

# CHAPTER 11

## SCIENCE & TECHNOLOGY (INCLUDING METEOROLOGY)

Science and Technology has made significant progress in various disciplines and continues to play an important role in the socio-economic development of country. The emphasis has been to maintain a strong science base, develop technological competence and implement focused programme in various disciplines of science & technology. Some of the major achievements of the various S&T departments /agencies during the Annual Plan (2000-01) and the programme proposed for the Annual Plan (2001-02) are briefly highlighted below.

### DEPARTMENT OF SPACE

#### Major Achievements in 2000-01:

2. The GSLV, with complex developments involving Cryo stage has successfully completed all the developments and flight hardware realization phase. The GSAT-1 satellite for digital audio and data broadcasting services made final preparations at launch pad. There has been significant progress in Cryo Upper Stage (CUSP), second launch pad and PSLV projects also. The INSAT-3B satellite, the first in the INSAT-3 series, was successfully launched on March 22, 2000 and is providing fixed satellite services. One of the important developmental applications of this satellite have been for developmental communications in Orissa under "Vidya Vahini" yojana dedicated for the development of rural society. One transponder in the satellite is also used for setting up education and training network in Andhra Pradesh. The INSAT-3C has achieved substantial progress. The payload fabrication and testing are completed. The assembly, integration and testing of the spacecraft is in advanced stages. GRAMSAT satellite based network for developmental applications were initiated in Orissa with the launch of INSAT-3B and have been expanded in the states of Karnataka, Gujarat, Maharashtra, Goa, Rajasthan and West Bengal.

3. A pilot project on Tele-health services has been initiated in a small town "Aragonda" in Andhra Pradesh and is connected to a private hospital in Chennai to enable easy and remote referral services for medical expertise. Substantial progress was made in spacecraft and payload fabrication in the Technology Experiment Satellite (TES). The data from Oceansat (IRS-P4) launched in May 1999 have been extensively utilized for oceanographic studies including potential fishing zone forecast and retrieval of ocean/marine atmospheric parameters. With the concerted and well co-ordinated efforts with various user departments, the data from IRS satellites have been used in several applications projects of national importance including National drinking water mission and land slide zonation.

## **Major Programmes for the Year 2001-02:**

4. The major activities for the year 2001-02 include: Launch and operationalisation of INSAT-3C, a communication satellite and INSAT-3A, a multipurpose communication and meteorology satellite; launch of Technology Experiment Satellite (TES) to demonstrate advanced high resolution imaging technologies and third operational flight of PSLV –C3 with TES satellite and two other auxiliary foreign satellites viz., PROBA of Belgium and BIRD of Germany; Launch and operationalisation of METSAT, the meteorological satellite and fourth operational flight of PSLV-C4 to launch METSAT.

5. Activities on various ongoing projects like IRS-P5 (Cartosat-1), IRS-P6(Resourcesat), IRS-2A (Cartosat-2), INSAT-3D/3E, Second Launch PAD, GSLV –D2/GSAT-2, CUSP and application programmes will be progressed commensurate with their launch targets. The main thrust of INSAT-3 programme will be to achieve substantial progress in hardware realization for INSAT-3E satellite and development of the advanced meteorological payload for INSAT-3D. Development of GSAT-3 satellite will also be initiated after finalizing the payload configuration. Completion of the payload fabrication and advancing the Space craft fabrication, integration and testing of IRS-P6 (Resourcesat ) will be an important target under IRS programme. Most of the fabrication work on IRS-P5 (Cartosat-1) would be completed. Progress towards the second developmental flight of GSLV-D2/GSAT-2 will be a major activity in the launch vehicle area. Efforts will be made towards engine tests, realisation of additional engines and the proto-stage under the CUSP project. The activities relating to structural fabrication and erection of sub-systems like umbilical tower, launch pedestal tower etc. for the Second Launch Pad would be continued.

6. In the area of space applications, the thrust will be laid for establishment of Gramsat Networks in various States for developmental purposes. The Jhabua Development Communication Project ( IDCP) would be expanded. Efforts will be made to evolve a suitable institutional framework to replicate the programme in other districts/states in a phased manner. Training and Development Communication Channel(TDCC) network with more uplinks and new technologies for distance education and training would be expanded. Activities on various application missions such as National Drinking Water mission, Expansion of National Natural Resource Information System (NRIS), Crop production and acreage estimation, Bio-diversity characterization, Land slide zonation studies and drought /flood monitoring will be continued.

## **DEPARTMENT OF ATOMIC ENERGY (R&D Sector)**

### **Major Achievement in 2000 –2001**

7. The major activities/achievements have been related to the development of: technology to design, build, operate and maintain nuclear power reactors of PHWR type, next generation nuclear reactors for exploiting vast reserves of thorium; reprocessing of nuclear materials and fuels for reactors, spent fuel; recycling fertile and fissile materials and management of the nuclear wastes; refurbishing of CIRCUS research reactor, design

and procurement for core conversion of APSARA reactor to Multi Purpose Research Reactor (MRPR) and engineering development of Advanced Heavy Water Reactor (AHWR); setting up a Critical Facility for AHWR & 500 MWe PHWR; designing, engineering of Advanced Compact Core Reactor experimental facility; construction of Synchrotron Radiation Source (SRS)-Indus-1; introduction of mixed oxide (MOX) fuel in Tarapur. Waste Immobilization Project at Trombay for the treatment and immobilization of high and medium level liquid wastes generated from Plutonium plant, Trombay has been completed. Development of future nuclear reactors for exploiting the vast reserves of thorium was initiated.

8. The design and engineering of Advanced Reactor Experimental Facility was completed. A facility for separation of Uranium-233 from thoria and thorium targets irradiated in DHRUVA and CIRUS reactors completed. The other important activities have been relating to development of: high yielding and virus resistant varieties of Black Gram and Soyabean, 3 MeV and 10 MeV electron accelerators and setting up of Electron Beam Centre at Khargar, the fuel for Prototype Fast Breeder Reactor (PFBR), food irradiator for potatoes and onions (POTON), desalination plant at Kalpakkam, multi centre trials on phosphorous-32 coated stents for use in angioplasty, liquid filled balloon approach for endovascular beta irradiation to prevent restenosis after angioplasty, CO<sub>2</sub> and their applications, heavy ion accelerator and ion beam programmes. A process for obtaining a thick coating of chromium nitride on stainless steel components for PFBR has been developed. The liquid helium plant was commissioned. The technology for the fabrication of the honeycomb chambers of Photon Multiplicity Detector (PMD) developed.

### **Major Programmes for the Year 2001-2002**

9. The major R&D activities would include: engineering development for AHWR; development of new methods for decontamination, minimizing bio-fouling, understanding thermodynamic and structural properties of proposed new fuels and spent fuels; development of advanced reprocessing technology, R&D projects in hi-tech areas of accelerators, lasers and related technologies, etc. The other important activities to be taken up would include: augmentation of fuel fabrication facilities, development of process of plutonium based fuels and their characterization, augmentation of MOX fuel fabrication facility at Tarapur, development of tele-robots, tele-manipulators and high speed rotor, construction of Indus-2 cyclotron, superconducting cyclotron, heavy ion program, radioactive ion beam facility, exploration of rare gas (Helium) from hot springs, food irradiator facilities at Lasalgaon near Nashik to demonstrate the feasibility of increasing the shelf life of Potatoes and Onions, bio-evolving high yielding food crops and delaying or preventing post-harvest losses by increasing shelf-life, developing newer modalities for low dose cancer radiotherapy and employing molecular and isotope techniques in basic biology for disease diagnosis and finger printing of individual and population groups, processing of radio-isotopes for supply to various users and for formulation of a variety radio-pharmaceuticals, etc

10. The other programmes include construction of pilot facilities for waste solvent, designing and building of the Steady-State Tokamak for thermonuclear fusion research at the Institute for Plasma Research, development of 100 Giga Flop sustained performance

ANUPAM system using 128 node Alpha processor, strengthening of seismic monitoring and data processing

## **DEPARTMENT OF SCIENCE AND TECHNOLOGY**

### **Major Achievements in 2000-01**

11. R&D programmes / projects in new and emerging/challenging areas were supported by Science and Engineering Research Council (SERC). Several initiatives have been taken to promote research like enhancement of number of fellowships to cover science, engineering and medical students at the graduate level, support to Kishore Vaigyanik Prothshahan Yojana (KVPY) to encourage young students right from the school level to take research as a career; provide fund for Improvement of S&T Infrastructure in Academic and related Institutions (FIST); SERC Fast Track Scheme for Young Scientists to provide support to bright young scientists below the age of 35 years; launching of integrated Science Olympiad programme at National level; strengthening of BOYCAST programme etc. Number of R&D facilities were set up/strengthened which include in the areas of : Laser scanning confocal microscope facility; National facility for isotope discrimination studies for Water Efficiency Use (WEU); experimental and theoretical studies in non-accelerator particle physics; design, synthesis and bioactivity determination of antagonist analogs and mimetics of vasoactive intestinal peptide (VIP) for cancer therapy, new anti cancer compounds; rational design synthesis and screening of new anti-microbial macrolides, national facility on Geochronology/Isotope Geology, upgradation of seismological observations network in Himalayan region, upgradation of earthquake mitigation research related activities, providing V-SAT communication links at selected seismological observatories. For promotion of S&T entrepreneurship development, activities relating to Entrepreneurship Awareness Camps (EACs); Entrepreneurship Development Programmes (EDPs); Technology based EDPs; Faculty Development Programmes; Entrepreneurship Development Cells (EDCs); S&T Entrepreneurs Parks (STEOs) were pursued .

12. In the areas of meteorology, upgradation of existing cyclone detection network of IMD by deployment of Doppler Radars is in progress. Equipment for establishment of 10 High Wind Speed Recorder Station in Coastal Areas have been installed. Order for procurement of 4 Nos. skopographs for installation at International Airports for automatic landing of aircrafts has been finalized. Action for procurement of remaining equipment for Augmentation of Air pollution Lab at Pune is in progress.

### **Major Programmes for the Year 2001-02**

13. R&D programmes would be further strengthened under the SERC mechanism particularly in the universities and academic institutions in the areas of plant sciences, soft condensed matter physics , lasers and quantum optics, boundary layer modeling, crystal engineering, earth sciences applications for societal needs, geophysical exploration, mathematical sciences, glaciological studies in the Eastern Himalaya; support to seismology programme relating to seismological observatories and strong motion instrumental arrays,

strengthening of observational network and other collateral geophysical studies in critical seismogenic areas, etc. Efforts would be continued to support collaborative research projects leading towards drug development in the area of diseases like tuberculosis, leprosy, malaria, skin disorders like leucoderma, gastrointestinal disorders like diarrhea, diabetes, hypertension, cardio-vascular disorders and other prevalent infectious diseases in particular acute respiratory infections.

14. The IS-STAC will continue to provide a framework for R&D support in the socio-economic ministries through the support to Joint Technology Projects. The status of ongoing projects will be reviewed and the future vision for STACs will be evolved. Specific programmes for socio-economic upliftment of weaker sections of the population in farm and non-farm sectors are likely to be developed focusing on technological empowerment of people with optimum utilization of local resources, material and skills. Based on the success of some individual projects, coordinated programmes on integrated farming system and sustainable agriculture are proposed to be initiated in different parts of the country to benefit small and marginal farmers. A coordinated programme on water health and sanitation for owning and sustaining drinking water in 10 different agro-climatic locations will also be initiated with active participation of women. Two more women technology parks at East Coastal region (Orissa) and Cyclone prone area of Andhra Pradesh; and some more rural technology parks in North East will be set up. A coordinated programme on fisheries in Garhwal Himalayas will also be launched. DST would continue to support its various autonomous research institutions including TIFAC, Vigyan Prasar and NABL Professional Bodies. In the areas of meteorology, major activities would be to strengthen the cyclone detection by deploying Doppler radar besides supplying various programme on weather forecasting.

## **DEPARTMENT OF BIOTECHNOLOGY**

### **Major Achievement in 2000 –2001**

15. The Human Resource Development Programmes have been strengthened by launching, six new post graduate programmes in biotechnology to generate skilled human resource; Five National Bioscience Awards for Career Development to young scientists and Three National Women Bio-scientists awards; creation of G.N. Ramachandran chair and UNESCO Biotechnology chair awards were instituted at Indian Institute of Science, Bangalore. In the areas of medical biotechnology programmes the major achievements include supply of 1.3 lakh doses of Immunomodulator 'Leprovac' for treatment of leprosy patients through NGOs and some hospitals; regular use of MAC –ELISA system for diagnosis of dengue virus infection by major hospitals and regional centres; transfer of technology on MAC-ELISA system for detection of Hepatitis A infection to M/S Bharat Biotech Ltd., Hyderabad, etc.

16. National Bioresource Development Board (NBDB) was established with the objectives of utilization of bioresources for the development of products and processes through the application of modern biology. Several major programmes have been initiated which include Indian Initiative for Rice genome sequencing as part of International Rice Genome

sequencing programme, bioprospecting of North East jointly with Department of Space and biomapping of Meghalaya State has been successfully carried out; a National Facility of Virus Diagnosis and Quality Control of Tissue Culture Raised Plants for certifying planting material to boost the industrial production of tissue cultured plants; a transgenic containment facility established at NBPGR, Delhi for testing the transgenics; an International Depository Authority on microorganisms established by upgradation of existing Microbial Type Culture Collection facility at Institute of Microbial Technology, Chandigarh.

17. Under environmental biotechnology programmes, biobeneficiation and desulphurisation technologies perfected and transferred to industry. Technology packages for eco-restoration of mine spoil dumps, microbial remediation of petroleum sludge and oil spill, photo remediation of dye industry effluent treatment standardized and transferred to industry. Technologies in the areas of tissue culture, biofertilisers, biopesticides and feed development have also been transferred to industry for commercialisation.

### **Major Programmes for the Year 2001-2002**

18. The Human Resource Development Programmes would be consolidated and support would be provided to Post-graduate and Post doctoral courses with adequate linkages involving UGC. Repositories and biotech facilities would be reviewed for consolidation and continuation. Programme support at Indian Institute of Science, Bangalore; CCMB, Hyderabad; Rajiv Gandhi Biotechnology Centre, Trivandrum would be continued. A network programme on toxicological evaluation of GM food and certification for assessment of safety would be developed. The major initiatives proposed would include development of DNA based vaccine for major carps, biocleaning agents and establishment of centre of excellence in marine biotechnology; development of transgenic microbial inoculants for wheat genomic programme; improvement of crops like tea, spices, apple, jute through tissue culture; R&D programme on various aspect of buffalo genomics, etc .

19. In medical biotechnology area, the major emphasis would be to transfer a large number of prototypes test systems to suitable industries for up-scaling and commercialisation; to undertake R&D projects in the area of stem cell biology and oral cancer; to establish "GEN-NET INDIA" to cure, control and care genetic disorders prevalent in the country along with the development of network programmes on human genome diversity and biochips in genomics towards gene identification/diagnostics; initiation of comparative genomics, data annotation, preteomics, pharmaco-genomics and activities on microbial genomics; network programme on pesticide bioremediation and steel slag treatment; integration of R&D programmes on biodiversity conservation for North-East region, etc.

20. Under National Bioresources Development Board, special programmes for different biogeographic regions of India will be initiated. A special integrated programme in collaboration with other ministries and departments of bioprospecting and conservation of medicinal plants towards development of new herbal drug formulations will be taken up. Biotechnological applications for society would be further strengthened. Number of training

programmes and workshops will be organized to create awareness on patenting and biosafety issues in different regions of the country. Projects on assessment of environmental impact of transgenic plants with improved agronomic and pest and disease resistance will be initiated.

## **DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH INCLUDING COUNCIL OF SCIENTIFIC RESEARCH**

### **Major Achievements in 2000-01**

21. CSIR continued to provide scientific and industrial R&D support for sustained development and the major activities include initiation of a new scheme (CPYLS) to attract and build up youth for leadership in science, undertaking of New Millennium Indian Technology Leadership Initiative (NMITLI) seeks to secure for India a global leadership position based on technology and taking up of NTAF to strengthen wind tunnel facilities. In addition significant achievements were made in the areas of: health care products like radio pharmaceutical; herbal formulation; development of fast growing mint variety; new strain of Ashwagandha, an important Indian Medicinal plant; a process for the synthesis of Zeolite –X using sodium aluminate and sodium silicate; a novel nickel based catalyst; a new drug for treatment of recurring malaria under the trade name Ablaquin; three dimensional seismic models to decipher critical linkages between recurring seismicity and high velocity; non-recovery type coke ovens to produce soft coke; a new method to utilize lignin-a pulp and paper mills waste to produce phenol formaldehyde resin powder, used as raw material for making bakelite plastic and vanillin used in cakes and the ice-cream industry; a low cost, and fast response Polymeric thin film sensors to detect the presence of microbes in food and toxic gases in mines, a process for extraction of ginger oil directly from fresh ginger; a low cost simple processing technology for the product of Coconut Vinegar used as food preservative and flavouring agent from matured coconut water using vinegar generators; pilot maize mill with 1 ton/hour capacity for dry milling of maize ; a new process, using fungal protease for soaking, bating and dehairing leather processing industry; a low cost online water purification system; cost-effective and manually operated Water Purifier.

22. Under DSIR the major achievements included: organization of 14<sup>th</sup> National Conference on in-house R&D in industry; recognition of 61 new in-house R&D units and 26 new Scientific and Industrial Organisations (SIROs); support to 21 new projects for technology development and demonstration and completion of 15 technology absorption and development projects under the Programme Aimed at Technological Self Reliance (PATSER )Scheme. The major activities undertaken under the Scheme to Enhance the Efficacy of Transfer of Technology (SEETOT) were relating to provide technical and technological inputs for acquisition of technologies, accelerate exports of technologies and services, enhance consultancy capabilities and support mechanism for technology transfer. 12 projects of individual innovators were supported under Technopreneur Promotion Programme (TePP). The activities relating to development and maintenance of national information centres, value added patent information systems, library networks for resource

sharing, information services to enterprises were taken up under the scheme National Information System for Science and Technology (NISSAT). The projects relating to process development of large area Silicon Solar Cells, design and development of Microwave / Millimeterwave Dielectric Resonator Oscillator were taken up by Central Electronics Ltd. (CEL) .

### **Major Programmes for the Year 2001-02**

23. The major activities envisaged include developmental flight test of prototype of a multirole Light Transport Aircraft; augmentation of National Trisonic Aerodynamic Facilities; operationalisation of Unit for Research & Development of Information Products; development and commercialisation of Bioactive molecules, and upgradation of National Standards and Apex Calibration facilities to meet mutual Recognition Arrangement/obligations. In addition emphasis would be on technological support for production of extended version of Hansa aircraft; R&D activities on genomics and molecular medicine, functional genomic and diagnostics; conservation, bioprospection and domestication of the genetic resources of commercially important medicinal plants; DNA finger printing of released varieties and elite genotypes of medicinal and aromatic plants, tissue culture of economic plants, studies on fundamental and applied aspects of catalysis, envirocatalysts and catalytic processes, development of agro chemicals, and development of fluoro organics; research programmes relating to antifertility, filariasis, malaria, leishmaniasis, and cardiovascular, central nervous system and others disorders; methane and gas hydrates along the continental margins of India, hydrocarbons and coal exploration; mineral exploration and engineering geophysics; exploration; assessment and Management of Groundwater Resources, Earthquake Hazard Assessment; R&D for intelligent diagnostic and control system for transport and industrial applications; intelligent instrumentation and control for agricultural, agro-based and process Industries; and Audio and speech processing for communication and development of biotechnical process etc.

24. The ongoing activities of DSIR would also be continued which include: organization of 15<sup>th</sup> National Conference on in-house R&D in industry; support to various technology development and demonstration projects under PATSER Scheme besides facilities strengthening of TePP programme.

## **DEPARTMENT OF OCEAN DEVELOPMENT**

### **Major Achievements in 2000-01**

25. The XX Indian Scientific expedition to Antarctica was launched on 30 December 2000 from Cape Town, South Africa to carry out contemporary research in the various areas of polar sciences. The Phase I of the National Centre for Antarctic and Ocean Research (NCAOR), Goa was completed and dedicated to the Nation. Under Assessment of Marine Living Resources programme, five cruises were undertaken and Data on Mixed Layer Depth (MLD) and latent heat fluxes was obtained. The other major achievements include: collection and identification of new marine flora and fauna for chemical extraction and evaluation,



initiation of long-term stability studies of the active standardized preparations of the anti-diabetic and anti-diarrhoeal leads, continuation of the next sequential step of development of drugs from marine organisms. Under Polymetallic Nodules Programme the activities taken up included : Spot sampling of nodules using grab sampler with spot photography at 5 km. grid for assessing the trends of higher abundance and revalidation of the earlier assessment; updating of geo-statistical resource evaluation in the pioneer area and recommending relinquishment of additional 20% of the Pioneer area; recolonisation study of benthic organisms by monitoring the sea bottom; testing of upgraded version of ROV developed by CMERI at a water depth of 250 m; commissioning of the joint collaborative programme for the design development and testing unmanned submersible capable of working up to 6000m depth; setting up of demonstration pilot plant 500 kg/day capacity nodules; optimization of extraction metallurgy; bathymetric studies in parts of Bay of Bengal etc. The implementation schedule of Coastal Ocean Monitoring and Prediction System (COMPAS) programmes was modified and the components included Pollution Monitoring; Liaison, Regulation and Legislation and Consultancy services. The programme of Ocean Observation and Information Services (OOIS) was strengthened by deployment of various instrument like current meter, drifting buoys etc particularly to validate IRS-P4 satellite data.

26. The major activities undertaken by National Institute of Ocean Technology (NIOT) were related to : fabrication, erection and commissioning of 1 MW floating OTEC plant off the coast of Tuticorin; design, fabrication, erection and commissioning of navigational buoy based on Backward Bent Ducted Buoy Principle; completion of project report for pilot mining polymetallic nodules at 6000 m depth; geophysical, geotechnical and hydrographic investigations for determining a submarine pipeline across the Gulf of Khambhat.

### **Major Programmes for the Year 2001-2002**

27. The XXI Indian Scientific Expedition to Antarctica would be launched. The Phase II laboratory building of National Centre for Antarctic and Ocean Research (NCAOR), Goa would be commissioned. The major thrust would be on Delineation of Continental Shelf programme under which acquisition, processing and analysis of seismic data in Arabian Sea, Bay of Bengal and Indian Ocean with the participation from various institutions would be initiated. Clinical trials of the anti-diabetic, anti-diarrhoeal and hypolipidaemic agents would be initiated under the programme Drugs from the sea..

28. Under the Polymetallic nodules programme, the ongoing activities would be continued and activities relating to development of integrated mining complex nodules of 25,000 tonnes/year capacity at 6000 m depth; development of the shallow bed mining system for operation at 6000 m depth, commissioning of demonstration pilot plant of 500 kg/ day capacity, extraction of metals would be further continued. The programme on Coastal Ocean Monitoring and Prediction System (COMAPS) like studies on spatial and temporal variation of pollutants, identification source of pollutants, intensified monitoring at 12 selected hot spots etc. to keep a watch on the health of the sea using CRV Sagar Purvi & Sagar Paschimi

would continued for pollution monitoring both in the east and West Coast. The activities under Ocean Observations and Information Services (OOIS) would include: deployment of drifting buoys in the Indian Ocean and compilation of all the data generated; deployment and retrieval of a current meter array in the equatorial Indian Ocean; commissioning of Information Bank and Ocean Web Services for effective dissemination of ocean data and data products to the various national and international users; generation and dissemination of PFZ forecasts etc. Marine Research and Capacity Building Manpower Training programme would be continued and OSTCs will be strengthened with necessary equipment and infrastructure and about 20 new fellowships would be initiated.

29. National Institute of Ocean Technology (NIOT) would continue its programmes in the areas of ocean energy, deep sea technologies, ocean mining, coastal environmental engineering and marine instrumentation including the activities on 1 MW OTEC plant and preparation of final report on the pilot scale demonstration; commissioning of desalination plant at Vizhinjam; feasibility studies on OTEC plant at islands; insitu measurement of soil properties at Indian nodule mining site at 6000 metre water depth etc.

30. The details of the Plan Outlays / Expenditure for S&T sector are given at Annexure 11.1 and 11.2

## Annexure - 11.1

## Outlays/Expenditure in the State/UTs under the State Plan

(Rs. in lakh)

| S.No. | States/UTs            | 2000-01 B.E.    | 2000-01 R.E. |
|-------|-----------------------|-----------------|--------------|
| 1     | 2                     | 3               | 4            |
| 1     | <b>Andhra Pradesh</b> | <b>56.22</b>    | <b>#</b>     |
| 2     | Arunachal Pradesh     | 223.07          | 223.07       |
| 3     | Assam                 | 60.00           | #            |
| 4     | Bihar                 | 300.00          | 191.00       |
| 5     | Goa                   | 65.00           | 65.00        |
| 6     | Gujarat               | 13075.00\$      | 12000.00\$   |
| 7     | Haryana               | 150.00          | 150.00       |
| 8     | H.P.                  | 146.00          | #            |
| 9     | J&K                   | 74.37           | #            |
| 10    | Karnataka             | 170.00          | #            |
| 11    | Kerala                | 1885.00*        | 1900.00*     |
| 12    | M.P.                  | 162.00          | #            |
| 13    | Maharashtra           | 181.30          | 181.30       |
| 14    | Manipur               | 75.00           | 226.00@      |
| 15    | Maghalaya             | 93.00           | 93.00        |
| 16    | Mizoram               | 90.00           | 90.00        |
| 17    | Nagaland              | 17.00           | 37.00        |
| 18    | Orissa                | 215.68          | 200.76       |
| 19    | Punjab                | 138.70          | #            |
| 20    | Rajasthan             | 100.00          | #            |
| 21    | Sikkim                | 70.00           | #            |
| 22    | Tamil Nadu            | 219.23          | 231.63       |
| 23    | Tripura               | 27.81           | 31.81        |
| 24    | U.P.                  | 462.00          | 400.00       |
| 25    | West Bengal           | 3237.00         | #            |
|       | <b>Total State</b>    | <b>21293.38</b> |              |
|       | U.Ts.                 |                 |              |
| 1     | A&N Islands           | 20.00           | #            |
| 2     | Chandigarh            | 18.00           | #            |
| 3     | D & N Haveli          | 6.00            | #            |
| 4     | Delhi                 | 250.00          | #            |
| 5     | Daman & Diu           | 22.00           | #            |
| 6     | Lakshadweep           | 35.57           | 30.91        |
| 7     | Pondicherry           | 35.00           | 25.55        |
|       | Total U.Ts            | 386.57          |              |
|       | <b>Grand Total</b>    | <b>21679.95</b> |              |

\*Including Ecology &amp; Environment

\$Including outlay for Information Technology and Education Deptt.

@Including Rs. 155 lakh for computer Education and Rs. 10 lakh MARSAC

# Figures - Not Available

**Plan Outlays under Scientific Department**

Annexure 11.2

(Rs. Crore)

| S.<br>No. | Departments  | 1999-2000<br>Actuals | 2000-01<br>BE  | 2000-01<br>RE  | 2001-02<br>BE  |
|-----------|--|----------------------|----------------|----------------|----------------|
| 1         | 2  | 3                    | 4              | 5              | 6              |
| 1         | Department of Atomic Energy (R&D)                            | 320.99               | 420.00         | 415.27         | 459.00         |
| 2         | Department of Ocean Development<br>(Including I&M)           | 83.16                | 135.00         | 86.18          | 142.00         |
| 3         | Department of Science & Technology                           | 272.37*              | 362.00**       | 351.26*        | 410.00         |
| 4         | Department of Biotechnology<br>(Including I&M)               | 116.46               | 125.00         | 140.00         | 175.00         |
| 5         | Department Scientific and Indus.<br>Research (Including I&M) | 270.98               | 355.00         | 327.48         | 360.00         |
|           | (I) Council of Sc. & Indus. Research                         | 249.73               | 328.00         | 303.00         | 332.00         |
|           | (II) Deptt. of Sc. & Indus. Research<br>(Including I&M)      | 21.25                | 27.00          | 24.48          | 28.00          |
| 6         | Department of Space  | 1424.23              | 1700.00        | 1600.00        | 1710.00        |
|           | <b>Total</b>   | <b>2488.19</b>       | <b>3097.00</b> | <b>2920.19</b> | <b>3256.00</b> |

\*excludes capital works

\*\*Includes capital works.