the country through the 15 points programme. The Council intends to provide financial support for R & D in the following Science and Technology areas which will promote technological leapfrogging and provide substrate condition for enhanced national and foreign investments in the areas indicated below. An amount of Rs. 1.50 crores has been proposed for the Tenth Five Year Plan period.

**Research & Development to promote
Technological Leapfrogging**

- (i) *Energy*: R & D and renewable energy technologies such as harnessing energy sources like Solar, bio-gas bio-mass, wind energy will be promoted. Efforts towards improving the efficiency of the system, development of new devices and materials for energy applications etc., will also be encouraged.
- (ii) *Environment*: Support for development and improvement of traditional knowledge systems having linkage in the principles of ecology particularly with reference to use and re-use of materials, recycling of available materials and management of solid waste and organic waste etc. will also be addressed adequately.
- (iii) *Health and Medicine*: Support for the traditional knowledge systems of the country particularly with reference to health systems that can be used at the grass-root level for emergency medicine and health care system which will provide alternate and lasting solutions at rural level will be supported for further R & D.
- (iv) *Agriculture & Nutrition*: R & D support will be provided to agricultural technologies and innovations which incorporates traditional systems and provides nutritional security apart from support for innovations in bio – pesticides, bio – fertilizers etc.
- (v) *Social sector*: Support to S & T inputs towards developing gender and social equity and support to activities involving S & T inputs aimed at improving the employment potential, economics of deprived class will be provided.
- (vi) *Scientists and Society*: Activities which promote inter action and exchange of information and ideas between scientists and society particularly with a view to developing and promoting technological empowerment will be promoted.

An outlay of Rs. 13.35 crores is proposed for the Tenth Five Year Plan as budgetary support for implementing various Schemes. The details are given in Table.

Tamil Nadu State Council for Science and Technology**Allocations for schemes****(Rs. in crores)**

S.No	Name of the Scheme	Outlay
1	Student Project scheme	1.75
2	New and On-going Science & Tech. Project	2.00
3	Development of Young Student Scientists for Rural Areas	1.00
4	Young Scientists Fellowship scheme	0.10
5	Partial Financial Assistance for seminar symposia Workshop	0.50
6	Application of Science and Technology to Rural Areas	0.50
7	Popularisation of Science and Tech. Among Rural Masses & Students	0.75
8	Travel Grant	0.50
9	Publication of Scientific Books in Tamil	0.25
10	Tamil Nadu Scientists Award	0.50
11	Manufacturing technology options for rural livelihood and sustainable development	1.00
12	State level Science Congress	0.50
13	State level Children Science Congress	0.50
14	Training the P.G. students for NET, lectureship by UGC& CSIR, GATE conducted by IITs for rural students	0.50
15.	Intellectual Property Right (IPR) - Patent registration	0.25
16	Technological innovation & Dissemination	0.50
17	Ongoing Expenditure	0.75
18.	Technological Leapfrogging and providing the substrate conditions	1.50
	Total- Grants to Tamil Nadu State Council for Science and Technology	13.35

II. Science City

The Adayar – Taramani – Guindy Area, designated as Science City has about 60 institutions involved in education, research and testing facilities particularly in the field of Science and Technology. These institutions together command a great deal of invaluable resources, which can be effectively utilised for the development of Science at large. With this in mind Science City has planned to carry out the following activities:

- 1) Promotion of Science & Technology components involving existing and new institutions.
- 2) Promoting the technology transfer component involving industrial houses and venture capital agencies.
- 3) Promoting the global technology monitoring and forecasting.
- 4) Establishing a complex for the member institutions of the Science City, maintaining and operating it including necessary infrastructure facilities with a view to organize national and international conferences and exhibitions.

- 5) Promoting application of science and technology in those areas of socio economic and environmental developments.
- 6) Encouraging scientific collaboration and technical co-operation among the institutions in the Science City area.
- 7) Promoting a Science Park and International Technical Cooperation and Collaboration bilaterally and multilaterally for setting up new institutions in collaboration with other agencies.
- 8) Converting Science City into an Eco City.
- 9) Honouring outstanding personalities in the field of Science and Technology.

Tenth Five Year Plan Programmes

1. Preparation of Databases on S&T Resources in the Science City and at State level

The objective of the scheme is to create a database of Scientists, Science & Technology manpower, their field of expertise and the research and infrastructure facilities available in the various institutions in the State of Tamil Nadu as a whole. The period of this project is three years. The cost per year is Rs. 10 lakhs for a period of three years and the recurring cost is Rs. 5 lakhs for five years. Hence the outlay for Tenth Plan is Rs. 35 lakhs.

2. Setting up of Bio-Technology Incubator Park

It is proposed to set up a common state-of-art Bio-technology R & D facility for the use by researchers of Universities, Government bodies, NGOs, Research Institutes, Industrial and Private Entrepreneurs and Venture Capitalist at Anna University in their Biotechnology complex. A space measuring approximately 5000 sq.ft is available in the Bio-technology complex. The facilities to be created are communication facilities including computers and required furniture. The non-recurring expenditure for this project is Rs. 75 lakhs and the recurring expenditure is Rs. 25 lakhs per year. The Tenth Plan outlay is Rs. 1.97 crores.

3. Popularisation of Science

The basic concept of Popularisation of Science is to promote Science and Technology, take it to the masses, induce scientific essence and knowledge among children, develop interest in Scientific inventions and experiments to benefit the Scientific Community within Science city. To this end, Science city is organising various programmes like web quiz, science camps for the benefit of students of science city, seminars and trainings for students. In addition, Science city proposes to organise inter-city and intra-city science exhibition and science talent contest. The cost per year is Rs. 30 lakhs. The outlay proposed for the Tenth Plan is Rs. 1.5 crores.

4. Gender Cell Activities

Science city introduced the concept of Gender cell and included it as one of the major concepts. As part of this programme, women scientist's forum has been formed and is headed by the Vice-Chairman of Science City.

Women Scientist from various academic institutions and other Science & Technology organisations are members of the forum. A State level directory for women is under preparation. The outlay proposed for the Tenth Plan is Rs. 1 crore.

5. Networking of Libraries

Science thrives and flourishes on communication and exchange of information. Science and Technology know no boundaries and the holdings of any one library cannot satisfy the needs of an individual, nor can any library afford to buy all the materials required by its institution. In such a scenario, co-operative and collaborative programmes, in short, networking of libraries become essential. With this in mind, Science City has embarked on a project for Networking of libraries to facilitate access to satisfy information requirements. The project envisages networking of all the automated libraries by fibre optic cables. The outlay provided for this project in the Tenth Plan is Rs. 1 crore.

6. Environment Related Activities

This scheme aims at safeguarding the environment and maintaining good quality of life within Science City. The overall objective of the scheme is to ensure clean, pollution free environment for better quality of life. Science City is working towards making Science City a Zero Garbage, Wastewater Management, Energy efficient and Green Belt Development. The proposed outlay for Tenth Plan is Rs. 1 crore.

7. Research Scholarships

Proposals will be invited from students to carry out their Ph.D work from all the Science City Member Institutes. The invited proposals will be scrutinised by an expert committee and those that have direct relevance to the activities of Science City will be given preference. The scholarship will be given for a minimum period of 3 years for completing the Ph.D programme. An outlay of Rs. 17.50 lakhs is proposed for the Tenth Plan.

8. Awards

Science City had initiated the Children's Science Academy Award in the year 2001 for school students of IX, X, XI standards in Tamil Nadu which is the first of its kind in the State. The projects will be received in the areas of Biological Science, Social Science, Computer Science, Mathematical Science, Physical Science and Chemical Science. An expert committee will scrutinise the projects and select students for this prestigious award. The winners of the award will be invited to a Science camp arranged exclusively for them. The Tenth Plan outlay for this scheme is Rs. 10 lakhs.

Life Time Achievement award are given to honour women scientists above the age of 65 who have excelled and contributed immensely in the field of Science and Technology. The committee nominated by the Tamil Nadu State Council for Science and Technology will do the selection of the awardees. The Tenth Plan outlay for this scheme is Rs. 7.50 lakhs.

Young Women Scientist Award are given to encourage women scientists below the age of 40 who have excelled and contributed immensely in the field of Science and Technology. The committee nominated by the Tamil Nadu State Council for Science and Technology will do the selection of the awardees. The Tenth Plan outlay for this scheme is Rs. 5 lakhs.

9. Ongoing Expenditure

This provision is intended to cover expenses connected with the establishment of Science City, such as pay and allowances of all the officers of Science city, motor car maintenance and fuel, postage and telegrams, telephones, stationery & printing, office expenses, etc. The Tenth Plan outlay proposed for the ongoing schemes is Rs. 1.82 crores.

Thus totally, the outlay as Plan Grant to the Science City Project will be Rs. 9.05 crores, as set out below:

Science City
Allocation for Schemes in Tenth Five Year Plan
(Rs. in crores)

S. No	Name of the Scheme	Outlay
1	Preparation of Database on Science & Technology Resources in Science City and at the State level	0.35
2	Setting up of Bio-technology Incubation Park	1.97
3	Popularisation of Science	1.50
4	Gender Cell	1.00
5	Networking of Libraries	1.00
6	Environment Related Activity	1.00
7	Research Scholarships	0.18
8	Awards -	
	a. Children's Science Academy Awards	0.10
	b. Life Time Advance Award	0.08
	c. Young Women's Scientist Award	0.05
9	On-going Revenue Expenditure	1.82
Total- Plan Grants to Science City		9.05

III. Tamil Nadu Science and Technology Centre

The Tamil Nadu Science and Technology Centre was established in the year 1983 and is functioning with the financial assistance of Government of Tamil Nadu. The Tamil Nadu Science and Technology Centre has set up Periyar Science and Technology Centre and B.M.Birla Planetarium in Chennai. Besides this, a Mobile Science Bus with 24 built-in exhibits is touring all places in Tamil Nadu, as part of extension activities to cater to the needs of rural students also.

The objectives of the Tamil Nadu Science and Technology Centre are as follows:

1. To spread and popularise Science and Technology among the general public in the rural and urban areas by setting up Science Centres in different parts of Tamil Nadu.

2. To create awareness for the general public and the students about the basic principles and developments in Science and Technology mainly through interactive exhibits.
3. To supplement and complement the formal science education imparted in schools and colleges.
4. To train teachers in developing teaching aids for science instruction with a view to improve the quality of School Science Education in the State.
5. To undertake Scientific Research in the areas of Science and Technology including ecology and Astronomy.
6. To provide research facilities for pursuing basic and applied research.
7. To organise Seminars, Science exhibitions, Science Camps, Popular Lectures, Training Programmes and Workshops for students, Teachers and general public.

Tenth Five Year Plan Programmes

1. Establishment of Regional Science Centre including Planetarium at Coimbatore

With the objective of establishing a Regional Science Centre at Coimbatore, a sum of Rs. 10 lakhs as seed money for acquiring land for the Regional Science Centre with Planetarium was provided. A land measuring 5.91 acres near Coimbatore has been alienated and the Centre has taken possession. Now Planetarium building is to be constructed at Coimbatore with infrastructure facilities like air-conditioning, provision of chairs, sky theatre, etc. An outlay of Rs. 3 crores is proposed for the Tenth Plan for this purpose. It has been proposed to establish two halls of science in the proposed Regional Science Centre at Coimbatore with an outlay of Rs. 80 lakhs. In the proposed two halls of science, interactive exhibits are to be provided. The exhibits are participatory type, so that the visitors could themselves operate and learn the concept behind the scientific knowledge. An outlay of Rs. 60 lakhs is proposed for the Tenth Plan period. Thus, a sum of Rs. 4.40 crores is provided for the Tenth Plan period.

2. District Science Centre at Vellore

During IX Plan, the scheme of setting up of District Science Centre at Vellore was approved and a piece of land measuring 0.30.5 hectare was acquired for this purpose. Four halls of science with an administrative office building are to be constructed in the site with an outlay of Rs. 1.50 crores proposed for the Tenth Plan. Interactive exhibits of participatory type are also proposed to be provided in the four halls with an outlay of Rs. 80 lakhs. The visiting public and students can gain scientific knowledge by operating the exhibits. Hence, a sum of Rs. 2.30 crores is provided for this scheme in the Tenth Plan.

3. Anna Science Centre, Tiruchirappalli

This centre was established and dedicated to the Nation in 1999. Two galleries on popular science and energy are proposed to be established in this centre for which buildings with an area of 500 sq.mts each have to be constructed. An outlay of Rs. 80 lakhs for construction and Rs. 60 lakhs for provision of exhibits have been proposed for the Tenth Plan. The total outlay proposed for Tenth Plan is Rs. 1.40 crores.

4. Periyar Science and Technology Centre and B.M.Birla Planetarium

The Periyar Science and Technology Centre and B.M.Birla Planetarium Centre is located in Chennai. During the Tenth Plan, it is proposed to take up the following schemes with a view to strengthening the infrastructure facilities thereby increasing the utility of the centre.

- | | |
|---|--------------|
| a. Provision of additional infrastructure facilities such as X-Y tables | Rs. 26 lakhs |
| b. Provision of 6 nos., of B type projectors with computers | Rs. 12 lakhs |
| c. Provision of 15 KVA UPS | Rs. 6 lakhs |
| d. Modernisation of existing 8 galleries | Rs. 10 lakhs |
| e. Strengthening of Science Park, Traffic Park, Eco Park etc. | Rs. 5 lakhs |
| f. Establishing Herbal Garden | Rs. 5 lakhs |

The total outlay proposed for Tenth Plan for Periyar Science and Technology Centre and B.M. Birla Planetarium is Rs. 64 lakhs.

5. Ongoing Schemes

The Tenth Plan outlay for ongoing schemes is Rs. 7.15 crores to cover the spillover of Ninth Plan and the recurring expenditure for the Tenth Plan period. This provision is intended to meet the expenses connected with the establishment of Tamil Nadu Science and Technology Centre, such as pay and allowances of all the officers, motor car maintenance, fuel, postage and telegrams, telephones, stationery & printing, office expenses, etc.

Thus, the outlay for the Tenth Five Year Plan as Plan grant for the Tamil Nadu Science and Technology Centre will be Rs. 15.89 crores. The details of the schemes are given in Table.

**Science & Technology Centre
Allocation for Schemes in Tenth Five Year Plan**

Sl. No	Name of the Scheme	Outlay (Rs. in crores)
1.	Regional Science Centre & Planetarium at Coimbatore(*)	4.40
2.	District Science Centre at Vellore (**)	2.30
3.	Anna Science Centre, Tiruchirappalli (***) a. Establishment of Popular Science Gallery b. Establishment of Gallery on Energy	0.70 0.70
4.	Periyar Science and Technology Centre and B.M. Birla Planetarium, Chennai	0.64
5.	On-going Plan Expenditure	7.15
	Total- Plan grants to Tamilnadu Science and Technology Centre	15.89

(*) For provision of Projector and allied equipments a High Level Fund Raising Committee is being constituted to mobilize funds to the tune of Rs. 6 crores

(**) District Science Centres have sustainable activities on alternate sources of energy and demonstration of technology role based science and technology programmes and gender issues.

(***) For establishment of Environment Gallery (500 Sq. mt.) the Government have already sanctioned Rs. 0.25 crore construction of Buildings, for which the Indian Oil Corporation has sponsored the provision of exhibits to the tune of Rs. 0.30 crore

IV. Science and Technology Research Programmes in Universities of Tamil Nadu - Plan Grant to Anna University

There is a need to continue to provide assistance to Universities for research programmes in S & T.

A. Continuing Schemes

1. COSIST-Centre for Water Resources (CWR)

UGC has sanctioned non-recurring and recurring grant to the CWR of this University under COSIST programme. The UGCs assistance for the recurring expenditure had been available upto March 1993 and the Government of Tamil Nadu has agreed to bear the recurring expenditure of Rs. 1 lakh from then onwards. The Centre's mission is towards a sustainable management of inland water resources through planning, development and utilisation with consideration to technical, environmental, social and institutional factors. The Centre has been pursuing a multipronged approach towards fulfilling this mission. The Tenth Plan outlay proposed for this scheme is Rs. 24.50 lakhs.

2. Centre for New and Renewable Sources of Energy (CNRSE)

The aim of developing CNRSE in Anna University is to produce energy experts. Every year a P.G programme on M.E Engineering is offered. The Government of Tamil Nadu have approved this scheme for establishing a centre at the University and sanctioned the non-recurring and recurring grant for this purpose. An outlay of Rs. 50 lakhs is proposed for the Tenth Plan.

3. DSA - Centre for Environmental Studies

Under the special assistance programme, UGC has sanctioned non-recurring and recurring grant to the Centre for Environmental Studies of this

University upto March 1992. The Government of Tamil Nadu has agreed to bear the recurring expenditure of Rs. 4.20 lakhs per annum and released grants upto 2000-01 except for the year 1999-2000. Public Health Engineering Department and the Water Supply Board Engineers are given in-service training in 'Sewerage Treatment Plant Designs' which will help them in formulating such plants in urban areas. Similarly, a special in-service training is given to the engineers in 'Water Distribution Network Analysis' in Distribution System Design using computers. An outlay of Rs. 70 lakhs is proposed for the Tenth Plan.

4. DSA - Centre for Water Resources

The field of irrigation and water resources assumed strategic proportions in the seventies due to changes in the philosophy of water management and execution of Irrigation projects. To meet this requirement, the Centre was sanctioned with a multi-disciplinary team by the UGC under its DSA programme which was further continued by the Government of Tamil Nadu. Hence, an outlay of Rs. 1.43 crores is proposed for the Tenth Plan.

5. Establishment of Research-cum-Documentation Centre for Centre for Human Settlements

Government of Tamil Nadu approved the scheme of Establishment of Research-cum-Documentation Centre for the Centre for Human Settlements at this University. Recurring and Non-recurring grant has also been sanctioned. The programme content includes organising training at National and International level on subjects relating to urban and regional developments, spatial planning, capacity building for urban local bodies and the like. The Tenth five year Plan outlay is Rs. 77 lakhs.

6. Institute of Remote Sensing

Institute of Remote Sensing is carrying out pilot studies for evolving methodology in Remote Sensing applications to gather information on natural resources like soil, water, minerals, forest and fisheries and also carrying out experimental and operational projects for resources evaluation, monitoring and management. Short-term courses are conducted for scientists and engineers. For developing a data bank to serve as central facility where input data products like aerial photographs, satellite data in the form of imagery and CCT, topographical maps and digital database could be stored for ready reference, the Tenth Plan outlay is Rs. 3.46 crores.

7. Setting up of Research and Documentation Lab for Textile chemistry.

The Government of Tamil Nadu has approved this scheme and sanctioned non-recurring and recurring grant. Since this is a continuing scheme, the Government has issued a standing sanction for the drawal of a grant of Rs. 0.25 lakh every year towards the miscellaneous expenditure for this scheme. The Tenth Plan outlay for this scheme is Rs. 1 lakh.

8. Strengthening of Research facilities

The Government of Tamil Nadu has approved this scheme and sanctioned non-recurring and recurring grant. Since this is a continuing scheme, the Government has issued a standing sanction for the drawal of a grant of Rs. 0.25 lakh every year towards the miscellaneous expenditure for this scheme. The Tenth Plan outlay for this scheme is Rs. 1 lakh.

9. DSA - Chemical Engineering

The UGC has sanctioned non-recurring and recurring grant to the Chemical Engineering Department of Anna University. Under this scheme, two posts of Professors, one Senior Technical Assistant and one Junior Technical Assistant and one typist have been sanctioned. The nature of this job is to share the teaching load of various faculties in the above mentioned branches of study. The UGC's assistance for the recurring expenditure has been available upto March 1988. The Government of Tamil Nadu has been bearing the expenditure since then. An outlay of Rs. 68 lakhs has been proposed for the Tenth Plan.

B. Programmes under Technological leapfrogging

The Anna University has identified the following two programmes under Science & Technology with particular reference to Technological leapfrogging for which the outlay will be Rs. 1.25 crores. The details of the programmes are as follows:

Anna University will undertake research with the objective of taking the benefits of the recent findings of emerging/ thrust areas like bio-technology, Information Technology, Electronic media, Remote Sensing, Environmental studies etc., to the community to improve the quality of life. Field projects will be designed making use of the research findings in India and abroad to be implemented in Tamil Nadu. An outlay of Rs. 85 lakhs has been proposed.

New cost effective, environmental friendly techniques are adopted in developed countries in construction and maintenance of infrastructure facilities. Beneficial research findings in areas such as bio-technology, Information Technology, Electronic media, Remote Sensing, Environmental studies, Transportation, Energy management etc., have not reached the society. Contact programmes / Seminars / Workshops will be organised by the Anna University to transfer technological development of societal advancement involving NGOs and beneficiary agencies. Booklets and reports will be prepared both in English and Tamil with a view to explain the findings of the research and the possibilities of their adoption in the field to improve overall quality of the concerned systems. An outlay of Rs. 40 lakhs is proposed.

Thus, totally an outlay of Rs. 9.06 crores is proposed for the Tenth Five Year Plan as Plan grants to Anna University for continuing the ongoing Projects started during the earlier Plans. The details are given in the Table below.

Plan Grants to Anna University
Allocation for Schemes in Tenth Five Year Plan
(Rs. in crores)

S.No.	Name of the Schemes	Outlay
A.	Continuing Schemes	
1.	COSIST-CWR	0.25
2.	Centre for New and Renewable Sources of Energy	0.50
3.	DSA - Centre for Environmental Studies	0.70
4.	DSA - Centre for Water Resources	1.43
5.	Establishment of Research-cum-Documentation Centre for Centre for Human Settlements	0.77
6.	Institute of Remote Sensing	3.46
7.	Setting up of Research and Documentation Laboratory for Textile Chemistry	0.01
8.	Strengthening of Research facilities in Bio-technology	0.01
9.	DSA Chemical Engineering	0.68
B.	Programmes under Technological leapfrogging	1.25
	Total- Plan Grant to Anna University	9.06

The research project proposals of the Medical University, Agricultural University, Tamil Nadu Veterinary and Animal Sciences University, Madras University, etc., will be covered in the Sectoral outlays for the respective departments.

Tenth Five Year Plan (2002-2007) Outlay

For Science & Technology the total outlay will thus be Rs. 47.35 crores as given in Table below.

Outlay for Tenth Five Year Plan

S.No	Name of the Institutions	Outlay
I	Tamil Nadu State Council for Science and Technology	13.35
II	Science City	9.05
III	Tamil Nadu Science and Technology Centres	15.89
IV	Anna University	9.06
	Total – Science & Technology	47.35