VOLUME - II

DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH

REPORT OF THE WORKING GROUP FOR ELEVENTH FIVE YEAR PLAN

OCTOBER 2006

Contents

DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH

REPORT OF THE WORKING GROUP FOR ELEVENTH PLAN

1. Background to DSIR

DSIR is a one of the three departments of Ministry of Science and Technology, formed in 1985 with a view to promote industrial research, technology development, transfer and its utilization. The DSIR has two public sector undertakings viz. Central Electronics Limited (CEL) and National Research Development Corporation (NRDC) and two autonomous organizations viz. Council of Scientific and Industrial Research (CSIR) and Consultancy Development Centre (CDC). DSIR also provides the host facilities to Asian and Pacific Centre for Transfer of Technology (APCTT). This report will discuss the plan proposals of all the constituents of DSIR except the CSIR, which are discussed separately.

1.1 Unique Features of DSIR

DSIR holds a unique position in the government because of the following:

- Around 1200 in-house R&D units of Industry recognized by DSIR in five sectors viz. Chemicals, Electrical & Electronics, Mechanical, Process Industry and Agro & Food Processing Industry
- Around 550 Scientific and Industrial Research Organizations recognized by DSIR in Agricultural Sciences, Medical Sciences, Natural and Applied Sciences and Social Science
- National R&D Awards for significant R&D Achievements
- A well established mechanism for supporting multi-disciplinary projects for development of innovative process/product technology
- A well established mechanism to support individual innovators enabling them to convert their innovative ideas into working models/prototypes
- Data of around 400 companies with exportable technologies and projects which is expected to grow to 1000
- Database of approved foreign collaborations
- Centres of Technology and Innovation Management in academic institutions

- Subject specific information portals such as coastal hazards portal, science & technology portal, portal on Indian tea, textile technology research portal and database on traditional knowledge and folk wisdom

- NRDC, a PSU totally dedicated to commercialization of indigenous technology within the country and abroad. Also, specializes in patent assistance and training

- CEL, a PSU dedicated in research and manufacture of solar photo-voltaic systems, railway electronics and strategic electronics.

- CDC maintains a database of around 2500 technical consultants and consultancy organizations and has a membership of around 800 consultants

1.2 Limitations of DSIR

- A small department with a total strength of around 100 including just 40 technical officers

- A small budget outlay (10^{th} Plan approved outlay Rs. 145 crore) as a result of which most schemes operate at sub-critical levels.

- Space constraints (presently sharing a small percentage of space with DST in Technology Bhawan)

2. Working Group for Formulation of 11^{th} Plan Proposals

A working group was formulated under the chairmanship of Dr. R.A. Mashelkar, Secretary, DSIR vide DSIR Order No. DSIR/TPDU/XI Plan/07(1)/2006-07 dated 7^{th} July, 2006. A copy of the order is given at Annexure 1. The working group met twice on 31^{st} July, 2006 and 29^{th} August, 2006 and the minutes of these meetings are given at Annexure 2 and Annexure 3, respectively.

3. Performance in Tenth Plan

3.1 Department of Scientific and Industrial Research – TPDU Programmes

DSIR operated a scheme on "Technology Promotion Development and Utilization (TPDU) Programmes" in the tenth five year plan. The scheme was an outcome of consolidation, merger and dropping of some of the schemes operated in the ninth five year plan. TPDU Programmes endeavoured to: encourage industry to increase its share in country's R&D expenditure; support a larger cross section of small and medium industrial units to develop start-of-the art globally competitive technologies of high commercial potential; catalyze faster commercialization of lab-scale R&D; encourage individual innovators to translate their ideas into workable prototypes; enhance the share of technology intensive exports in overall

exports; strengthen industrial consultancy & technology management capabilities; and establish user friendly information network to facilitate scientific & industrial research in the country.

There were six components of TPDU scheme. Performance and major achievements of each component of the scheme during the tenth plan is briefly described below:

3.1.1 Industrial R&D Promotion Programme

- 5 National in-house R&D conferences held
- 38 R&D units bagged DSIR National R&D Awards for Outstanding in-house R&D achievements
- 410 new in – house R & D units recognised
- 1800 in – house R&D units granted renewal of recognition
- 120 new SIROs recognised
- 950 SIROs were granted renewal of recognition
- Around 3200 essentiality certificates for claiming customs duty exemption by DSIR recognised SIROs issued
- Around 450 essentiality certificates issued for claiming central excise duty exemptions
- 160 approvals u / s 35 (2AB) were issued (Form No.3CM)
- 200 certificates (Form No. 3CL) for weighted tax deduction u / s 35(2AB) were issued by DSIR to the Director General (I.T. Exemptions)
- 30 commercial R&D companies have been approved
- 560 registration / renewal of registration certificates issued to Public Funded Research Institutions / Universities

3.1.2 Technology Development and Innovation Programme

3.1.2.1 Technology Development and Demonstration Programme

Objectives:

(a) Development of need-based technologies that are oriented towards:

- human welfare,

- natural hazards mitigation,
- conservation of natural resources and sustainable development.

(b) Strengthening the interface between industry, R&D establishments and academic institutions.

Support for Technology Development projects**:**

Providing partial financial support for :

- Development and demonstration of technology for new and improved products and processes by industrial units in all sectors / areas

- Absorption and upgradation of imported technology

- Priority Technology development projects of PSUs in consultation with and co-financing from economic ministries

To Provide partial / full financial support for :

- Lab scale / bench scale technologies developed by national laboratories / institution, international research laboratories and universities and their scale up and commercialization by Indian industries

- Consortium projects for development of technologies of common interests for group of industries / associations to be undertaken by industrial units, National Laboratories, User Industries in important focused areas such as Electronics & Communications, Railways, Drugs, Chemicals & Fertilizers, etc.

- Development of technologies at national laboratories / Govt. supported research organizations / institutions for use by cluster of industries

- Technology missions in important areas such as healthcare, machine tools, capital goods, telecom products, environmentally sound technologies, socially relevant areas like visual aids, hearing aids, rural technology upgradation, natural products and other areas

- Patent filing in India and abroad

A number of number of projects have been supported by DSIR under the programme. Many of these projects have not only been successfully completed but commercialized also. Following achievements are given by way of examples:

i. **Interactive Small Arms Training Simulator (ZEN iSATS)** has been developed by M/s.Zen Technologies Ltd., Secunderabad. The firm has commercialised the

technology and entered into co-production cum development agreement with Bharat Dynamics Limited (BDL), a Ministry of Defence Undertaking.

ii. **Composite Insulators for high power transmission** have been successfully developed by Goldstone Teleservices Ltd., Hyderabad and commercialized silicone polymer Insulators for 66 kV, 132 kV, and 400 kV power transmission lines using their own compound developed in-house.

iii. **Technology for Manufacture of Digested Organic Supplement (DOrS) and Enriched with Micronutrients** has been developed and commercialized by M/s. T. Stanes & Co. Ltd., Coimbatore. The product is non-toxic, environment-friendly and compatible with soil micro flora and other chemical fertilizers. It is a unique product, which contains beneficial microorganisms in an immobilized state. It is enriched with potassium as sulphate of potash, mixed with Neem fractions like Neem cake. It is available in pasteurized powder and pellet form for easy application and suitable for all types of soil.

iv. **Two types of water based inks viz. water based flexo inks used for absorbent stock (craft paper) and coated stock (art paper, etc.) and UV radiation curing inks used for coated stock and non-absorbent substrates such as PVC, Polyster, etc.** have been developed by M/s Organic Coatings Limited, Mumbai. The inks have been produced at commercial scale.

v. **Technology for manufacture of Tetrabromobispheonl-A (TBBA)** has been jointly developed by Solaris Chemtech Ltd., (Formerly BILT Chemicals Ltd.), Secunderabad and IICT, Hyderabad. The product Tetrabromobispheonl_A is a flame retardant which is having a good market in Asian and European countries. It is highly effective as a reactive flame retardant in epoxy resin systems due to its structural compatibility, high bromine content and thermal stability. The technology has been commercialized.

vi. **Process for hydrogen sulfide removal and recovery of sulphur from sour gases** has been jointly developed by Gujarat Narmada Valley Fertilizer Co. Ltd., Bharuch, Gujarat and Engineers India Ltd, New Delhi. This process is effective for low and fluctuating H2S gas. The H2S removal efficiency is nearly 100% and converts it into elemental sulphur. Iron or Vanadium complexes are used as catalyst and the process is very versatile. This technology was successfully demonstrated at ONGC, Hazira plant. The technology has been commercialized. Recently, some of the Bio-fuel manufacturers have approached NRDC for transfer of technology for removal of H2S. NRDC is actively considering transferring this technology to these manufacturers.

vii. **Liposomal Amphotericin B.** The process for manufacture of Liposomal Amphotericin B, which was initially developed at Delhi University and clinical trials carried out at KEM Hospital, Mumbai, has been scaled up by Lifecare Innovations Pvt. Ltd., New Delhi. The process is patented in India and the

technology transferred to M/s. Lifecare Innovations Pvt. Ltd., through NRDC. This Liposomal drug developed in India is available at 1/10th cost of imported Liposomal Amphotericin B. It is life saving in patients with systemic fungal infection occurring in diabetes, mellitus, kidney transplant and cancer patients. It is also very effective in the treatment of kala-azar. The product was formally launched on 'Technology Day' i.e. 11th May 2003.

viii. **Process for manufacture of Pyrazinamide using Catalytic route** was jointly developed by SPIC Ltd., Chennai and IICT, Hyderabad. The process of making Pyrazinamide comprises of following three steps:

(a) Cyclisation of ethylenediamine with propylene glycol to 2-methylpyrazine
(b) Amoxidation of MP to 2-cyanopyrazine (CP)
(c) Hydrolysis of CP to Pyrazinamide

In the above given process steps (a) and (b) are catalytic reactions. The catalysts for each of these two steps have been developed separately by SPIC as well as IICT thereby resulting in the development of 4 catalysts. These catalysts have been found to be very efficient. The project has been successfully completed and the technology is available for transfer.

ix. **An Improved Tilting Disc Heart Valve Prosthesis** is being developed by TTK Healthcare Ltd., (TTKHL), Bangalore in association with Sree Chitra Tirunal Institute for Medical Sciences & Technology (SCTIMST), Trivandrum. This project is a continued R&D programme for developing a new model of TTK-Chitra Tilting Disc Heart Valve Prosthesis with following improved features:

MRI compatibility
Reduced production costs
Improved thrombo-resistance

At present, trials on sheep are in progress.

x. **Development of process for isolation of natural dyes from the forest plants of Uttranchal.** The process has been developed and demonstrated in a pilot plant at FRI, Dehradun (isolation of natural dye from one more plant material is in progress). The experience and capabilities acquired by FRI under the project are being extended to a similar project undertaken by Sikkim Khadi & Village Industries Board, Sikkim for isolation of natural dyes from the plant materials of Sikkim Region.

xi. **Cotton Seed Delinting Plant** has been successfully developed and commercialized by Maharastra Seeds Corporation Ltd. The plants are pollution free and so far 6 plants of various capacities have been sold. The company has got patent and design registered.

The special Features:

- Pollution free cotton seed delinting plant
- No use of sulphuric acid for hydrochloric gas generation
- Possible to delint small lots of even 10 kg.
- All machines coated with Teflon and lined with FRP for corrosion resistance.
- Minimum electric power consumption
- Economical price compared to imported and indigenous plants
- No hazardous operations
- Maximum use of gravity flow of seeds.
- Recommended by Commissioner Agriculture, Ministry of Agriculture, GOI

xii. **An integrated pilot demonstration plant for spice processing** has been jointly developed by Mata Foundation, New Delhi and RRL, Trivandrum. In another project Mata Foundation jointly with CFTRI, Mysore has established **integrated pilot demonstration plant for fruit processing**. The technology for Spice processing (Ginger) has been commercialized and the trial runs for fruit processing in the pilot plant are in progress.

The above examples show that the programme has met its objectives by developing new processes / technologies / products and strengthening the interface between industry and R&D establishments and academic institutions. The programme has played an important catalytic role in the innovation chain and cutting edge technologies have been developed in some cases.

Status**:**

Projects Completed	108
Ongoing	56
Foreclosed	26
Total	190

During the first four years in 10th Plan	35 new projects approved 5 projects completed.

Association of National Labs/ Institutes / Universities in executing TDD Projects	44 organisations involved in 81 projects

Royalty received from 35 projects / companies	Rs.6.16 crores
Royalty received during the first four years of X Plan	Rs.4.57 crores

IPRs associated with the projects supported under TDDP**:** 24

No. of Patents	20
No. of Trademarks	3
No. of Design registrations	1

3.1.2.2 Technopreneur Promotion Programme

TePP (Technopreneur Promotion Programme) jointly operated by DSIR (Department of Scientific and Industrial Research) and TIFAC (Technology Information, Forecasting and Assessment Council) of DST (Department of Science and Technology) is the jubilee year gift of Government of India to individual (independent) innovators. It is unique in several respects:

- The only program jointly operated by two departments in Ministry of Science & Technology. TePP secretariat is in DSIR and all activities - proposal screening, evaluation, project funding, monitoring are equally shared between DSIR and TIFAC.
- About 30 scientists of DSIR & TIFAC are involved in TePP and all of them carry out this task as additional responsibility. Multi tasking, multi pillar, hierarchy less structure makes TePP structure unique.
- The only program in GOI where government is directly funding individual innovators.
- Despite the small value of grant and large number of beneficiaries spread over the country, each project is independently monitored with visits to the innovator.

Aim was to support 100 individual innovators in the 10^{th} plan. Funding was available in two phases:

Phase I

Technopreneurship Support(TS)	... maximum support Rs 50,000/-
TePP Project Fund (TPF)	…maximum support Rs 10 lakhs

Phase II

Supplementary TePP Fund (STF)	… maximum support Rs 5 lakhs
Seamless scale-up support (S3T)	…maximum support Rs 30 lakhs

STF is for technology transfer from innovator to industry and S3T is for innovator becoming entrepreneur based on his innovation.

Over 6000 ideas were accessed and 1240 applications were accepted for processing, of which 880 were screened in by the TePP group for evaluation by experts. These evaluated proposals were discussed in the TePP Screening Committee and finally 142 were recommended for support.

Illustrative examples

- In the 1950s, Professor Gavril Abramovich Ilizarov devised and developed his revolutionary method for treating fractures, deformities and other bone defects. Using a circular external fixator he was able to show that controlled, mechanically applied tension stress produced reliable and reproducible regeneration of bone and soft tissue. Prasad Narayan Kulkarni of Sangli was determined to bring this

technology to Indian masses and with limited support under TePP developed *motorized Auto-distractor.* Clinical trails showed promising results of bone regeneration, a boon to correct birth defects of short or deformed legs.

- Innovative farmer Bhanji Bhai Mathukia of Junagadh developed a small 3 wheeled *10 HP tractor*. TePP supported him to develop an engineered product by networking with ARAI, Pune and CFMT&TI , Budni. The technology was licensed to M/S Pramal Farmatics (P) Ltd, Anand.

- Entrepreneur Ramesh Nibhoria developed environment friendly *solid biomass Furnace* , installed it at Jawahar Navodaya Vidyalaya, Nafajgarh and demonstrated the savings in fuel (LPG) consumption. More installations are underway in various schools.

- Teacher innovator Dr Jagadeesh of Kavaraiputtai developed an unique vertical cylindrical solar water heater with lotus flower shaped reflector.

- Retired DRDO scientist RA Yadav has taken up redesign of Surgical bandage cloth making machine.

- Loving mother Smt Pragnya Dilip Bhatt, determined to make her visually challenged son feel the shape of flowers, is perfecting a sketching device for use by visually challenged.

The 10th plan performance of TePP was reviewed on 15th July, 2006 at IIT, Bombay. Recommendations of the review committee were the following:

i) Processing time to be reduced to 4 months from receipt of application to either sanction or regret.
ii) Calibrated decentralization essential to take full advantage of TUC potential.
iii) The local expert evaluation to be honoured to a great degree and reasons to be cited if his views are overruled by another expert. This will create a sense of belonging to TePP.
iv) Clear policy needed for faculty innovations.
v) Activity flow chart and checklist to be prepared for TUCs.
vi) Regret letters should be dispatched as soon as decision is taken and reason for rejection to be explained so as not to hurt the feelings of creative person.
vii) TUCs need to be supported for advertisement, local travel and at least one full time person exclusively for promoting TePP to be employed on a contract basis.
viii) Model IP sharing contract may be prepared as guide for small institutes.
ix) There is need for utility patents in the country.
x) International fair on innovations to be organized to give global visibility to TePP innovators.

xi) Extensive training programs to be arranged on creativity to bring a new generation of young Indians strong in technology and creativity.
xii) Innovators need to be educated on making business plans, the pain points of user.
xiii) Grass root innovators to be perceived as 'source' rather than 'sink' for creative solutions.
xiv) Open source innovations with great diffusion potential to be encouraged.
xv) Innovations meeting needs of 'Bottom of Pyramid' can be transferred to other developing countries.
xvi) To make any noticeable impact, TePP should be scaled up and minimum 1000 innovations need to be supported in XIth plan. This would call for processing 10,000 applications and accessing above 50,000 ideas.

3.1.3 International Technology Transfer Programme

India's merchandize exports had touched US$ 102 billion during 2005-06 and the target for the year 2006-07 is US$ 126 billion. According to World Trade Report 2006, India's share in world merchandise exports inched up to 0.9 % in calendar year 2005, during which India recorded US$ 90 billion out of total global exports of US$ 10,121 billion. The technology intensive exports roughly constitute around 25% of the merchandize exports. While India contributes to 0.9% of world merchandize exports, in terms of high, medium and low technology exports, its contributions are merely 0.15 %, 0.3 % and 1.9 % respectively. Services exports stood at a level of around US$ 67 billion during 2005-06. The technology intensive exports have been growing at an average growth rate of around 25% over the last three years compared to the growth rate of around 20% of merchandize exports. The services exports have been growing even faster. Thus, it would be prudent to accelerate technology intensive and services exports. This would also help in speedy realization of the national export target of 1.5 % of world exports by the year 2009, as stated in the Foreign Trade Policy 2004.

The DSIR is the only department in the government of India which has a programme to promote export of technology. It has been operating an "International Technology Transfer Programme" which is aimed at promotion of international technology transfer and trade including export of technologies, projects, services and technology intensive products. The Programme nurtures India's potential to export technology and hi-tech products. The Programme promotes technology exports for several reasons, one - technology exports establish a long term relationship with the overseas customer, two – technology exports have a multiplier effect on exports, three – technology exports enhance the export competitiveness in today's age of rapid product obsolescence and lastly, technology exports create a brand image for the country.

The Programme Objectives

a. To compile information on exportable technologies and technology intensive

projects, products & services available with Indian industry and R&D establishments

b. To create awareness about our technology export capabilities among potential foreign buyers or collaborators
c. Support capability building of industries and R&D establishments for technology intensive exports
d. Support research and analytical studies aimed at providing inputs to the government for technology export related policy formulation
e. Promoting and supporting Institutional Mechanisms to catalyze international technology transfer and trade
f. To facilitate signing of MoUs / Agreements on High Technology Cooperation and Trade between Indian and foreign industrial units

Major Achievements

(a) The programme supported carrying out surveys of small and medium enterprises (SMEs) in various states of the country to compile profiles of exportable technologies and projects available with them. Grouping of States and status of work completed/ underway is given below:

Proposed Regional Grouping of States	**Status**
Maharashtra	Project completed
Delhi & NCR	Project completed
Punjab, Haryana, HP & J&K	Project completed
Andhra Pradesh & Karnataka	Draft Report Available
Tamilnadu & Kerala	Draft Report Available
West Bengal & 8 NE States	Project in progress
Gujarat & Rajasthan	Project in progress
Uttar Pradesh, Uttaranchal, Bihar & Jharkhand	Project in progress
Madhya Pradesh, Chattisgarh & Orrisa	Project in progress

(b) The department has been setting up a Technology Trade Pavilion at India International Trade Fair, Pragati Maidan, New Delhi every year since 1997

(c) The programme has supported setting up of a "Technology Trade Facilitation Centre" at NRDC

(d) The programme supported organization of **"**International Training-cum-Awareness Programmes" in select technical areas aimed primarily at overseas participants.

(e) The programme has supported two institutional mechanisms:

Technology Export Development Organisation (TEDO) in association with Confederation of Indian Industry and Centre for International Trade in

Technology (CITT) in association with Indian Institute of Foreign Trade (IIFT).

(f) DSIR and Department of Commerce under its MAI scheme and Focus CIS Programme jointly took up a Project on Promoting High Technology Cooperation and Trade between India and CIS Countries.

3.1.4 Consultancy Promotion Programme

Objectives

The main objective of the programme is to strengthen and promote industrial consultancy services and capabilities for domestic use and export requirements. The various areas include the following: -

- Consultancy services within the country for the establishment of new enterprises, improving the performance of the existing units including sick units, mergers and acquisitions, etc.
- Infrastructure development
- Consultancy services for acquisition or import of technologies, requiring technological and managerial competence to evaluate the technologies and engineering them as per local requirements, Promoting quality Foreign Direct Investments (inward and outward).
- Consultancy services for export of projects, technologies and services and setting up Joint Ventures abroad, etc.
- Consultancy services for development and transfer of technologies from R&D institutes and strengthening linkages of R&D system with industry.
- Consultancies for new and emerging areas of national interest.
- Other areas as may be identified including special efforts for consultancies for SMEs and tiny sector.

Activities/achievements during 10^{th} Plan include:

- The Food Processing Technologies and Services Centre (FPTSC) at Kanpur has been set up by UPICO-CFTRI with the support of DSIR and the Pilot plant facilities at CFTRI Centre, Lucknow and Analytical Laboratory Facilities at Kanpur were established.

- Consultancy Clinic at Katni (MP) mainly for Lime Kiln Industry was completed.

- The project for Setting up of a Consultancy Clinic for IT sector by CDAC, NOIDA was supported.

- The project for Creation and Maintenance of Industry Specific Sectoral National Online Database of Consultants and Consultancy Organizations in India by CDC has been initiated.

- The study for Development of Model Grading/Rating System for Consultants in India in association with ICRA Ltd was initiated.

- The project for Setting up of Consultancy Clinic for Hosiery Industry at Kanpur by U.P. Industrial Consultants Ltd. was initiated

- The project for Setting up of Consultancy Clinic for Jute & Jute Diversified Products by West Bengal Consultancy Organisation Ltd., Kolkata was initiated.

- The project for Design & Engineering Centre for Mould Designs used in Automotive and Durable Consumer Goods with Class A Surfaces by PSG College of Technology, Coimbatore was initiated.

3.1.5 Technology Management Programme

Objectives and Activities under the programme

i. Studies on technology and innovation management areas (including case studies)
ii. Collaborative work with Industry / Research / Academic / Consultancy/ Government bodies and others
iii. Industry-institute networking through creation of region-specific resource centers.
iv. Information dissemination on TM issues through Newsletters, Manuals, Paper contests on specific technology related issues.
v. Training/Interaction meets/ Seminars/ Management Development Programmes including specific programmes for trainers as well as lectures by Distinguished Technologists.
vi. Technology Audit parameters (commenced on pilot basis in 10^{th} Plan)
vii. Compilation and analysis of foreign collaborations (NRFC as per Allocation of business for DSIR)
viii. Curriculum development in TM (commenced in 10^{th} Plan)

Highlights of the Programme during 10^{th} Plan

- Technology gaps and trends in respect of 180 products/ processes have been identified and measures suggested for further development.
- More than 40 case studies and other teaching aids prepared in emerging areas of TM, are being put for pedagogic use.
- Intense projects spanning several activities have been undertaken in association with 5 geographically distributed institutions across the country.

- More than 150 training programmes on emerging areas of technology transfer, knowledge, R&D and innovation management including IPR have been organized.
- More than 8000 persons have been trained in the above programmes.
- Around 20 need identification studies have been carried out including the rural sector and North East region; covering Medicinal & Aromatic plants, Minor Forest Produce, Vegetable dyes, cashew etc.
- 4 Centres have been launched to facilitate industry-institute interaction in different locations.
- Newsletters catering to topical TM needs are being brought out by 5 different organizations.
- 3 research studies on TM benefiting industry and academia have been completed.
- 3 portals on Technology management have been launched

3.1.6 Technology Information Facilitation Programme

The programme formulated during the Tenth plan had the following objectives:

- Develop appropriate endogenous information capacities to support R&D activities
- Support the production of local content and to promote indigenous knowledge
- Promote information and knowledge networking at local, regional and national levels to facilitate flow and sharing of information resources
- Map the national S&T productivity in relation to the international S&T Productivity
- Support education, training and R&D in digital content development and utilization
- Promote national and international cooperation in related areas

Major Achievements

Databases and Content Development

- Creation and maintenance of a bibliographical and digital image database of available literature and material on Bishnupur terracotta art and sculpture and Traditional design of Potchitra, Baluchori & Madhubani *(Kolkata)*
- Computerized botanical database on wild ornamental plants of Himalaya (*Nauni, Solan*)
- Multimedia Software Database of available pest management technologies of major oilseeds and pulse crops of central India (*Jabalpur*)
- Floral potential of J&K State: Survey and Documentation (Srinagar)
- Preparation of Database on Metallopharmaceuticals

National Websites / Portal

- Portal on Indian Tea and strengthening of electronic networking system (Valparai, Coimbatore)
- Science & Technology Portal *(Pune)*
- Development of the Coastal Hazards portal *(Goa)*
- Indigenously developed textile technology research *(Ahemedabad)*
- Industrial R&D in India: A Web Portal (Hyderabad)
- Online Directory of Indian Academic & Research Establishments (Bangalore)

Documentation of traditional knowledge and Folk wisdom

- Scouting for grass-root level innovations, compilation and dissemination of information in local languages across India (SRISTI, Ahmedabad)
- Documentation of community knowledge, traditional knowledge, and oral traditions" in eight districts of the state of Karnataka with special reference to agriculture and rural practices *(Manipal)*
- Isolation & Documentation of Indigenous Knowledge & Conservation of Traditional Practices in Theni, Virudhunagar, Sivagangai, Dindigul and Madurai Districts in Tamilnadu (*Anand Nagar Krishnankoil, Virudhnagar Dist)*
- Folk Wisdom of West Bengal *(Kolkata)*
- Documentation and preservation of Agricultural Traditional Knowledge by Modern Electronic Media through Farmer Participatory Approach (Madurai)
- Design and development of database on folk knowledge (Aurangabad)
- Studies on Tradition Folk Herbal Veterinary Medicines and Poisonous plants of Rajasthan (Udaipur)
- Development of a Portal and Kiosk of Goldsmith's skill towards enhancement of entrepreneurship abilities among unemployed youth *(Durgapur)*

Virtual Information Center (VIC)

- VIC Resources for Wider Access to Reliable & Affordable STM information *(Hyderabad)* (*http://www.vic-ikp.info*)

Electronic publishing of selected Indian S&T materials

Open Archive Initiatives (OAI)

- Establishing MOLTABLE- An Open Access initiative for Molecular Informatics (Pune)
- Development of OAI-based Institutional Research Repository Services in India (Bangalore)

Surveys and R&D Studies

Education and Training

- Web based interactive multimedia training programme on Digitization and Digital libraries (IGNOU)
- Training programme on Content Development and management (Mumbai)
- Digital Content Development for Human Resources Development of Rubber Industry (IRMA, Mumbai)
- Model (Software and procedure) for web-driven distance education system (Delhi)

Expert Meet / Brain storming Sessions/Seminars

- Four brain-storming sessions at Pune, Bhubaneswar, Chandigrah and Hyderabad were held. Experts from industries and R&D institutions participated in the meeting.
- National Conference on Community Information Service : Challenges and opportunities for library (Varanasi)

3.1.7 Technology Development and Utilization Programme for Women (TPDUW)

Objectives

The objectives of the programme are:

- Promoting the adoption of new technologies by women
- Awareness creation and training of women in various technologies
- Technological Upgradation of tiny, small and medium enterprises run by women entrepreneurs
- Showcasing of appropriate technologies and organizing demonstration programmes for the benefit of women

Performance since its Introduction

- Farm and Non-Farm sector employment and Tribal Women – a Socio-Economic Analysis
- Training of women in Computer Aided Drafting Package and Microsoft office software

- Empowering Women through Entrepreneurship Development in Amravati, Akola and Buldhana Districts, Maharashtra State
- Study on Impact of the Information & Communication Technology on Women Employment in Kerala
- Upgrading indigenous technology for preparation of herbal products as home remedies and food supplements by encouraging sustainable cultivation, conservation and propagation of medicinal plants involving rural women of West Bengal
- Training-cum-Workshop on Development of Modern Educational Training Kits for Women consultancy Cells
- Propagation of Technologies & Development of Micro Enterprises by Women in Andhra Pradesh, Orissa & Kerala States
- Identification of Gaps in Technology Utilization and Training for the Development of Rural Women (A Study in Andhra Pradesh
- Diffusion of Farm Technologies to Farm Women through User-Friendly Interactive Multimedia Compact Disc.

3.1.8 DSIR Financial Performance during 10th Plan (2002-2007)

(Rs. Crore)

S.No.	Programme	Outlay	Actual(Expected)*
1.	Industrial R&D Promotion Programme	2.50	1.0
2.	Technology Development & Demonstration TePP	44.0 5.0	37.0 3.0
3.	Int'l Technology Transfer Programme APCTT	7.5 7.2	6.0 6.0
4.	Consultancy Promotion Programme	11.0	8.0
5.	Technology Management Programme	5.0	3.0
6.	Technology Information Facilitation Programme	13.8	4.5
7.	IT Activities and Miscellaneous	3.0	1.5
	TPDU	**99.0**	**70.0**
8.	CEL	25	25
9.	NRDC	20	18
	Total	**144**	**113**

* BE figures for the year 2006-07 have been taken to work out the expected expenditure during the tenth plan

Reason for low expenditure: Approval of the scheme came only in March 2004

3.2 Central Electronics Limited

3.2.1 S&T Scheme

Physical

a. Upscaling of Solar Photovoltaic operations to 10 MWp per annum from level of 2.0 MWp, per annum, for becoming price competitive, through economies of scale, for tapping both domestic as well as huge export marketing opportunities in global markets to attain turn around of SPV operations.

b. Expanded SPV Export marketing operations by giving due thrust to utilize full enhanced capacity of SPV plant.

c. Developed and standardized process for using thinner wafers for bulk Solar cell production as a cost saving solution improving price competitiveness in both highly price sensitive domestic as well as export markets and also to overcome problems faced relating to availability and high prices of thicker wafers earlier used in the production.

d. Developed Building Integrated Photovoltaic Module (BIPV) considering its enormous commercial potential for roof top (as a building material) and economic at medium size SPV power plant applications in near future in domestic and also export markets

e. Developed high wattage (220 Wpk) modules proving to be economical for large SPV Power Plant in domestic market and having good demand in as export markets.

f. Expanded production capacity of Microwave Ferrites used for PCM production to cater for large projected requirement of PCMs for Weapon Locating Radars (WLR), planned for production in the country with DRDO technology.

g. Developed linkages with SSPL and other DRDO Labs, working on future technologies for Phased Array Radars, keeping in view long term business plan in this area.

h. Developed new components in Electronic Ceramics by acquiring new high grade PZT materials technology for components to be used for future technologies in Sonar area, and also for high volume applications like cellular/ mobile phones for dielectric ceramic products and Heat Fuse 551 for sustainable operations of Electronic Ceramics Division.

3.2.2 I&M Scheme

Physical

a. Upgradation and upscaling of Solar Photovoltaic operations from 2MW to 10 MW.

b. Regular production of larger size modules upto 220 Wpk capacity.

c. Induction of single entry digital axle counter and increased the capacity to produce around 2000 Axle counter per year.

d. Regular production and supply of phase control modules(PCM) and IFF system to DRDO.

e. Standardization of various PZT powder composition and supply of PZT components for hydro phones for Naval applications.

Financial

(Rs.in Crores)

	2002-03 (Actuals)	2003-04 (Actuals)	2004-05 (Actuals)	2005-06 (Prov.)	2006-07 (Expected)
Production	68.10	65.24	85.42	102.17	116.00

3.3 National Research Development Corporation

Commercial Activities

A. Gross Premia/Royalty And Other Income/Profit

(Rs. in lakhs)

Year	2002-03 (Actual)	2003-04 (Actual)	2004-05 (Actual)	2005-06 (Prov.)	2006-2007 (Projected)
Premia	138.58	115.58	93.25	136.35	150.00
Royalty	170.31	224.36	232.99	230.00	250.00
Export of Technology	8.75	10.10	3.28	--	20.00
Other Income	112.90	89.89	83.75	78.65	50.00
Total Income	430.54	439.93	413.27	445.00	470.00
Expenditure	417.90	420.58	400.67	430.00	447.00
Profit before tax	(+)12.62	(+)19.35	(+)12.60	(+)15.00	(+)23.00

B. Creditability with Industry

The credibility of NRDC with industry has increased during the 10th plan further as various industries operating in different sectors of economy approach the Corporation to license technologies so that they can face global competition. Corporation has been able to license 172 technologies and in their capacity in generating employment potential. Some of the licensed technologies have been in the field of national importance like drinking water (treatment and testing), medicines (777 oil for treatment of psoriasis), conversion of waste (Bio-conversion of Coir waste to Organic Manure), building materials (Manhole cover), herbal products (herbal beer, lipstick), energy saving (Nutan Himveer Bukhari, Kerosene wick lamp), Vaccines, etc.

- Number of technologies licensed during the years are :

Year	2002-03	2003-04	2004-05	2005-06	2006-07 (Expected)
Nos.	29	25	39	44	35

Social Impact

During 10th Plan national wealth of about Rs.300 crores in terms of goods generated/produced have been created by licensees of NRDC. Revenue generated for the Research Institutes is about Rs. 12.00 Crores from their technologies.

C. Networking with R & D Institutions

About 40 Memorandum of Understanding (MoUs) were Signed/ are likely to be signed with R&D institutions / universities / individual inventors during 10th Plan

D. Technology Networking

Year	2002-03	2003-04	2004-05	2005-06	2006-07 (Proposed)
Nos.	71	45	42	30	25

E. Knowledge into Wealth

In order to convert knowledge into wealth, the corporation has established in collaboration with Dialog of USA and set up 'on line patent search facility' which has been made or available to individual inventors, scientists and business managers. Through this facility the technology generator can access and benefits on a regular basis extensive collection of world wide information sources of more than 450 (databases) which covers information, on millions of documents and various scientific and technical literature. This facility enables them to convert knowledge into wealth more speedily.

F. Knowledge Alliances and Networking

Recently a virosome based targeted gene drug delivery system which has the potential to become platform technology was developed by University of Delhi and transferred to NRDC. This is based on F-virosome of Sendai virus and is highly liver cell specific. This plate form technology has a strong potential to develop a number of therapies and vaccines for several Diseases (Hepatitis, liver cancer, Hemopohilia, Malaria) which are originating from liver cell. NRDC has licensed the know how to M/s Panacea Biotech, New Delhi for manufacturing and marketing the product in India.

As NRDC is interested in marketing this delivery system as platform technology globally to international pharma companies, it has established a knowledge alliance with a laboratory located in Albert Einstein College of Medicine, New York and University of Delhi to conduct more in-vivo test and generate further needed data for evaluation of its efficacy on several diseased animal models. The knowledge alliance and networking thus worked by NRDC, will help it in licensing and commercialising the know how to various pharma industries abroad.

G. Initiative to Add Value to IP from other forms of Know-How/ Knowledge Base

Over the years NRDC has experienced that various researchers mainly working in the university system and some of the R & D institutions are able to develop knowledge base/know-how like an improved process on the basis of alteration/modification/additions/alteration of existing products and processes and which has definite commercial potential but has a shorter life period due to fast changing spectrum of technology.

In absence of utility model available for protection in India it is not advisable to go for prolonged patent protection procedure and even the researcher in university systems are allergic to long patent prosecution as they are quite familiar with immediate recognition through publications. Coupling of IP with such type of knowledge base/ know how has acted as a deterrent to the knowledge worker thus resulting in economic loss to both NRDC as well as to researchers who are not able to transfer their outputs. In order to overwrite this problem

NRDC has taken a new initiative to link this knowledge base from the various forms of IP protection procedures and transferring it straight way to the interested parties so that it can be utilised by the customer.

Promotional Activities

The Corporation is operating the following two programmes to promote development and transfer of indigenous technologies:

(i) Invention Promotion Programme (IPP)

(ii) Technology Promotion Programme (TPP)

- *Development and Promotion of Rural Technology*
- *Promotion of Export of Technology*
- Informatics for Technology Transfer
- *Technology Development Programme for Priority Projects*

These two programmes are run by NRDC with the support of Department of Scientific and Industrial Research (DSIR) which comes in the form of grants-in-aid.

4. Eleventh Plan Proposals

On the one hand, it is proposed to continue the 10th Plan scheme on TPDU Programmes with renewed thrust and on the other, some new initiatives have been also proposed in the 11th Plan. The proposed financial outlay for the 11th Plan in respect of schemes and programmes of DSIR, CEL, NRDC and CDC is given in Appendix 2 to Annexure 3. Scheme-wise details follow:

4.1 DSIR-TPDU Programmes

4.1.1 Industrial R&D Promotion Programme

The main objective of the programme is to strengthen application oriented research and development by nurturing the growth of R&D in industry and strengthening R&D infrastructure in industry. Proposed activities in 11th plan and the outlays are given below:

		Rs. in lakhs
*	National Awards for R&D Efforts in Industry	40
*	National Conference on in-house R&D in Industry/Workshops/get-togethers	40
*	Publication of Outstanding R&D Achievements, Directories, R&D Overview, R&D in Industry Updates and other related publications	30
*	Preparation of Status reports relating to IPR, in-house R&D systems	50
*	Support to Research Associations, SIROs	70
*	Misc. including office equipment, TA/DA, etc.	20
	Total	**250**

4.1.2 Technology Development and Innovation Programme

4.1.2.1 Technology Development and Demonstration Programme

Objectives:

(a) Development of need-based technologies that are oriented towards:

- human welfare,
- natural hazards mitigation,
- conservation of natural resources and sustainable development.

(b) Strengthening the interface between industry, R&D establishments and academic institutions.

Support for Technology Development projects**:**

Providing partial financial support for:

- Development and demonstration of technology for new and improved products and processes by industrial units in all sectors / areas

- Absorption and up-gradation of imported technology

- Priority Technology development projects of PSUs in consultation with and co-financing from economic ministries

To Provide partial / full financial support for :

- Lab scale / bench scale technologies developed by national laboratories / institution, international research laboratories and universities and their scale up and commercialization by Indian industries

- Consortium projects for development of technologies of common interests for group of industries / associations to be undertaken by industrial units, National Laboratories, User Industries in important focused areas such as Electronics & Communications, Railways, Drugs, Chemicals & Fertilizers, etc.

- Development of technologies at national laboratories / Govt. supported research organizations / institutions for use by cluster of industries

- Technology missions in important areas such as healthcare, machine tools, capital goods, telecom products, environmentally sound technologies, socially relevant areas like visual aids, hearing aids, rural technology up-gradation, natural products and other areas

- Patent filing in India and abroad

It is proposed that the scheme continues in the 11th Plan.

In view of the suggestions received during the first working group meeting, the following is proposed:

- to reduce the interest rate on repayable amount to 1%;
- to increase DSIR support up to 80% of project cost depending upon technological capabilities of beneficiary industry;
- to give priority for scaling up of globally patented know-how by Indian industry;
- to consider scaling up of lab scale know-how in areas such as nano, bio, new energy, new materials, waste utilization etc.;
- to link up with schemes such as TDB and support scale up of pre-commercialization phase of projects, as identified by experts;
- to play an active role in commercialization of spin-off technologies from atomic energy, defense and space sectors.

It is proposed to support around 60 new technology development projects aimed at developing state-of-the art globally competitive technologies of high commercial potential.

Proposed budget outlay is as under:

Rs. in Crores

2007-08	2008-09	2009-10	2110-11	2011-12	Total
11.50	11.50	12.00	12.00	13.00	60.00

4.1.2.2 Technopreneur Promotion Programme

Objective:	To build sustainable eco-system supportive of individual innovators
Aim:	To reach the tipping point by accessing 10,000 news ideas and supporting 1000 innovations in 5 years.
Structure:	Network with 20 out reach centers and others in the innovation promotion space.
System:	Decentralise gradually by releasing funds annually to public funded TUCs and NIF. Increase outer limit of support under Phase-I & II by 50%.
Activities:	Continuation of 10th plan activities and taking up new activities to give a push to “Creativity”.

Budget:

Funds for 1000 innovations	:	Rs. 40 crores
Limited support to TUCs (20nos)	:	Rs. 10 crores
Promotion, advt, publicity etc (international innovation fairs and others)	:	Rs. 10 crores
DSIR Share	:	Rs 30 crores
TIFAC (DST) Share	:	Rs 30 crores

Justification

i. Public funds are provided as grants to individuals not to subsidize their product development costs but to create an environment supportive of creativity and to build a large base of innovations to support innovative India. The numbers are critical in this game, the attempt is to scale up the activity to reach the *Tipping Point.* The "*tipping point*" is reached when the critical mass is obtained. The phrase "tipping point" is a sociological term that refers to that dramatic moment when something unique becomes common The concept has been applied to any process in which beyond a certain point, the rate at which the process (chemical, sociological, etc.) proceeds increases dramatically. Conditions necessary for tipping are:

- enrolment of network partners who have large connectivity with innovators/ entrepreneurs,
- supporting network partners to improve impact of their service
- and focusing on communication.

ii. In an eco-system the network partners have a growth charter of their own, TePP outreach centers (TUCs) need to evolve into creativity zones taking up the following activities:

- Handholding innovators at all stages of idea transit, from concept to market.
- Diffusion of technologies developed under TePP and from other sources to Rural Business Hubs.
- Mentoring innovators with business models, market entry strategies etc.
- Arranging funds from banks, VCs
- Helping in patenting
- Organizing exhibitions
- Running TePP training schools

Against tenth plan target of supporting 100 innovations, the 11^{th} plan aims to support on the average 200 innovations per year. This scale up is feasible with involvement of 20 TUCs.

The plan program envisages annual grant of Rs 10 lakh to each of the 20 TUCs.

- iii. The one factor that could hinder the transition of India to a developed country is limited CREATIVITY, the fertile ground for mushrooming of original ideas. This large issue is addressed by several organizations like CSIR, DST,CII, HRD and there can be no surfeit of initiatives at this stage. Original ideas are the feed stock for TePP and TePP has a large stake in augmenting supply of its inputs. TePP piloted few programs in creativity training and creativity competitions and plans to pursue them with greater vigour in 11th plan. It is proposed to strengthen exixting institutions such as NIF and establish chairs at several institutes to carry out research and training in creativity. A framework for a creativity institute could be also debated.

4.1.3 International Technology Transfer Programme

The proposed activities and outlays for the 11th five year plan are the following:

a) Research and Documentation — *Rs. 2 crore*

- Research into emerging technology issues and producing reports — Rs. 50 lakh
- Technology Exports Newsletters and Monographs on Technology Export Success Stories — Rs. 75 lakh
- Database of exportable technologies and projects — Rs. 75 lakh

b) Publicity and Promotion — *Rs. 12 crore*

- Participation in National and International Exhibitions — Rs. 5 crore
- Technology Trade Facilitation Centres — Rs. 3 crore
- Support to Indian Industrial delegations abroad — Rs. 1 crore
- Participation in Buyer-Seller Meets — Rs. 1 crore
- International Awareness Programmes in India and Abroad — Rs. 2 crore

c) Capability Building of Industries and R&D Establishments for enhancing their Technology Intensive Exports — *Rs. 3 crore*

It is proposed to organize programs for industry in areas such as IPR, product design, quality, export certification etc. for enhancing the competitiveness of their technology intensive products. Also, it is proposed to train and support SMEs to enable them to launch global operations.

d) Support to institutional mechanisms — *Rs. 10 crore*

Institutional mechanisms like Technology Export Development Organization (TEDO) with CII and Centre for International Trade in Technology (CITT) shall continue to be supported. Other institutional mechanisms with sectoral industry associations and other related agencies are also planned.

New Activity

It is planned to operationalize an Indo-Australian Bi-national Industrial Research and Development (BIRD) Programme. DSIR would participate in the collaborative projects between Indian and Australian industries for which Australia is prepared to commit some 2 million Australian Dollars. While the details of the programme shall be worked out, a provision of *Rs. 3 crore* as DSIR's matching grant is being made.

Total 11th Plan Outlay for ITTP ***Rs. 30 crore***

Asian and Pacific Centre for Transfer of Technology (UN - APCTT)

Objective

The objective is to extend GOI support to the Asia Pacific Centre for Transfer of Technology of the UNESCAP with a view to promoting international cooperation in the areas of industrial R&D, innovations and technology development and transfer.

Activity-wise Breakup of Outlay for 11th Plan

	(**Rs. crore**)
- Institutional support	7.50
- Programme support	5.00
- Support towards expenditure of capital nature	1.50
Total	**14.00**

4.1.4 Consultancy Promotion Programme

The following activities of the Tenth Plan will be continued in Eleventh Plan:

a) Consultancy Clinics
b) Design & Engineering Centres
c) Studies, seminars, conferences, training programmes etc relating to technological advances, consultancy capabilities and needs in India and abroad
d) Support to Consultancy Promotion Agencies and Associations
e) Support to Technical Consultancy Development Programme for Asia and Pacific (TCDPAP)

Renewed Thrust in Eleventh Plan

a) Recognition/bench marking of consultants

CDC in association with ICRA Ltd. is working on developing a model for accreditation/grading of consultants and consultancy agencies in India, which will be

ready soon. Necessary modalities will be worked out for implementing the model. This mechanism would be of great help to clients in identifying the right type of consultants for their assignments as well as the consultants in enhancing the business opportunities. Also, it would enhance the image of Indian consultants and consultancy agencies, especially when a large number of foreign consultants are operating in India and giving a tough competition to Indian consultants.

b) Promotion of Education and Research Programmes in the area of consultancy in Universities and Institutions of Higher Learning

Presently the only academic degree programme in the area of consultancy is the MS Degree Programme conducted by CDC in collaboration with BITS, Pilani. This part-time programme is for working professionals and is restricted to persons in and around Delhi. With vast potential for consultancy in the present economic environment, It will be useful to start degree and post graduate programmes in universities and institutions of higher learning in the area of consultancy with practical orientation and focus on development of consulting skills and capabilities, employment generation which would in-turn generate work and wealth for the country.

c) Scheme for providing start-up support for new entrants in consulting in potential areas

There are no opportunities available for young professionals who are brilliant and have necessary expertise to start consultancy. Due to lack of support measures, most of them though have good ideas and the required capabilities, either take up employment or go abroad to pursue higher studies. Similarly, many retired scientists and other experts can be developed as good consultants through a proper support mechanism. Considering this, it is proposed to start a scheme to provide start-up support for those who wish to enter the consulting profession. Financial support through soft loan/grant can be provided for the initial 2-3 years based on the merit of the proposal and after evaluation and recommendations of the Technical Advisory Committee.

d) Federation of Technical Consultancy Organizations (TCOs)

There are 17 TCOs in the country providing consultancy services in various sectors of industry and the economy. Financial institutions like IDBI, IFCI, ICICI, banks and State governments set up these TCOs. During the last one and half decade it has been observed that while a few of these TCOs are doing very well, majority of them are not doing well even though the potential for consultancy services is quite high in almost all the States of the country. Due to such a situation, the successful TCOs have started operating in more than one region including those where the less successful ones are located. Considering the vast consulting opportunities emerging in various states due to the infrastrutural and other developments taking place, the TCOs need to be supported and interlinked through establishing a Federation for their effective working. Since DSIR is the nodal department in the country for promoting Indian consultancy services, it would be highly useful for DSIR to establish and coordinate the federation as a structured organization.

e) Scheme to support the interface of new entrant consultants with experts in the respective areas

Often, it is observed that most new entrants though have sound technical knowledge and competence, are not very successful in consulting business due to lack of practical experience. It would therefore be useful to associate experts in the relevant area to guide the new entrants to develop towards a successful consulting career. CDC, through DSIR support is in the process of developing a national database of consultants and domain experts. Support provided to new entrants as indicated above will be supplemented through support of relevant experts in the area identified from the database referred above or proposed by the new entrant to have an effective interface.

f) Technology Incubators & Consultancy Parks

Technology Incubators are developed as a mechanism to develop small businesses / start-ups businesses through a shared facilities for technology development and innovations. The models vary depending upon the objectives. This mechanism has been reported to be successful in USA, Germany, China, Korea, Malaysia, Japan and Singapore etc. One of the special features of this concept is that an individual inventor/entrepreneur by using incubator facilities may be able to convert his innovations into reality. It is therefore proposed to develop technology incubators around 4 select R&D labs. DST is engaged in promoting Technology Business Incubators and STEPs, which are mostly around academic institutions and are primarily aimed at promoting technology based businesses rather than technologies. However, these efforts need to be complimented through other agencies. DSIR is uniquely placed in favour of technology incubators since it has a chain of laboratories in CSIR and closer contacts with in-house R&D in industries, Research Associations, etc., and also is the administrative Department for various tax and fiscal incentives to R&D. Similarly, Consultancy Parks on experimental basis, are proposed to be promoted, to enhance consultancy business opportunities for individual consultants/professionals as well as to enhance export of construction projects, turnkey projects and services.

g) Promotion of consultancy need & capabilities in areas such as IPR, Bio-technology, New Materials, Infrastructure, Venture Capital Financing etc.

h) Linkages and tie-ups with foreign consultants

i) Support to consultants for bidding and executing in multi-lateral and UN funded projects

Rs. in Crore

Activity	Physical Target	Outlay
Clinics & Design Engineering Centres	Clinics – 20 nos. DE – 5 Nos.	15.00
Support to other Consultancy Agencies	-	2.00
Studies, Seminars, etc.	10	2.00
Registration of Consultants	-	5.00
International linkages & Networking with foreign consultants	20	2.00
Technology Incubators/Consultancy Parks	1	3.00
Miscellaneous including TA/DA, office equipment, etc.		1.00
Total Eleventh Plan		**30.00**

4.1.5 Technology Management Programme

The proposed activities in the 11th Plan are:

- *Technology Benchmarking and Audit*

  The Parliamentary Standing Committee has recommended that DSIR may undertake technology audit of public sector enterprises. The Division has gained experience in developing technology audit parameters and other related issues.

  It is proposed that we may undertake technology audit of 20 PSEs over the 11th Plan period.

- *Chairs in Technology and Innovation Management*

  With a view to give further thrust to research and teaching in technology and innovation management, it is proposed that 10 Chairs on the subject may be supported in different institutes covering IITs, NITs, IIMs, Universities and other specialized Institutes.

- *Technology strategy analysis*

  Industry, the research/academic institutions and the technology community need to be continually updated with information on future likely developments in their respective areas of work. Continuous tracking and trend analysis of global technological developments is imperative to remain competitive. It is essential to define and assess future business scenarios and accordingly strategize an innovation path in a dynamic mode. The Division is contributing towards this through region/product/process specific studies and analytical reports, enriched with visions and trends of technology leaders and business innovators. But to

evolve a complete strategy, work in this area is proposed to be stepped up using other different mechanisms.

One mechanism that could be exploited is the patent document search. Even though a majority of patents granted may seem to be economically non-significant, a patent document is an important source of technical information. The patent document can reveal a lot of important information: current or future focus areas, mix of competitors and particular business roles, strong patenting activity can indicate growing research interest, number of patents granted to a single organization can indicate particular level of activity, abandoned patents can indicate the status of R&D efforts taken up to a certain extent. All in all, the analysis can be a very useful tool for management of technology portfolios, R&D management and for developing a technology strategy. It is proposed that efforts of the Division may be steered towards these and other such efforts.

- *Support to a Technology Management National Resource Centre*

  The Division has initiated the setting up of regional centres for Technology and Innovation Management in different locations of the country. These provide access to information on TM aspects of specific interest to the region of concern, expertise to advise and provide guidance on issues concerned with technology management, and generate long-term as well as short-term solutions. The activities taken up have been wide ranging: training, research, scouting innovation, manpower development, interfacing between academia and industries, data generation, sharing of knowledge and providing solutions to industries, cluster development studies, case preparation, technology related policy studies, developing training tools and modules. Five centres are currently operational and three more are on the anvil. It is proposed to create a national centre that would link the various sub centres and act as a forum for sustenance of aspects pertaining to technology management across these centres through networking and sharing of programmes and activities.

- *Technology-link cells in Institutes*

  It is proposed that the Division may prioritize sectors in a phased manner and link the R&D needs of these sectors with suitable cells located in select academic/research institutions to address developmental needs on an on going basis. The Division could assist in the setting up of these cells. A mechanism for profitable functioning of these cells on a continuing basis would be formulated by the Division.

- *Industry-institute fellowship/exchange programme*

  A mechanism for exchange/loan of scholars between industry and academia would be set up by the Division. Around 50 fellowships are proposed initially.

- *Register of International research alliances*

  Currently, there is no mechanism in place for tracking of international organizations that have established research bases in the country. It is proposed that we may create a Register of International Research Alliances.

- *Networking with International organizations*

  Technology management is being accorded a lot of importance by both developed and developing countries. Learning on these issues can be considerably enhanced by forging relationships with other countries. The Division may institute mechanisms for forging strategic alliances with reputed international institutions and agencies on these issues.

- *Innovation Policy Formulation*

  The Division may formulate a National Innovation Policy that would link with innovation oriented programmes of different agencies/other Government Departments and generate an integrated holistic policy.

Budget Requirement For 11th Plan

Ongoing work	Rs 10 crore
Technology Benchmarking and Audit	Rs 10 crore (20 organizations @ Rs 0.50 crore)
Chairs in Technology & Innovation Management	Rs 7.0 crore
Technology Strategy Analysis	Rs 2 crore
Technology Management National Resource Centre	Rs 10 crore
Technology-link cells in Institutes	Rs 5 crore
Industry-institute fellowship/exchange programme	Rs 2 crore
Register of International research alliances	Rs 0.50 crore
Networking with International organizations	Rs 3 crore
Innovation Policy Formulation	Rs 0.50 crore
TOTAL	Rs 50.0 crore

4.1.6 Technology Information Facilitation Programme

The programme is proposed to be fine tuned and priorities refixed during Eleventh Plan. It is also proposed to seek private sector involvement in its implementation, wherever feasible.

The critical areas of focus during Eleventh Plan under the programmes would be on content development and delivery of nationally available science and technology information and improving the technical competency of persons involved in information handling and delivery.

Content Development

Two major components of content development include the Research outputs of scientific institutions in India and Traditional Knowledge and Folk wisdom.

Research outputs of scientific institutions in India
A host of scientific institutions including Universities and research centres do publish several dissertations/ theses covering all branches of science & technology. The creation of centralized facilities in different regions for the collection and digitization of such outputs and its dissemination through electronic media would be given focus. In addition the reports generated out of research and development efforts funded by the Government and its agencies would also be collected and centralized dissemination through the regional facilities would be strengthened.

Traditional Knowledge and Folk wisdom.
India's diverse communities and its age-old traditions and heritage make it a country where indigenous knowledge abounds. Information, practices, beliefs, tools, materials and biological resources, which have been based on experience and have been tried and tested over centuries of use, have been passed down through generations in several ways. Oral traditions, folk media, stories and apprenticeships have ensured that the knowledge is alive, updated and used. Indigenous knowledge could be of the following categories:

- Locally bound, indigenous to a specific area
- Culture – and context- specific
- Non-formal knowledge
- Orally transmitted, and generally not documented
- Dynamic and adaptive
- Holistic in nature
- Closely related to survival and subsistence groups of persons or specific communities

The recognition that indigenous knowledge has a significant role to play in the development process and contribute towards sustainable development has raised the interest of grass root level workers, scholars, governments and international agencies. Several social trends and changes are leading towards a loss of indigenous knowledge. Since indigenous knowledge is often transmitted by word of mouth rather in written form, it is vulnerable to rapid change – especially when people are displaced or killed, etc. Some indigenous knowledge is lost naturally as

techniques and tools are modified or fall out of use. The WTO regime has highlighted the need to record this indigenous knowledge, so that the community that "owns" this knowledge does not lose out to others who may claim it as their own and reap its benefit. It is imperative for traditional societies to explicate and record this knowledge, organize and collate it and disseminates it widely, thus staking their claim over it.

Indigenous Knowledge pervades all domain knowledge – agriculture, forestry, soil conservation, water management, food and nutrition, health and hygiene, pregnancy and child care, health and medicine, arts and crafts, etc. In many of these areas, women are key links in the indigenous knowledge preservation, dissemination and use chain.

In view of the above, it is proposed to give the requisite emphasis and focus in the documentation and digitization of traditional knowledge and folk wisdom and its delivery in regional languages. It would, however, require the establishment of a suitable mechanism and policies for ensuring the delivery of the traditional knowledge without compromising the rights of the persons/ community possessing such knowledge.

Information Delivery Systems

It is also important that effective and efficient delivery systems are developed for ensuring that S&T information available both nationally and internationally become available to the user clientele scattered through out the country. The specific activities proposed to be undertaken in this regard include the following:

Information Support to Industrial Clusters

The benefits of R&D activities and technology transfer programmes of DSIR are presently accruing to largely to a limited number of institutions which are generally in the organized sector. It is therefore important to initiate positive measures to broad base its activities so that the fruits of industrial research become available to a large cross-section of the industries.

The Small and Medium Enterprises (SMEs) in China could achieve substantial growth and export performance through technology up-gradation with the help of scientific institutions of that country. There is no reason why India cannot adopt such mechanisms. It is therefore proposed to set up a National Research Council – Industrial Research Assistance Program as a key enabler within the country's innovation system. This can provide SMEs with value added technological and business advices, financial assistance and a range of other innovation assistance. The activities involved in this would include the following:

- Enlist major clusters of production units in specific industry groups

- Document the technologies available including those developed by the CSIR labs suitable for each type of industry and production line.
- Prepare detailed project reports for the technology upgradadtion of the cluster including the steps involved and training requirements with the help of technology Advisers
- Provide assistance and technical inputs at every stage of technology Upgradation of the cluster
- Provide financial assistance and fiscal incentives for cluster wise technology Upgradation

Clearing house for S&T related information.

Since MNCs are setting up R&D centers in India, it is proposed to establish a clearing house facility in India for attracting R&D investments in the country. The facility is proposed to be set up as a joint venture project in collaboration with the private sector. It will network between various R&D organizations and provide information on current S&T activities and opportunities available for commercialization.

National Sectoral Portals

Information and Communication Technologies (ICT) are now internalized to the socio-economic fabric of the country. These all pervasive technologies can be fruitfully applied to all sectors of the economy, and the community of the scientific and industrial workers could be one of the beneficiaries. Information delivery through internet could be therefore profitably employed by setting up national sectoral portals in collaboration with scientific institutions in the relevant sectors.

Virtual Information System

Virtual information System has already been established in ICICIKP, Hyderabad which is acting as interface between institutions and industries for sharing S&T information. It is proposed to replicate atleast 2 more such facilities in other parts of the country during Eleventh Plan.

Electronic Publishing of Indian S&T materials

Though electronic publishing of Indian S&T journals has been taken up an activity during Tenth Plan to enhance the visibility and readership of such journals, only one such project namely Journals of INSA could be completed. It is proposed to intensify this activity during Eleventh Plan.

Open Archive Initiatives

This is also an activity taken up during Tenth Plan which would be continued during this plan period. Digital archives of intellectual products created by the faculty, research staff and students of specific institutions would be created and made accessible to end users both within and outside the country.

Competency Development

The development of information systems and its delivery to the targeted users cannot be achieved unless the necessary skill and competency development is given priority. The activities proposed to be undertaken in this regard during this plan period include the following:

Incubation Centres for Promoting Content Development

It is proposed to establish incubation centers in some of the selected universities to promote content development as a profession. Typically, the incubation centers will have the requisite computer and software facilities for imparting training in content development, experienced trainers and facilities for preparation of project profiles and feasibility reports. The centers will also have services of domain experts and language experts. The training component will include the following:

- ✓ Communication skills
- ✓ Domain knowledge
- ✓ Information organization skills
- ✓ Technology know-how
- ✓ Language capability and
- ✓ Improving creative talent

Formal & Informal Training Programmes

These training programmes would be targeted to information users and information managers and intended to enhance the skills and competence of knowledge workers. Both formal and informal programmes with the assistance of professional institutions would be taken up on identified areas like Intellectual Property Rights, Knowledge Management, Institutional Repositories, and Greenstone Software for Digitization, DSpace, etc.

Survey and Research Studies

Periodical surveys and studies would be undertaken to identify the user needs and to assess the new technologies and tools for information management. In addition sector specific studies on the impact of IT and Media convergence will be undertaken to evaluate the sectoral implications of the ICT and explore the new opportunities.

International Coordination

It is necessary to maintain meaningful liaison with international agencies involved in S&T information so as to adopt the international standards and tools & techniques. In particular the coordination with UNESCO, ESCAP, etc will be continued and technology familiarization visits will be made.

Activity	No & Rate	Amount (Lakhs)
4.1 Content Development		
Research outputs of scientific institutions in India	4 x 25	100
Traditional Knowledge and Folk wisdom.	10 x 20	200
4.2 Information Delivery Systems		
Information Support to Industrial Clusters	5 x 50	250
Clearing house for S&T related information	----	1300
National Sectoral Portals	10 x 20	200
Virtual Information System	2 x 75	150
Electronic Publishing of Indian S&T materials	5 x 13	65
Open Archive Initiatives	4 x 25	100
4.3 Competency Development		
Incubation Centres for Promoting Content Development	10 x 25	250
Formal & Informal Training Programmes	25 x 5	125
4.4 Survey and Research Studies	15 x 10	150
4.5 International Coordination		10
4.6 TOTAL		2900

4.1.7 Technology Development and Utilization Programme for Women (TPDUW)

Objectives

- Promoting the adoption of new technologies by women
- Awareness creation and training of women in various technologies
- Technological Upgradation of tiny, small and medium enterprises run by women entrepreneurs
- Showcasing of appropriate technologies and organizing demonstration programmes for the benefit of women

Projects Eligible for Funding

DSIR under its "Technology Development and Utilization Programme for Women (TDUPW)" provides assistance for those projects which are relevant to

the betterment of women. In particular, the projects of the following nature are eligible for assistance:

- ➢ Studies/ surveys for the assessment of information needs of women in different walks of life.
- ➢ Documentation and content development on the following aspects:
- Women's rights and legal provisions
- Technologies useful for subsistence production, personal care and community management including food processing, water conservation, waste disposal, maintenance of health and hygiene, etc.
- Best practices in promoting economic activities by women.
- Contribution of women innovators/entrepreneurs.
- Contribution of women Scientists/ Technologists working in various scientific laboratories.
- Technologies and products beneficial to women.
- Awareness creation and training of women in information and computer technologies.
- Case studies of successful R&D and business women.

Outlay for 11th Plan : Rs. 6.5 crore

5. New Initiatives in 11th Plan

5.1 Small Business Innovation Research Initiative (SBIRI)

Introduction

Opening up of the Indian Economy with increased liberalisation and integration with the global economy has necessitated Indian Industry to take steps to reorient itself. Further, in the light of the Agreement on Trade Related Intellectual Property Rights (TRIPS) of the World Trade Organisation (WTO), the Indian Entrepreneurs have started thinking more and more about indigenous technologies, their development, perfection and absorption. However, the Indian industry has to speed-up its efforts to gain competitive advantage as a nation to capture the global market and generate wealth. The commercialization of new technologies and high tech projects in various industries needs to be accelerated to meet the future challenges and realise full potential of industries are at the forefront of another technological revolution and are definitely going to prove as the industry of the new millennium. Industrial research has vast potential for commercialisation in the areas of computers, information processing, electronics, drugs, pharmaceuticals (other than biotechnology based), chemicals, telecommunications, automobile & automobile components, aircraft, helicopters, materials, energy, environmental protection and others, and various industrial products emanating out of them. The global technologies have been undergoing dynamic changes in terms of perspective and priorities. Innovation is needed for

development of new products and processes. There is a need to create a critical mass of small business units that have the potential to drive the innovation.

About the Scheme

The Small Business Innovation Research Initiative (SBIRI) would be the new scheme launched by the department to boost public-private-partnership effort in the country. The distinctive feature of SBIRI is that it supports the high-risk pre-proof-of-concept research and late stage development in small and medium companies lead by innovators with science backgrounds which is unique in nature to support private industries and to get them involved in development of such products and processes which have high societal and commercial relevance. SBIRI has unique process for generating ideas by bringing users and producers of technology together, it has the direct focus on producing product and a sense of urgency for producing defined results that only private sector engagement can produce. National consultations will be held after every three to six months to generate ideas in different sectors of technological development.

The SBIRI (other than Biotechnology) aims to:

- strengthen those existing private industrial units whose product development is based on in-house innovative R&D,
- encourage other smaller businesses to increase their R&D capabilities and capacity,
- create opportunities for starting new technology-based or knowledge-based businesses by science entrepreneurs,
- stimulate technological innovation,
- use private industries as a source of innovation and thereby fulfil government objectives in fostering R&D, and
- increase private sector commercialisation derived from Government funded R&D.

Objectives

The key objectives are:

a. to provide support for early stage, pre-proof-of-concept research in areas other than biotechnology by industry,
b. to support late stage development and commercialisation of new indigenous technologies particularly those related to societal and commercial needs,

c. to nurture and mentor innovative and emerging technologies/entrepreneurs, to assist new enterprises to forge appropriate linkages with academia and government.

Area Coverage

The scheme covers all areas related to computers, information processing, electronics, drugs, pharmaceuticals (other than biotechnology based), chemicals, telecommunications, automobile & automobile components, aircraft, helicopters, materials, energy, environmental protection and others, and various industrial products emanating out of them.

Who can apply?

The proposals can be made

- Solely by in-house R&D unit(s) of industrial firms; or
- Jointly by Industry and National R&D Organizations and Institutions: or
- Collaborative projects of common interest to the concerned sector/area proposed by a group of industries/users, national research organizations etc.

If the project involves collaboration among two or more partners, the scope of work and responsibilities of each participating establishment in the project should be highlighted. Public-Private Partnership is encouraged and all things being equal, this model will be preferred.

Eligibility criteria for Industry Partner

- The unit should be registered in India and must fulfill the criteria of Small Business Unit. Here a 'Small Business Unit' is defined as an enterprise with not more than 500 employees.
- The Company should have well established in-house R&D unit recognized by Department of Scientific and Industrial Research (DSIR) or have patent rights (National or International) in the proposed activity.
- Joint ventures and limited partnerships would be eligible for SBIRI support, provided the entity created meets the above requirements.

In case of projects focused on strategic and critical national needs, the eligibility criteria for a company can be relaxed at the discretion of the Apex Committee of SBIRI.

Funding structure

The SBIRI scheme will operate in two phases viz. for establishment of pre-proof of concepts of innovations and for product and process development. In both the phases, projects will be implemented at the industry site. However, in any case the actual project cost would not involve cost of land and building but only capital investment and recurring costs.

SBIRI Phase – I : The following structure of funding will be available to industry depending on the project cost and own resources brought in by the promoter to the project.

a. If the actual project cost is upto Rs. 25 lakhs, 80% of the project cost will be available as a government grant.

b. If the actual project cost is between Rs. 25 lakhs and Rs. 100 lakhs, 50% of the project cost will be available as government grant subject to a minimum of Rs. 20 lakhs and maximum of Rs. 50 lakhs.

c. If the project cost is beyond Rs. 100 lakhs, in addition to the Govt. grant of Rs. 50 lakhs, the unit will be eligible for interest free loan upto 50% of the amount (subject to a limit of Rs. 50 lakhs as loan) by which the total project cost exceeds Rs. 100 lakhs.

SBIRI Phase – II : It is proposed to provide soft loan upto Rs. 10 crores for a project as per its requirement. Soft loan upto Rs. 100 lakhs will carry a simple interest of 1% while the interest rate will be 2% (simple interest) on the amount of loan beyond Rs. 100 lakhs. The role of public R&D institution at this stage too is critical, as many of the projects would continue to require technical support from the public funded R&D institutions. The partner in the public institution at this stage will get the R&D support as grant.

Management

The scheme is coordinated by the Special Purpose Vehicle (SPV) under the guidance and directions of Department of Scientific & Industrial Research, Ministry of Science & Technology, Government of India through Apex Committee of SBIRI (ACS).

Monitoring

Each and every project supported under the scheme SBIRI will be monitored by the Internal Monitoring Committee (IMC) to be chaired by emeritus scientist/technocrat in that particular area designated by ACS and having the

project investigators from all participating institutions and companies as members of this Committee. The Committee can have 3-4 external experts depending on the requirement. IMC will submit half yearly progress report to ACS for review.

Outlay for 11th Plan: Rs. 500 crore

5.2 Fund for Accelerating Start-ups in Technology (FAST)

Nitin Desai Committee on Technology Innovation and Venture Capital

Recommendation: Establish early stage venture fund through public-private partnership, under auspices of DSIR. Initial corpus to come from existing schemes supplemented by public & institutional resources.

Objective of FAST – Scheme

The first phase of FAST would provide seed capital to start-ups in the ICT sector seeking to create innovative products and services preferably based on Intellectual Property (IP) that find immediate application as solutions to customers' problems. Small business enterprises already in operation and employing not more than 500 persons are also eligible to apply. The scheme will operate in public private partnership mode.

Only projects where venture capital institutions issue a non-binding Expression of Interest (EOI) to support the start-up once the proof of concept is established using funds from FAST, would be eligible for support.

What Sectors Should FAST First Focus On?

India has achieved tremendous success in global markets in the IT, Life Sciences, and Auto Components sectors. FAST can therefore focus on these sectors and other high growth sectors that may emerge.

To begin with, it is suggested that FAST supports start-ups in the ICT sector. This is because the following conditions favour the emergence of a high-tech segment consisting of start-up firms developing cutting-edge innovations for global markets in this sector:

- Success and reputation of the existing software and services industry
- Availability of a large pool of high-quality, low-cost ICT graduates
- Presence of reputed software firms that could directly or indirectly contribute to the emergence of such a segment
- Web of personal and professional linkages with both Indians working in Silicon Valley and high-tech firms in that region and elsewhere in the US

- Key strategic investments in Indian innovation by high-tech firms such as Intel, Microsoft, and Cisco that could encourage creation of ventures around their offerings

The study of the Indian software industry by Avnimelech and Teubal (2003) also concludes that India is well poised to enter into an R&D intensive, Silicon Valley phase of its ICT industry. This phase would involve further expansion of the existing ICT industry and entry into higher value-added areas through the creation of large number of start-ups.

Creating an Ecosystem to Support High Technology Start-ups

DSIR, The Indian School of Business (ISB), Hyderabad, TiE propose to create an enabling ecosystem by bringing several partners together on a common platform. This ecosystem would provide:

- Mentoring and start-up management advice
- Access to technology skills to support product development
- Access to follow-up financing
- Intellectual Property (IP) Management
- Access to managerial talent with strong operating experience
- Access to product management and international business development support

DSIR & ISB would partner with the Indian Institute of Science (IISc) and The Indus Entrepreneurs (TiE), Hyderabad chapter to create this ecosystem.

About ISB

ISB has rapidly emerged as one of the leading institutions imparting management education in India. The School evolved from a need for a globally top-ranked and distinctive business school in the Asian region dedicated to providing the best management education. The School is the dream of some of the best minds from the corporate and academic world. Their aspiration in creating the ISB is to establish an internationally top-ranked, research-driven, independent management institution that grooms future leaders for India and the world.

The School's Governing Board comprises business leaders, entrepreneurs, and academicians from some of the world's leading business and management education institutions. The school has academic partnerships with the Kellogg School of Management, The Wharton School, and London Business School.

The ISB is uniquely positioned to create this ecosystem for high-technology ventures given its:

- World-renowned faculty

- Linkages with reputed global institutions
- Experienced and high-quality student body
- Association with renowned entrepreneurs and global business leaders
- Dedicated centre for excellence in entrepreneurship
- Relationships with global Venture Capital firms
- World-class infrastructure and facilities

ISB would be supporting start-ups funded by FAST by providing mentoring and start-up management advice using the resources available through its entrepreneurship centre, the Wadhwani Centre for Entrepreneurship Development (WCED). ISB would also leverage its resources and relationships to enable these start-ups manage their IP, access managerial talent with operating, product development, and international business development skills.

The Indus Entrepreneurs (TiE), Hyderabad Chapter

TiE is a global not-for-profit organisation focused on promoting entrepreneurship that began in Silicon Valley. TiE helps budding entrepreneurs by way of advice, guidance and assistance from successful and experienced entrepreneurs and professionals. It has 45 chapters in 10 countries and counts successful entrepreneurs, venture capitalists, angel investors, and business service providers among its members. The Hyderabad chapter of TiE would partner the ISB in creating this ecosystem.

TiE would use its network to facilitate start-ups funded by FAST access follow-on financing, recruit talent with strong operating and start-up experience, and enable them obtain access to potential buyers for their products and services in international markets. TiE would be paid an annual retainer for the support it renders.

Indian Institute of Science (IISc)

The Indian Institute of Science (IISc) is a premier institution of research and advanced instruction in India. It is one of the oldest and finest centres of its kind in India, and has a very high international standing in the academic world as well.

The Institute has been able to make many significant contributions primarily because of certain uniqueness in its character. It is neither a National Laboratory which concentrates solely on research and applied work, nor a conventional University which concerns itself mainly with teaching. The Institute is engaged research in frontier areas and education in current technologically important areas. In keeping with its aims and objects, the Institute has organised a centre for scientific and industrial consultancy through which the know-how generated in the Institute percolates to industries via industry-sponsored projects.

IISc would be supporting start-ups funded by FAST in accessing technology skills needed to support product development. IISc would be paid an annual retainer for the support it renders.

Creating and Managing the Ecosystem

A separate entity would be set up by the ISB at Hyderabad to create and manage this ecosystem. This entity would be manned by persons experienced in working with start-ups. The entity would be responsible for sourcing applications from start-ups, processing them for obtaining financial sanction, and putting together the support mechanism needed by each entity provided seed capital. The activities of this entity would be overseen by Governing Board , Chaired by Secretary, DSIR that will have representatives from DSIR, Partner Institutions, and independent board members of repute.

An Advisory Committee chaired by the Executive Director – WCED at the ISB would also be constituted. The members of this board would include entrepreneurs, VCs, academics, and nominees of DSIR. This board would be the authority empowered to recommend proposals for financial sanction to the DSIR under FAST, and identifying the support needs of entities financed.

ISB would be paid a lump sum fee for putting together this ecosystem and an annual retainer to cover expenses and pay for time committed to this entity.

FAST Scheme – Fund Size

The fund size of FAST – Scheme would be:

- Rs 25 crore for start-up funding
- Rs 50 crore for follow-on funding for R&D purposes

Who can apply?

Start-ups/Small Business intending to create products and services (preferably IP-based) that have their development activities located in India can apply. It is necessary that the IP created be owned by the India outfit.

Quantum and Nature of Funding

FAST would meet the total funds required to establish the proof of concept/develop a working prototype and create the IP needed to take the venture forward subject to a maximum of Rs 25 crore. Funds would not be provided for meeting expenses towards acquiring land and constructing buildings.

FAST would provide funds to the start-up through a mix of grants and interest-free loans.

Where the assessed fund requirement of the start-up is less than or equal to Rs 25 lakhs, the entire amount would be provided as a grant.

Where the assessed fund requirement of the start-up more than Rs 25 lakhs, 50% of the amount would be provided as a grant subject to maximum of Rs. 100 lakh and the balance as an interest free loan.

Funding for further R&D after the concept is proven

In such cases, start-ups and small enterprises can avail a soft loan subject to a maximum of Rs 10 crores per unit. The first Rs 100 lakhs would carry an interest rate of 1% (simple interest) and amount in excess of Rs 100 lakhs would carry an interest rate of 2% (simple interest).

If an established R&D institution is supporting the unit in its R&D efforts, its fee would be paid directly to that institution by the FAST scheme as a grant. The total loan amount to the unit would stand reduced by the amount paid as fee to the R&D institution.

What happens if the VC that had indicated an EOI refuses follow-on funding?

The entity at the ISB would make all reasonable efforts to ensure that the start-up obtains follow-on funding from other sources. If reasonable efforts fail to excite interest in VCs, the failure process will be triggered.

Assessing Failures and Recommending Write-offs

If the start-up fails to meet its commitments in the time frame agreed to, fails to attract follow-on funding because of lack of VC interest, or if the concept fails to meet the requirements of the target market, the start-up would be termed a failure. A Review Committee consisting of a representative from the entity at the ISB, a representative from each partner institution, a Government nominee and an independent technical consultant renowned in the field in which the start-up operates would evaluate the causes of failure. The Review Committee would submit its report to the Advisory Committee.

If the Review Committee determines that failure occurred because of reasons beyond the control of the management and the Advisory Committee agrees with its findings, then it would recommend that the loan, if any pending, be written off by the scheme.

Future Directions

The Government can quickly incorporate learning from this policy experiment to refine the scheme, replicate it in other geographies in India, and also extend it to other sectors with potential. This replication and extension process would lead to

the development of strong innovation capabilities in India and to the creation of a pool of start-ups.

The two most important reasons cited for the successful emergence of an early-stage VC industry in Israel are the presence of a critical mass of innovative start-ups (about 300 in number) and strong innovation capabilities (Avnimelech, Kenney, and Teubal, 2004). Therefore, enhanced innovation capabilities and a pool of start-ups can set the stage for the emergence of a vibrant, early-stage VC funding industry in India too.

The Israeli Government did facilitate the emergence of the early-stage VC industry by putting together its highly successful YOZMA programme. It committed USD 100 million towards investment in early-stage VC funds with the rider that the VC take on a local financial institution and an experienced VC with international experience as partners. The international partner complemented the skills of the local partner by bringing in knowledge about VC operations and international experience. Each VC received a maximum of 40% of its corpus through the YOZMA programme subject to a limit of about USD 10 million. The VC fund had the option of buying back Government's investment in it at a pre-determined rate.

Once innovation capabilities are enhanced and a large pool of start-ups created, first phase of FAST Scheme can be closed and second phase of FAST – Scheme can be launched on the lines of YOZMA thereby facilitating the creation of the early-stage VC industry too.

5.3 IPR Programme

S&T Policy 2003

"To establish an Intellectual Property Rights (IPRs) regime which maximizes the incentives for the generation and protection of intellectual property by all types of inventors. The regime would also provide a strong, supportive and comprehensive policy environment for speedy and effective domestic commercialization of such inventions so as to be maximal in the public interest. "

The Policy planners considered Generation and Management of Intellectual Property as an important strategy. In the S&T Policy 2003 it is mentioned that :

"Intellectual Property Rights (IPR), have to be viewed, not as a self-contained and distinct domain, but rather as an effective policy instrument that would be relevant to wide ranging socio-economic, technological and political concepts. The generation and fullest protection of competitive intellectual property from Indian R&D programmes will be encouraged and promoted. The process of globalization is leading to situations where the collective knowledge of societies normally used for common good is converted to proprietary knowledge for commercial profit of a few. Action will be taken to protect our indigenous

knowledge systems, primarily through national policies, supplemented by supportive international action.

The development of skills and competence to manage IPR and leveraging its influence will be given a major thrust. This is an area calling for significant technological insights and legal expertise and will be handled differently from the present, and with high priority. "

Following the commitments made at WTO, India has modified IPR related laws and even made new laws such as in the area of Geographical Indication, Plant Variety Protection and Plant Breeders' Rights. While the laws are in place, exposure to the newly enacted laws is very negligible. There is an urgent need to generate awareness about the new / modified laws in the Indian community particularly scientists including agricultural scientists, technologists, innovators, farmers, academicians and industries. Awareness is required to be generated not only about IPR laws and how to develop / acquire IPRs but also to familiarize them with their rights and obligations.

Due to the changed industrial scenario and globalization of economy, the industry in general and the micro, small and medium enterprises (MSMEs) in particular have to face stiff competition as insulated and protected market conditions are no more available to it. However, through IPRs industry can enjoy the benefit of operating in a protected market conditions because IPRs are exclusive rights.

It is of no use to have IPRs if they are not enforced, may be, if need arises, through the Court of Law. This part of whole IPRs game is much more expensive than acquiring and maintaining IPRs.

For achieving these goals, there are certain issues, which need attention. Therefore, the proposed scheme will address the following issues / problems during the eleventh five year plan.

Problems to be Addressed

The patent literature is an extremely important source of information which is seldom used by our scientific community. Even the industries do not make use of this literature, which can give them enormous information about their competitors, future products likely to enter in the market, solutions to their technical problems by scanning patent literature and improvements in their existing processes / products thereby empowering themselves at the market place.

At the time of formulation of their R&D projects, patent information would help in avoiding any possible infringement of an existing patent. In fact the technical information contained in the patent literature, which is available for free use, can help in suitably devising a new and better product / process.

Further, the innovators have to fully exploit their own IPRs through commercialization by themselves or through licencing of technology. By knowing their rights & obligations through IPRs, they can become smart technology transfer negotiators and whenever & wherever required to take legal action, they can initiate appropriate action to protect their IPRs and indigenous / traditional knowledge.

Objectives:

Objective of the proposed programme is to take up whole range of activities concerning IPRs more rigorously, particularly in view of the strategies given in S&T Policy, 2003 by extending legal, technical and financial support.

The proposed activities of the programme include (but not limited to) the following:

i. To generate awareness of IPRs in the Universities, institutions of higher learning, R&D institutions and industries.

ii. Creating public awareness about IPRs including GI, Farmers and Breeders' Rights, and protection of new plant varieties among research institutes, academic community, universities and industries.

iii. Organizing seminars / workshops on IPR matters in academic institutions, research institutes and industries.

iv. With a view to enhancing competitiveness in the global context, to study and analyze opportunities and challenges faced by the industries in the new IPR regime. This would be done by awarding studies to competent agency / consultants and creating appropriate 'Chairs' in the Universities and institutes of higher learning. Dissemination of IPRs related information is also included.

v. Filing applications for the protection of IPRs in the appropriate IPR offices in India and abroad.

vi. Opposing grant of IPRs, wherever applicable / necessary, in India and abroad.

vii. Utilizing information available in patent and other IPR literature while formulating R&D project(s).

viii. Monitoring trend of innovations through IPR literature.

ix. Monitoring competitors' innovations and their commercial strategies through IPR literature.

x. Monitoring infringements, if any, and to take necessary action for initiating legal action.

xi. Initiating legal action against any possible infringement of IPR in India and / or abroad.

xii. Supporting R&D projects for development of process / product for which application for protection of IPR has been made.

xiii. Commercialization of the process / product for which application for protection of IPR has been made.

It is proposed to provide full financial support by DSIR for the activities at paras (i) to (ix) and partial financial support (50%) of the total project cost for the activities at paras (xii) and (xiii).

Target Beneficiaries**:**

Scientists working in Universities, institutions of higher learning, R&D institutions, agriculture sector and industries.

Mechanism of Operation:

The programme is proposed to be operated by DSIR. The details of the mechanism and other aspects would be worked out in due course.

Budget : Total Rs. 100 crore

Filing:

Country	**No. of applications per annum / 5 years**	**Total (Rs. in lakhs)**
India	10/50	25.00
PCT	5/25	45.00
USA	5/25	250.00
Europe	5/25 (in 5 countries=125)	530.00
Japan	5/25	300.00
	Total	**1150.00**

Other Activities:

Activity	**Expenditure (Rs. in lakhs)**
Awareness generation (4 seminars p.a. @Rs.5 lakhs)	100.00
Supporting R&D projects for which IPR application made	3000.00
Supporting commercialisation (including R&D activity) of patented inventions (50% support; 2 cases p.a. ;DSIR support ~ Rs. 5 crores)	5000.00

Studies & Chairs (4 for 5 years) IIM, National Law School, Indian Society of International Law, DSE, etc.) and procuring IPR related softwares and their licensing (Salary ~Rs.50000/- p.m. + University overheads)	700.00
Monitoring trends of innovation (Rs.5 lakhs p.a.)	25.00
Evaluation/Analysis of alleged infringements	25.00
TOTAL	**8850.00**

The above heads are given only to broadly explain the basis / activities. In actual practice, the budget utilization may interchange (inter-and/or intra-headings).

6. Central Electronics Ltd.

6.1 S&T Scheme

(i) To develop new SPV applications particularly in the areas of lighting and signaling exploiting **White** LED technology

(ii) To develop and identify process technology for the production of thin film silicon solar cells and modules, as possessing an alternate technology keeping in line with current technology trends globally and also with a view to adopt this technology for commercial production.

(iii) Solid State Interlocking, microprocessor based MUX, Universal Fail Safe Block Interfacing (UFSB), Auxiliary Warning System (AWS), EVM and LED Based Signals

(iv) Rotating Field Phase Shifter, Development of Piezo based materials, products and fuses for defence applications.

Proposed Outlay For 11th Plan:

(Rs.in Crores)

Scheme	2007-08	2008-09	2009-10	2010-11	2011-12	11th Plan
S&T Plan	5	8	5	5	5	28

6.2 I&M Scheme

The solar PV market has been growing at a rate of 40% since last 3-4 years, and is likely to grow at a rate of 25% per annum for next 5-10 years. With this rate the global market is likely to exceed the annual production mark of 12 GW during the year 2012. Likewise, the Indian market demand is expected to reach 200MW by the year 2012.

CEL will target the production of Solar Cells and Modules upto 25 MW per annum by the year 2012. The main emphasis will be to establish/state of the art process technology, to enhance the productivity and conversion efficiency. CEL is in the process of establishing in-line manufacturing/testing facilities by year 2012.

Safety being the highest priority in Indian Railways, large-scale deployment of modern signaling & safety equipment is envisaged. The present infrastructure will be upgraded so that the stringent specifications and requirements not only of Indian Railways but also international level to generate export are met. CEL will acquire sophisticated latest production equipment (CAM) for the Systems Production with an objective of minimizing failure rate and improving MTBF of the products. The design of the products will be continuously improved, keeping in pace with trends in the components and technology.

Defence is likely to induct Weapon Locating Radar and Akash Missile in large number during XI Five Year Plan. To meet the projected demand, the manufacturing/testing facilities of Phase Control Modules (PCM) etc. are need to be augmented to manufacture 30,000 to 40,000 Nos. PCM annually.

Production plan for 11th five year plan

Rs. in crores

2007-08	2008-09	2009-10	2010-11	2011-12
192.75	218.13	232.88	250.00	250.00

Proposed Outlay for 11th plan

Rs. in crores

2007-08	2008-09	2009-10	2010-11	2011-12	11th Plan
4.00	6.00	3.00	2.00	__	15.00

Manpower Employed:

	As on 31.3.2006	2007-08	2008-09	2009-10	2010-11	2011-12
Scientific & Technical	480	460	460	450	450	450
Administration	115	100	100	95	90	90
Supporting Staff	81	65	65	65	60	60
Total	676	625	625	610	600	600

7. National Research Development Corporation

7.1 Invention Promotion Programme Rs. 100 crore

Continuation of on-going programmes

S.No.	Particulars	11th Plan
1.	Prize awards for meritorious inventions	2.50
2.	To bring out scientific publications like Invention Intelligence (English bi-monthly magazine), Awishkar (Hindi monthly magazine) including mail version of Invention Intelligence	7.00
3.	Assistance for patenting inventive ideas and Providing financial assistance for the fabrication and testing of models or prototypes of commercially viable inventions/new ideas,	9.00
4.	Techno-commercial support to promising inventions including incentive to scientists for making know-how documents and demonstration of technology	10.00
5.	Patent awareness seminars	1.00
6.	On-line patent search	0.50
	Total	30.00

New Initiatives

S.No.	Particulars	11th Plan
1.	Incubation and Venture Capital Funding for promoting development of new generation products	50.00
2.	Information related to NRDC awarded inventions on Web and their regular updating.	4.00
3	IP Business Initiatives – Basic Engineering Design Packages	10.00
4	Consultancy/Man-power Cost	6.00
	Total	70.00

Incubation and Venture Capital Funding for promoting development of new generation products

NRDC realizing that there is an urgent need to convert discoveries into development at a faster rate is proposing to initiate a mechanism of Venture Capital Funding to promote development of new generation products through acceleration of technology development process by the proposed initiative to be taken during the 11th Plan. Thus in order to supplement the technological entrepreneurial base in the country, NRDC started a pilot scheme of VCF in the year 2006-07. Through this scheme NRDC aims to further encourage technologist, technocrat and professionals to take up new and risky ventures.

NRDC proposes to continue the pilot scheme of VC funding as a proactive step to give a boost to existing climate whereby such technologies development can be initiated and promoted and provide a much needed risk cover to entrepreneurs, willing to work with

such lab technologies. Wherever necessary, Venture Capital Funding for incubation of technology would also be provided at the pilot scale so that further opportunity gets created for successful development of such technologies.

The scheme is to :-

- Provide VCF to NRDC licensees/ promising inventions
- Provide a part of the associated capital required for implementing the widest possible range of industrial projects.
- Encourage new entrepreneurship which shall facilitate setting up of the knowledge based industries.
- Promoting untapped technological opportunities for funding

Objective of the Scheme

The objective of the scheme is i) to further encourage, even the first generation entrepreneurs, in order to enlarge the technological entrepreneurial base in the country and ii) to provide assistance in soft terms to those entrepreneurs who are willing to undertake risk oriented project entailing the use of advanced and/or complex technology or projects for the manufacture of new products for new application.

Financial Outlay:

The requirement of the funds for undertaking the activity Incubation and Venture Capital Funding for the 11th Plan are as follows:

(Rs in crores)

	2007-08	2008-09	2009-10	2010-11	2011-12	Total
No. of ventures to be supported *	8	8	9	10	10	45
Amount	7.50	7.50	10.00	12.50	12.50	50 .00

Basic Engineering Design Packages for licensed technologies

Today's industry prefers complete technology package which contain Basic Engineering Design Package so that they can scale it up further and put up the commercial plant. Once the Basic Engineering Design Package (BEDP) is prepared one can work out for detailed engineering for setting up the pilot plant and successful operation of the process at the pilot plant. Based on the experience gained during 2006-07, Corporation shall take up the work for development of BEDP of the various potential technologies some of which are in demand both in India and abroad and required considering the tomorrow's need for cleaner environment.

The Corporation proposes to build up resources of the various books, data, information along with procurement of imported process simulation software like Chemcad suite Aspin Plus batch etc. which help in preparing basic engineering packages and setting up of pilot plants for up-scaling laboratory based know-how. Corporation would develop basic engineering packages in the following manner

Financial Year	2007-08	2008-09	2009-10	2010-11	2011-12	Total
No. of packages	5	5	8	10	12	40

Financial Outlay: The proposed financial requirement for carrying out the activity "Basic Engineering Design Packages for licensed technologies" in the 11th plan period would be as under:

(Rs. in Crores)

Financial Year	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Amount	0.5	1.5	2.00	2.50	3.50	10.0

7.2 Technology Promotion Programme Rs. 68 crore

i. Promotion of Rural and Household Technologies

On-going programmes:

Rs. Crore

S.No.	Particulars	11th Plan
1	Strengthening of existing RTDT Centre	4.00
2	Setting up of new RTDT Centres	2.00
3	Wide Publicity to appropriate technologies by participation in Rural Exhibitions and advertisements	2.00
	Total	8.00

New Initiatives (Rural Clusters in Dairy and Sericulture)

Rs. Crore

S.No.	Particulars	11thPlan
1	Identification of important tecgnological gaps and need, prepration of technology modules in local language, training and demonstration,, literature printing, field trials, publicity etc.	5.00
2	Consultancy/Man-power Cost	4.00
	Total	9.00

ii. Promotion of Export of Technology

On-going programmes

S.No.	Particulars	11th Plan
1	Participation in exhibitions and technology promotion conferences abroad [@ six exhibition/year]	7.00
2	Printing, advertisement and publicity related to promotion of export of technologies	1.00
3	Knowledge Management System for identification of export of technologies	2.00
4	Multimedia presentation of small and micro machineries and technologies	1.00
5	Consultancy/Man-power Cost	3.00
	Total	14.00

New Initiatives

S.No.	Particulars	11th Plan
1	Setting Up of Offshore Demonstration Units of Indian Technologies and Machinery	7.50

iii. Informatics for Technology Transfer

S.No.	Particulars	11th Plan
1	Participation in exhibitions/seminars/workshops	2.00
2	Co-sponsoring seminars/workshop/get-togethers	0.50
3	Market Surveys	1.00
4	Updating the Website	2.00
5	Books, periodicals	1.00
6	Software	4.00
7	Printing of publicity materials related to technology dissemination	2.00
	Total	12.50

iv. Technology Development Programme for Priority Projects

On-going projects

- Further Development work on the patented process on Targeted Gene Delivery System for developing various therapeutics in association with Albert Einstein College of Medicine, New York, USA
- Hydrogenation of Azadichtrin
- Shelf Life Extenders for fresh fruits and vegetables
- Vaccines
- Bio-diesel

- Bio-pharmaceuticals

A sum of Rs.10.00 Crores is required for carrying out these developmental projects during 11th Plan.

Women Entrepreneurship Development Program

- Selection of NGO and identification of site
- Procurement of need based machines and establishing training facilities
- To exhibit and demonstrate machines/ technology appropriate for Women
- Preparation of multimedia presentation, manual/ training brochures, printing of catalogues
- Organising workshops, seminars/ hands on practice at different locations in the Country
- Providing necessary consultation and other services for setting up of Industries
- Assisting in getting loan from financial institutions

A sum of Rs. 2 crores will be required in 11th Plan for this activity.

Programme for North-Eastern States

NRDC plans to set up Demonstration centers at 3 locations of appropriate technologies/machineries related to :

- Biodiversity conservation technologies
- Post harvest technologies
- Food processing units
- Alternate source of energy

The above activitiy has to be carried out under mission mode approach. It is not necessary that the development of such technology should be carried out in a research institute of the area rather NRDC will act as a bridge and identify an Institute even locally and if not then in the country which is more advanced and most competent to carry out further developmental work. All such development of technology will be under mission approach basis which require a holistic approach with adequate funding arrangement.

In order to achieve these objectives awareness seminars and the training programmes would be organized in each state on a repetitive basis so that the thought process of the intellectual of the area should be focused on conservation and protection of bio-resources thereby bringing monitory benefits to the local public needing of the economic development of the each state. Training programmes and geographical indication registration and sensitization programmes shall also become a part of the activity.

Financial Outlay for this Scheme

Rs. 5.00 crores will be required for carrying out "New initiatives for North Eastern states" as per the details given below:

NRDC 11th plan Outlay in a Nutshell

Rs. Crore

S.No.	Continuing Schemes	Financial Outlay
1	Invention Promotion Programme	**100.00**
2	Technology Promotion Programme	
(i).	Development and Commercialisation of Rural Technology (Renamed to Promotion to Rural and Household Technologies)	17.00
(ii).	Export of Technology	21.50
(iii)	Informatics for Technology Transfer	12.50
(iv)	Technology Development Programme for Priority Projects for the larger benefit of the Nation	17.00
	TOTAL (TPP)	**68.00**
	TOTAL	**168.00**

8. Consultancy Development Centre

Proposed activities for 11th plan are given below:

(i) Consultancy Services Export Promotion Programme

During the last few decades India has developed considerable expertise and capabilities in consultancy, which can match international standards. The country has the necessary scientific and technological human resource and managerial expertise available in sufficient numbers for providing consultancy services including in advanced countries. Also, the reputation of effective delivery and low costs as compared to those in developing countries is an added advantage. This has led to opening up of new opportunities for Indian consultants and consultancy organizations in the global market, especially in the present environment with WTO providing an effective forum to influence global trade policies. In this situation, necessary mechanism should be evolved to effectively utilize the opportunity.

CDC is currently the Secretariat of the Technical Consultancy Development Programme for Asia and the Pacific (TCDPAP). This is a programme promoted by UN-ESCAP and supported by the DSIR for developing consulting capabilities at National, Sub-Regional and Regional levels in the Asia and Pacific Region. The programme initiated in 1994 comprises 13 Countries of Asia and Pacific region as members. CDC is the secretariat for implementing programmes of TCDPAP, which is guided by a General Council and Executive Committee. Over the years the Secretariat has carried out activities like training and skill building programmes in various countries, Annual Conferences every year in one of the

member countries, develop linkages through networking, publication of newsletter, proceedings of annual conference and so on. It is proposed to develop this activity as a Centre of excellence for facilitating export of Indian consultancy services to the Asia Pacific and other countries. The activities to be carried out through the proposed Centre shall comprise the following: -

- Identification and analysis of potential markets
- Conduct studies on issues related to consultancy services exports
- Organize exchange visits of delegations to prospective countries
- Publish compendiums on Indian consultancy expertise
- Publish compendiums on Indian consultancy expertise
- Develop a mechanism for facilitating Knowledge Process Outsourcing
- Organize training and skill building programmes

(ii) Consultancy Information, Research and Programme

It will be useful to evolve a research programme with focus on the consultancy profession dealing with issues relating to consulting, its operational dimensions, practices of consultancy services, client consultancy relationships, etc. The activities to be undertaken by the research facility will comprise

- Analytical Studies on consulting needs and trends with emphasis on SMEs
- Sectoral State-of-the-art reports
- Status reports on export promotion opportunities
- Journal on Consulting
- Publications
- Training and skill building on emerging trends

(iii) Training and Skill Building Programmes

Presently the Centre conducts a number of training and skill building programmes. These will be reoriented in line with the changing trends indicated in the vision/status reports. This area be given more thrust with quantum increase in the number of programmes with focus on emerging trends in various sectors including outsourcing and consultancy exports. Specialised programmes will also be planned and executed for various R&D organizations, consultancy and client organizations and other professional organizations. It is also proposed to design and develop certification programmes for consultants on the lines of Certified Management Consultant (CMC) programme of IMCI. The MS degree programme will be developed in a more focused way with practical orientation and the reach will be spread to other cities through evolving on-line programmes.

Budget

Activity	Outlay (Rs. Crore)
Consultancy Services Export Promotion Programme	4.00
Consultancy Information, Research and Promotion	5.00
Training and Skill Building	1.00
Total	**10.00**

ANNEXURE 1

No. DSIR/TPDU/XI Plan/07(1)/2006-07
Government of India
Ministry of Science and Technology
Department of Scientific and Industrial Research

Technology Bhavan
New Mehrauli Road
New Delhi – 110016
July 07, 2006

ORDER

Subject: Constitution of a Working Group for Formulation of 11th Plan Proposals of Department of Scientific and Industrial Research

In the context of formulation of the Eleventh Five Year Plan (2007-2012), it has been decided to set up a Working Group for the Department of Scientific and Industrial Research (DSIR). The terms of reference and the composition of the Working Group will be as follows:

I Terms of Reference

1. To review the performance, present status and growth of industrial research and technology development in the country, keeping in view the current economic scenario, emerging trends and the targeted goals.

2. To review the targets vis-à-vis achievements of the departmental plan scheme during the tenth five year plan.

3. To suggest new incentives and mechanisms to encourage industrial research and enhance industry's share in country's R&D expenditure.

4. To suggest innovative mechanisms for supporting and funding new technology development and its speedy commercialization.

5. To evolve efficient mechanisms for capturing the innovative spirit of individuals and hand-holding them for translating their innovative ideas into usable products.

6. To suggest mechanisms for facilitating Indian scientists, technologists, institutions and organizations in their endeavour to commercialize patents filed in India and abroad.

7. To evolve mechanisms for technological capability building of industry.

……..Cont'd 2/-

8. To evolve mechanisms for accelerating the growth of consultancy profession for catering to the domestic as well as export markets.

9. To enhance the share of technology intensive exports in India's export basket as well as enhance India' share of global technology exports.

10. To suggest mechanisms for innovation management and efficient utilization and management of technologies (available with institutions and research establishments) by industry. Also, to promote integration of technology strategy with business strategies in industry.

11. To suggest mechanisms for enhancing FDI for industrial research and technology development in the country.

12. To assess the needs and viability to develop a comprehensive system on S&T information to support industrial research and technology development in the country.

13. To evolve innovative schemes for departmental PSU - National Research Development Corporation.

14. To suggest mechanisms and schemes for turning around the departmental PSU – Central Electronics Limited.

15. To evolve innovative schemes for autonomous organization of the department – Consultancy Development Centre.

II Composition of the Working Group

1. Secretary, DSIR - Chairman
2. Representative of Department of Science and Technology
3. Representative of Department of Bio-Technology
4. Representative of Department of Commerce
5. Representative of Department of Information Technology
6. Representative of O/o Development Commissioner for SSIs
7. Representative of Planning Commmission
8. Representative of Ministry of Women and Child Development
9. Dr. K.V. Raghavan, Chairman, RAC (DRDO) and former Director, IICT
10. Mr. Sujit Banerjee, President, Reliance Industries
11. Dr. M.D. Nair, Former MD, SPIC
12. Representative of Confederation of Indian Industry
13. Shri Rajan Kohli, Dy. Secretary General, FICCI
14. Shri A.T. Kusre, GM, ICICI

……..Cont'd 3/-

15. Shri N.V. Satyanarayana, CMD, Informatics India
16. Representative of Industrial Design & Development Centre, IIT Delhi
17. Shri K.K. Kapila, Inter-Continental Consultants
18. Dr. Ashok Barua, Former Director, IACS
19. Dr. O.P. Agarwal, Emeritus Scientist, ICMR
20. Shri Ashwani Gupta, Scientist "F", DSIR - Member Secretary

2. The Chairman of the working Group may include additional terms of reference, in consultation with the members.

3. The Chairman of the Working Group may co-opt any other expert as member of the Working Group, if considered necessary.

4. The Chairman of the Working Group may consider and grant permission to invite FA, DSIR, all the departmental officers of the level of Scientist "G", CMDs of NRDC & CEL, departmental officer in-charge of PSUs and DG, CDC as "invitees" to the Working Group Meetings.

5. The Working Group will submit its report to the Chairman of the Steering Committee on Science and Technology before 31st August, 2006.

6. The expenditure on TA/DA of official members in connection with the meetings of the Working Group will be borne by the respective Department/Ministry to which the official belongs, as per rules of entitlement applicable.

7. The non-official members shall be paid an honorarium of Rs. 1000/- (Rupees One Thousand Only) per day for the days of the meetings.

8. The non-official members of the Working Group shall be entitled to airfare by entitled class, actual taxi fare for local journeys and DA as per the following rates.

City	**where non-official stays in Govt./Public Sector Guest House**	**makes his own arrangement**
A-I Class	Reimbursement of actual expenses for lodging + Rs. 195/-	Rs. 260/-
A Class	Reimbursement of actual expenses for lodging + Rs. 157/-	Rs. 210/-
B-I Class	Reimbursement of actual expenses for lodging + Rs. 127/-	Rs. 170/-
Others	Reimbursement of actual expenses for lodging + Rs. 101/-	Rs. 135/-

…….Cont'd 4/-

9. This issues with the approval of Secretary, DSIR vide their Dy. No. 1321 dated 03.07.2006 and with the concurrence of IFD vide their Dy. No. 107 -FA(DSIR) dated 03.07.2006.

Yours faithfully,

Sd/-

(S.BANERJEE)
Scientist 'G'

To,

Chairman and all the Members of the Working Group

Copy to:

1. PS to Chairman of Steering Committee on S&T
2. PS to Member(Science), Planning Commission
3. PS to Member-Secretary, Planning Commission
4. PS to JS (Plan Finance), Ministry of Finance
5. PS to FA, DSIR
6. All Scientist "G" in DSIR, CMDs of NRDC & CEL, Departmental Officer in-charge of PSUs and DG, CDC
7. Pay and Accounts Officer, Ministry of Science & Technology
8. Drawing & Disbursing Officer, DSIR

Sd/-
(S.BANERJEE)
Scientist 'G'

ANNEXURE 2

MINUTES OF FIRST MEETING OF THE WORKING GROUP FOR FORMULATION OF DSIR'S ELEVENTH PLAN PROPOSALS HELD ON 31ST JULY 2006 AT 2.30 P.M. IN CSIR, NEW DELHI

A Working Group Meeting to discuss the 11th Plan proposals of DSIR was held under the Chairmanship of Secretary, DSIR in CSIR Headquarters, New Delhi on 31st July 2006 at 2.30 p.m. List of participants is at Appendix.

At the outset, various officers of DSIR, NRDC, CEL and CDC made a brief presentation on the 11th plan proposals.

The observations/comments made by Committee Members thereafter and also comments sent subsequently in writing by some members are summarized below.

1. **The Chairman,** Secretary, DSIR said that DSIR is a small but very effective department. The role played by it is catalytic in nature and with its small budgetary support, it is able to establish linkages with a large number of research institutions and industrial units and encourage them to take up a number of projects of large commercial impact. He added that recognition of 1200 in-house R&D units of industry and 550 Scientific and Industrial research Organizations (SIROs) by DSIR brings it very close to industry and it is thus in a position to appreciate their concerns better. Therefore, DSIR is the most appropriate department to design programs that facilitate industrial research and technology development. He recognized that some of the on-going programmes of DSIR need a step-up e.g. TePP, International Technology Transfer and Technology Management. The chairman emphasized the importance of Public Private Partnership (PPP) wherein the programs will be catalyzed with public funds and monitored by public authorities but will be managed privately. Commenting on new initiatives proposed for the 11th plan, he said that the schemes of Small Business Innovation Research Initiative (SBIRI) (in areas other than bio-technology) and Global Research and Industry Partnership Fund (GRIPF) are good initiatives and are being discussed in various meetings and forums. GRIPF is about acquiring technology from abroad instead of developing it on our own and makes lot of sense in today's scenario.

   Appreciating that it would be unfair to expect comprehensive on-the-spot comments from members on DSIR proposals, he requested the members to take their time and e-mail their comments on the proposals with in a week's time.

2. Dr. M.D. Nair's comments on various programmes of DSIR were as follows:

   - Utilisation of funds under all the DSIR on-going programmes are below the approved outlays during the 10th five year plan. The programmes should be reviewed and fresh priorities should be set for the effective implementation of

those of high priority. Promotional activities should be focused on an identified target group and a cost to benefit analysis should be carried out using identified milestones and benchmarks.

- A detailed analysis of the business model that NRDC wants to adopt during the 11th plan needs to be carried out to ensure that this premier organisation is not only a technology transferor, but also the fountain head of applied R&D to develop commercially relevant products. It was suggested that NRDC may like to study the style of functioning of British Technology Group, the technology transfer company in UK and take up programs which promote licensing and commercialization proactively.

- With reference to SBIRI proposal and supporting small business innovation, he said that DSIR should take the lead in legislating the grant of Petty Patents to protect incremental innovations, which are of great significance to industry, a strategy adopted by many countries in both the developed and developing world. The sum total of the innovations protected by petty patents could be a major intellectual asset for the Country.

- With reference GRIPF proposal, he said that documentation and analysis of portfolios of Patents in select technology areas need to be prepared in all essential details and an agency created for not only evaluating them, but also accessing them for industrial use as well as for fresh R&D efforts with a view to create patentable innovations.

- Success of FAST scheme will depend upon the ability of the fund management to dentify potential technology winners for which an advisory group with intimate knowledge of both technology and business components should be set up.

- IPR awareness programmes need to permeate further to a wider section of the industrial segments, particularly in the SME sector.

- CDC needs to be revisited and fresh plans made to have an organization which would be productive and beneficial apart from being commercially viable. Since consultancy is an area where the private sector has successfully made major inroads, unless there are some special USPs, CDC's overall role will be questionable. The CDC should be a profit Centre and self sustaining if it is to be continued.

Dr. Nair further opined that India can definitely become an innovation hub provided we focus in select areas, where we have a niche and can make a difference.

3. Dr. A.K. Barua expressed his concern about the shortage of silicon and said that a silicon producing plant may be set up in the country. He added that CEL must work on new technologies for solar cells in the 11th plan.

4. Shri Kapila stressed on the need to strengthen the Technical Consultancy Development Programme for Asia and Pacific (TCDPAP) for which CDC is the secretariat. He also talked about developing a database of consultants and consultancy organizations working in the region who are in a position to take advantage of the global consultancy opportunities. It was added that TCDPAP should undertake training and skill up-gradation of consultants in the region on a regular basis. He also suggested TCDPAP membership may also be thrown open to corporate and individual consultants of the member countries besides consultancy organizations and necessary funds may be allocated for TCDPAP in the 11th plan.

5. Dr. Raghavan said that DSIR programmes need to be integrated into national innovation efforts. Special focus should be on commercialization and export promotion of novel products/processes in frontier areas such as nanomaterials, micro-nano composite devices, electroceramics, novel drug delivery systems, bio-photonics, sensing & imaging, renewable energy systems, novel hydrogen generation systems, etc. DSIR programmes should facilitate multi level collaborations and partnerships, easier access to resources and capabilities in public research institutions and faster commercialization of ideas. As regards Technology Development and Demonstration Programme, it was suggested to reduce the interest rate to 1%, to increase DSIR support up to 80% of project cost depending upon technological capabilities of beneficiary industry and give priority for scaling up of globally patented know-how by Indian industry. Scaling up of lab scale know-how in areas such as nano, bio, new energy, new materials and waste utilization was suggested. Also suggested was linking up with schemes such as TDB and support scale up of pre-commercialization phase of projects, as identified by experts. Also suggested was commercialization of university research towards product/technology development in areas such as healthcare, cosmetics, material science, microelectronics, micro-machines and photonics. He emphasized the importance of public private partnership and said that SBIRI is a good proposal. He further mentioned that DSIR can play an active role in commercialization of spin-off technologies from atomic energy, defense and space sectors. He also emphasized on the need to develop appropriate technologies for the North-East.

6. Lt. Gen. Mehta said that we must maintain information on Technology Deficits in the country so that we can focus on right kind of technology to be supported for development or acquisition. It was stated that Aerospace technology is the mother of all technologies and needs to be appropriately supported. He stressed on building a weather forecasting model which will help in disaster mitigation and conservation of natural resources. Building high tech clusters on the Cambridge model was also suggested. Lastly, he said that SMEs are excited in the present industrial scenario and need to be supported through appropriate Public-Private Partnership model.

7. Dr. A.T. Kusre stated that ICICI would like to be the partner in schemes where there is a provision for early stage financing. He also said that there is a need to step up the Technology Management Programme.

8. Shri N.V. Sathyanarayana said that there is no Google like portal for patent literature and therefore, proposed that DSIR should develop a portal on PPP model which has free access to all and is simple and easy for end-user navigation. He added that global information industry is a major sector of the industrial economy and is estimated at round US$310 billion (2006). Science & Technology information sector constitutes 5% of the industry, estimated at over US$ 15 billion. There is scope for building S&T information sector in India on a global scale on PPP model. Shri Sathyanarayana cited two major long-term benefits from investing in this sector: (a) visibility of Indian S&T potential and initiatives in global mainstream; and (b) India emerging as a competitive alternative in global S&T information segment.

9. Shri Arya mentioned about the schemes of DCSSI for supporting and funding SMEs. He talked about Rs. 960 crore scheme following the recommendations of National Manufacturing Competitiveness Council (NMCC) wherein 500 clusters are to be supported for lean manufacturing and 225 clusters for industrial design. He said that DSIR's help is needed to transfer the technology and train the consultants for supporting these clusters.

10. Dr. Lalit Das said that DSIR and its units are essentially propelled by able scientists and technologist. It has negligible designers who understand the conversion process from technology to marketable products & services and entrepreneurial managers who can create and understand organizations that mass produce and deliver products and services. He stated - what is required is a shift from technology transfer to 'Transfer of Technology cum Design Package'. He mentioned that export of handicrafts including hand knotted carpets from India amounted to over $3.5 billion in 2004-05 which is merely 2% of the global market for handicraft exports. He urged DSIR to consider providing quality testing, technology development, design and entrepreneurship generation facilities in all major handicraft clusters.

11. Shri Mittal said that we need support innovations the way it is done at the ignition centers in MIT, USA. He added that for development of rural technologies, costs incurred by rural entrepreneur in availing the services of labs and institutions need to be subsidized. He also stated that networking with other ministries is required for optimum utilization of resources.

12. Dr. Amit Biswas mentioned that we need to carry out IP landscaping and judiciously determine gaps that can be plugged by DSIR. He talked about IP analysis and developing skills to write patents. He said that GRIPF is a good initiative and for implementing the initiative, we can perhaps learn from China. It

was stated that China is the only country which has been able to convert nano-technology into business. He suggested Indian companies co-operating with emerging Chinese companies. Lastly, he talked about 6-sigma or in other words measuring or quantifying innovations so as to decide and prioritize, which ones to support.

13. Dr. Gopal said that NRDC's Rural Technology Demonstration cum Training Centres can play a useful role in providing employment to women and development of women entrepreneurs.

14. Dr. O.P. Agarwal ICMR supported NRDC's proposed venture capital funding initiative to promote development of new generation products.

15. Shri John Thomas said that SMEs should build technology as a resource through joint research programmes.

16. Dr. Renu Swarup said that SBIRI in areas other than bio-technology is a good initiative but efforts should be made to avoid overlaps since biotechnology cuts across various disciplines. It was suggested that the possibility of strengthening the IPR system in terms of human resource as well as infrastructure, especially in university system should be explored. She added that under the Techno-entrepreneur Promotion Programme, there should be a special thrust on grass root innovations.

After listening to everybody's comments, the Chairman, Secretary, DSIR thanked everybody for their useful contributions. He said that an internal meeting would be held in DSIR to give definite shape to the DSIR's 11^{th} plan proposals which would be discussed in the next meeting.

The meeting ended with thanks to the Chair.

APPENDIX

LIST OF PARTICIPANTS

1. **Dr. R.A. Mashelkar, Secretary, DSIR - Chairman**

2. Shri H.K. Mittal, DST
3. Dr. Renu Swarup, DBT
4. Shri J.K. Arya, DCSSI
5. Dr. A.K. Gopal, Director (NIPCCD), M/o of Women & Child Development
6. Dr. K.V. Raghavan, Chairman (RAC), DRDO
7. Dr. Amit Biswas, Reliance Industries Limited
8. Dr. M.D. Nair, Consultant to Pharma Industry
9. Lt. Gen. S.S. Mehta (Retd), CII
10. Shri Anjan Das, CII
11. Shri John Thomas, FICCI
12. Shri A.T. Kusre, ICICI
13. Shri N.V. Sathyanarayana, Informatics India Limited
14. Dr. Lalit Kumar Das, I.D.D Centre, I.I.T Delhi
15. Shri K.K. Kapila, Intercontinental Consultants and Technocrats Pvt. Ltd.
16. Dr. Ashok Barua, Indian Association for Cultivation of Science
17. Dr. O.P.Agarwal, CSIR Emeritus Scientist, ICMR
18. Dr. A.S. Rao, DSIR
19. Shri R.R. Abhyankar, DSIR
20. Smt. S. Ravindran, DSIR
21. Smt. Jyoti S.A. Bhat, DSIR
22. Shri Subrata Banerjee, DSIR
23. Shri Rajkumar, DSIR
24. Dr. S.K. Kulshrestha DSIR
25. Dr. K. Kamal, DSIR
26. Shri Vibhu Rashmi, DSIR
27. Shri K.V.S.P. Rao, DSIR
28. Shri Rakesh Bhartiya, DSIR
29. Shri Somenath Ghosh, CMD, NRDC
30. Dr. S.K. Kaicker, CMD, CEL
31. Shri Deepak Agarwal, DG, CDC
32. Shri S.V. Subbarao, CDC

33. Shri Ashwani Gupta, DSIR - Member Secretary

ANNEXURE 3

MINUTES OF SECOND MEETING OF THE WORKING GROUP FOR FORMULATION OF DSIR'S ELEVENTH PLAN PROPOSALS HELD ON 29th AUGUST 2006 AT 11.30 A.M. IN CSIR, NEW DELHI

Second meeting of the working group to discuss the 11th Plan proposals of DSIR was held under the Chairmanship of Secretary, DSIR on 29th August, 2006 at 11.30 a.m. in CSIR Headquarters, New Delhi. A list of participants is given at Appendix 1.

1. The meeting started with a discussion on the minutes of the first meeting held on 31st July, 2006. Highlights of the discussions held are given below:

   i. Regarding carrying out cost-benefit analysis of DSIR programs, the Chairman, Secretary, DSIR suggested that parameters for evaluation of the performance and outcome of scientific and technical work/schemes need to be clearly defined because the benefits that accrue from scientific and technical work/schemes are tangible as well as non-tangible. In this connection, he referred to Kelkar Committee Report on performance analysis of CSIR laboratories and suggested DSIR or the agency, which is assigned the responsibility to conduct cost-benefit analysis to consider the recommendations made in the Kelkar Committee Report.

   ii. Regarding "legislating grant of petty patents", it was stated that this subject comes under the purview of Department of Industrial Policy and Promotion (DIPP) and accordingly, a letter may be sent to DIPP for their consideration and necessary action.

   iii. Regarding "measuring and quantifying innovations", it was clarified that there is a need for evolving a systematic mechanism for proper screening of innovative ideas so as to segregate those ideas which have the potential to go through the process of pilot up-scaling and commercialization. This would help in proper utilization of funds and resources in supporting innovations.

   iv. The suggestions made regarding Technology Development and Demonstration Programme, viz. reduction in interest rate of repayment of funds to 1%, increasing percentage of DSIR support to 80% of project cost, and focus on the identified thrust areas were agreed to. It was added that DSIR support in this programme is not restricted to SMEs or small businesses but can be extended to large scale companies also. Further, it was agreed that DSIR support may not be restricted to companies alone but may also be extendable to public funded institutions.

   v. Regarding setting up a Google like Science Portal, it was said that it would create a new market in the global S&T information market place and it is the most opportune time for launching such an initiative on a PPP model.

vi. On NRDC, it was said that NRDC must proactively source new technologies that have higher commercialization potential.

vii. On self sustenance of CDC, the Chairman enquired about the dependence of CDC on government grant. It was stated that CDC's dependence on government grant has reduced to around 35% today compared to around 80% about 3 years ago.

viii. As regards transition of the country from the status of technology recipient to technology donor, formation of Chartered Technology Auditors and a resource pool that would tap the un-codified knowledge available with experts in various spheres of life was suggested.

Having confirmed that everybody's views and observations have been adequately addressed, the Chairman took up discussions on the 11th plan proposals of DSIR.

2. The TePP proposal stated that 10,000 new ideas would be accessed and 1,000 innovations would be supported. It was clarified that 10,000 ideas imply raw ideas and whether they are new or not would be assessed only after scrutiny. Thus, it was said that "new" may be deleted from "new ideas" used in the proposal. Further, it was added that creativity may be promoted in existing institutions such as NIF and through activity based support rather than establishing a new institute.

3. Regarding International Technology Transfer Programme, it was stated that Indo-Australian Bi-national Industrial Research and Development (BIRD) programme would be implemented by DSIR. DSIR would participate in the collaborative projects between Indian and Australian industries for which Australia has committed about 2 million Australian dollars. The BIRD fund would help in development and subsequent commercialization of innovative technological products and processes from which both, Australian and Indian companies can expect to derive benefits commensurate with investments and risks. Grant from BIRD fund would have to be paid back with interest if revenues are generated from the R&D project.

Further, it was pointed out that merchandize export target for 2006-07 is US$ 126 billion instead of US$ 120 billion mentioned in the background document circulated for the meeting.

4. Regarding the new initiative, viz. Fund for Accelerating Start-ups in Technology (FAST), it was said that this initiative is to prepare companies for venture capital funding. The Indus Entrepreneurs (TIE), Hyderabad chapter, which is proposed to be a partner in the initiative will provide the necessary guidance for venture capital funding.

5. Regarding the new initiative, Small Business Innovation Research Initiative (SBIRI), it was said that the title need not specify "in areas other than bio-technology" but adequate care to be taken to avoid overlaps with DBT scheme. It was stated that projects in traditional sectors in which there is lack of application of new technology such as coir, spices and cashew processing may be also supported under SBIRI. Further, there

should be no bar on supporting inter-disciplinary projects by DSIR where bio-technology is a minor component in the overall project. It was also suggested that implementation of the scheme in DBT may be carefully studied so as to identify areas which have hindered the implementation of the scheme (e.g. definition of small business viz. that employing up to 500 persons is being considered for review in DBT) and the same may be resolved while formulating the DSIR proposal.

6. As regards the initiative on IPR Programme, it was said that the budget outlay needs to be amended. The Chairman observed that patent infringement court cases, included in the outlay involve complex legalities and DSIR may stay away from them. It was stated that softwares have been developed by US based companies viz. MCAM (CEO-Mr. David E. Martin) and SAS which help companies in conducting patent searches affordably. It was suggested that DSIR may propose to acquire such softwares and make it available for use by the industry and institutions.

7. As regards the proposed women's programme, a written note received from the Ministry of Women and Child Development talks about drudgery reduction of women through use of technology. It states that the NRDC scheme on Promotion of Rural and Household Technologies can be used to demonstrate and exhibit modern technologies related to rain water harvesting, sprinkler based irrigation systems, herbal products etc. to improve the livelihood of womenfolk. Also, NRDC's rural technology demonstration cum training centers can be used to provide training to self help groups of women.

8. A written note received from CII recommended that DSIR should support at least 250 technology development projects in the 11th plan. Further, a bank of consultants in select areas may be developed who may be available to help industry in technology source identification, technology development process, technology transfer, commercialization and marketing.

9. On CEL, it was opined that up-scaling of production capacity of solar cells & modules to 25 MW may be inadequate in view of the rising demand for SPV products and systems. CMD, CEL stated that up-scaling beyond 25 MW would be much easier and would be taken up after completion of the present up-scaling from 2 MW to 25 MW.

10. On NRDC's new initiatives, it was said that NRDC must facilitate venture capital funding and even co-invest with VC funds to encourage technologists, entrepreneurs and professionals to take up risky ventures. The other initiative of NRDC to develop basic engineering design packages for technologies licensed to NRDC so as to attract entrepreneurs to take them up for further up-scaling was also supported by the working group.

Thus, the working group broadly agreed to the DSIR 11th plan proposals amounting to Rs. 1153 crore, given in Appendix 2.

The meeting ended with thanks to the Chair.

APPENDIX-1

LIST OF PARTICIPANTS

1. **Dr. R.A. Mashelkar, Secretary, DSIR - Chairman**

2. Shri Nirmal Singh, Department of Commerce
3. Shri Chandan Saha, DCSSI
4. Dr. A.K. Gopal, Director (NIPCCD), M/o of Women & Child Development
5. Dr. K.V. Raghavan, Chairman (RAC), DRDO
6. Dr. Amit Biswas, Reliance Industries Limited
7. Dr. M.D. Nair, Consultant to Pharma Industry
8. Dr. U.P. Phadke, DIT
9. Shri John Thomas, FICCI
10. Shri N.V. Sathyanarayana, Informatics India Limited
11. Dr. Lalit Kumar Das, I.D.D Centre, I.I.T Delhi
12. Dr. O.P.Agarwal, CSIR Emeritus Scientist, ICMR
13. Shri G.K. Moinudeen, CII
14. Smt. J. Khurana, DIT
15. Dr. A.S. Rao, DSIR
16. Shri R.R. Abhyankar, DSIR
17. Smt. S. Ravindran, DSIR
18. Smt. Jyoti S.A. Bhat, DSIR
19. Shri Subrata Banerjee, DSIR
20. Dr. S.K. Kulshrestha DSIR
21. Dr. K. Kamal, DSIR
22. Shri G.M. Bagai, DSIR
23. Shri Somenath Ghosh, CMD, NRDC
24. Shri Bimal Kumar, NRDC
25. Dr. S.K. Kaicker, CMD, CEL
26. Shri S.V. Subbarao, CDC

27. Shri Ashwani Gupta, DSIR - Member Secretary

APPENDIX-2

PROPOSED OUTLAY FOR DSIR 11TH PLAN PROPOSALS

Rs. in Crore

S.No	Programme	11th Plan Outlay
	TPDU (On-going)	
1	Industrial R&D Promotion Programme	2.5
2.	Technology Development and Innovation Programme Technology Development & Demonstration Programme Technopreneur Promotion Programme (TePP)	 60 30
3.	Int'l Technology Transfer Programme including APCTT	30 14
4.	Consultancy Promotion Programme	30
6.	Technology Management Programme	50
7.	Technology Information Facilitation Programme	29
8.	IT Activities	5
9.	Women's Programme	6.5
	TOTAL	**257**
	New Initiatives	
10.	SBIRI other than Bio-technology	500
11.	Fund for Accelerating Start-ups in Technology (FAST)	75
12.	IPR Programme	100
	Total	**932**
13.	**CEL**	**43**
14.	**NRDC**	**168**
15.	**CDC**	**10**
	Grand Total	**1153**